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REGIONAL INSTITUTE FOR POPULATION STUDIES
AT THE
UNIVERSITY OF GHANA

CAESAREAN SECTION DELIVERIES IN GHANA: TRENDS, DISPARITIES AND INFLUENCING FACTORS

BY

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LEGON, IN PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE AWARD OF PHD POPULATION STUDIES DEGREE

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ACCEPTANCE

Accepted by the College of Humanities, University of Ghana, Legon, in partial fulfilment of the requirement for the award of PhD (Population Studies degree).

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DECLARATION

I, CHRISTIANA NAA MOMO LOKKO, hereby declare that, except for references to other people's work which have been duly acknowledged, this is the result of my own research and it has neither in part nor in whole been presented for another degree.

…… ……....

CHRISTIANA NAA MOMO LOKKO DATE

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ABSTRACT

C-section births have been increasing, yet disparities exist in the rates spatially and among socioeconomic sub-groups globally. Wide C-section disparities mirror a situation of overuse or underuse of the procedure with implications for maternal mortality. Factors associated with the C-section rise and disparities have not been well documented**.** The determinants of C-section rise and disparities have focused extensively on individual, institutional and medical factors to the neglect of influence of beliefs and community factors. The study examines the levels and trends as well as the influence of beliefs of childbearing women (women aged 18-49 who had a child in the last five years) and community factors on C-section rise and disparities in Ghana. The study employed mixed research methods approach. The quantitative method used the GDHS datasets of 2003, 2008 and 2014. The qualitative methods employed key informants in-depth interviews with health workers and childbearing women respectively from Greater Accra and Northern regions of Ghana as a case study. SPSS version 20 software was used to analyse the quantitative data and Nvivo version 11 software was used to analyse the qualitative data. The findings indicate that C-section rate in Ghana has increased from 9.8 percent in 2003 to 18.2 percent as at 2014, and it is above the recommended WHO threshold of 15 percent. Drawing on the Socio-Ecological Model, the study suggests that C-section rise and disparities could be attributed mostly to individual, interpersonal, community and medical factors. The results of the qualitative data revealed that Ghanaian women were similar on the score of susceptibility to labour pains, perceived severity to C-section, cues to action and community beliefs. Women differ on the score of perceived barriers and perceived benefits of C-section delivery. Women in the Northern and Greater Accra regions identified beliefs and financial barriers respectively as obstacles to C-section delivery. The regression analysis suggests that community-level factors did not predict C-section delivery. However, community belief was identified in the qualitative study to have influenced C-section delivery. Women aged 35-49 years, wealthy, educated and those who have had a history of previous C-section were more likely to have C-section delivery. Similarly, women whose partners accompanied them to ANC visits were more likely to deliver by C-section. Further, women who had average-sized babies and multiparous are less likely to have C-section. Individual, interpersonal and medical factors were significant predictors of C-section rise and disparities. These findings could have implications for maternal mortality. Low C-section levels in community with negative C-section beliefs and the high C-section delivery among wealthy educated women could have negative implication for both infant and maternal mortality. It is therefore important to consider in maternal health interventions, the predictors (such beliefs) of C-section delivery to ensure that C-section is provided and accepted for medical reasons.

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DEDICATION

To My

Husband

Francis Obodai Lokko

And

Children

Nii Adom Lokko, Naa Amerley Lokko and Nii Barnor Lokko

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LIST OF ABBREVIATIONS

SDG	Sustainable Development Goal
NGO	Non-Governmental Organization
RIPS	Regional Institute for Population Studies
UG	University of Ghana
GHS-ERC	Ghana Health Service Ethical Review Committee
GDHS	Ghana Demographic and Health Survey
SSA	Sub-Saharan Africa
EmOC	Emergency Obstetric Care
WHO	World Health Organization
UN	United Nations
HBM	Health Belief Model
SEM	Social Ecological Model
TBA	Traditional birth attendant
IDIs	In-depth interviews
KII	Key Informants Interview
ECH	Ethical Committee of Humanities
ANC	Antenatal care

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CHAPTER ONE

INTRODUCTION

1.1 Background

The changing trend in child delivery is a global concern because of the rapid rise of caesarean section (C-section) delivery in some parts of the world and extremely low rates observed in other parts (Cavallaro, 2015; Victora, Barros, & Ronsmans, 2013). Child birth is one of the significant issues for human beings and generations of the world, because it is the only means through which human population is replaced. There are two major processes of child delivery - natural and caesarean. The process through which child delivery naturally occurs, is called vaginal delivery (Cunningham et al., 2010), whilst C-section is delivery of a child through incisions in the uterus (Gjonej et al., 2015; Mohtasham & Afshari, 2013; WHO, 2009). Although both are methods of child delivery, C-section is to be used only to save lives when complications arise during pregnancy and labour (Betrán et al., 2015). The rate of C-section deliveries is calculated as a percentage of all births and is used as an indicator for measuring availability and utilization of obstetric care services (Chordate, Javadi, & Ahmadi, 2016). There is no agreement on the optimum C-section rate, but it is critical to ensure necessary C-section for those who really need the intervention.

Access to necessary caesarean section (C-section) is a hallmark of an effective essential and emergency obstetric care (EmOC). As a result, in order to attain the Sustainable Development Goal (SDG) 3 on reducing maternal and infant mortality and morbidity, there has been prioritization of EmOC in many low- and middle-income countries (Molina et al., 2015). However, about three decades ago, many high- and middle-income countries began to experience escalating rise in C-section delivery rates far above the United Nations' (UN) 15 percent threshold. So, in

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1985, reproductive health experts at a meeting organized by the World Health Organization (WHO) in Fortaleza, Brazil concluded that there was no reason for any country to have C-section rate lower than five percent and higher than 15 percent (WHO, 2015). Yet, three decades later, the optimal C-section rate remains controversial in many high-, middle- and low-income countries, with population-level C-section delivery rates ranging between one percent in Niger (Gulati & Hjelde, 2012) and 56 percent in Dominican Republic (Betrán et al., 2015).

C-section delivery rates have progressively increased in many low-, middle-, and high-income countries over the last three decades. Studies estimated that, the average C-section rate was approximately 15 percent in 2007 (Torloni et al. 2013), 12 percent in 2012 (Tunçalp et al., 2013) and reached a record high of 19 percent in 2014 (Betrán et al., 2015). These current regional estimates suggest that globally, approximately one in every five women gives birth by C-section (Betrán et al., 2015).

There are diverse opinions on why C-section rate has risen so rapidly in most parts of the world. Authors on one hand concluded that, changes in C-section rates are in part due to changes in maternal characteristics such as maternal higher education, parity, urban living, wealth and advanced maternal age (Chordate, Javadi, & Ahmadi, 2016; Long et al., 2013; Nasir, 2015; Wang, Xu, Baker, Tong, & Zhang, 2016). In contrast, other researchers have highlighted health institutional factors as the main determinanats of the problem, suggesting that the rise in C-section deliveries is largely caused by private health-care providers whose aim is to make money off the procedure (Nazir, 2015; Orsi et al., 2010). Total spending on C-section globally has undoubtedly risen radically and the technique has become an important source of revenue for private hospitals (Gibbons et al., 2010). On the other hand, some researchers have also emphasized medical considerations as the key factors contributing to the rise, especially maternal indications like

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cephalopelvic disproportion, previous C-section, eclampsia, failed induction of labour and placenta previa. Also, foetal distress, breech presentation, foetal macrosomia, and complication due to multiple foetuses have been indicated to have contributed to the rise (Akessa & Muleta, 2015; Al Rowaily et al., 2014; Molina et al., 2015; Pallasmaa, 2014; Tapia, Betran, & Gonzales, 2016; Volpe, 2011). On the extreme end of the spectrum, few studies suggest that beliefs are the major cause of the problem, arguing that the rise is due to community misconception that caesarean delivery is healthier for babies, give better wages for physicians and fear of litigation by physicians in the case of difficulty (Guzman, Ludmir, & DeFrancesco, 2015). Other causes of the rising C-section rates have been found to be fear of labour pains (Gallagher, Roudsari, Zakerihamidi, & Merghati Khoei, 2015; Shi et al., 2016) and fear of child birth (Akintayo et al., 2014; Hou, Sabah Rakhshani, & Iunes, 2014).

In Ghana, there are few studies on C-section deliveries and most of these studies were based on which of the mode of child delivery Ghanaian women preferred. These studies indicate that most Ghanaian women prefer vaginal delivery to C-section with only four percent of deliveries attributed to C-section (Adageba & Danso, 2008; Danso et al., 2009). However, a study in 2010 indicated that C-section rate at the Korle Bu Teaching Hospital in Accra was 35 percent (Gulati & Hjelde, 2012). The high rate is not surprising because this is a referral hospital and the biggest public hospital in Ghana. This rate is however not a representative sample of Ghana as a nation and therefore cannot be generalised to the whole country (Gulati & Hjelde, 2012).

Despite marked improvements in the overall health of the population, disparities in access to health such as C-section interventions persist across sub-populations across and within countries (Zuvekas & Taliaferro, 2003). Globally, disparities in health and lack of optimal care for vulnerable groups continue to be a point of debate for demographers, healthcare providers and

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scholars (Cameron, Carmargo, & Hungler, 2014). So, goals to reduce any form of disparities in health are the focus of several global policies including the SDGs. Although the use of C-section globally has increased to very high levels, the above picture indicates that the gap in access to C-section between high- and low-income countries still remains. There are urban-rural and socio-economic differentials in C-section rates in many countries (Rezaeisardari et al., 2014). This variation also exists in Ghana where there is a gap in access to C-section between the women in northern and those in southern Ghana (Ghana Statistical Service, Ghana Health Service, & ICF-International, 2015). Yet, little is known about the factors driving these C-section deliveries, hence this study highlights the factors influencing the C-section deliveries in Ghana.

1.2 Statement of the Problem

The changing trends in child delivery pose essential public health challenges to many high-, middle-, and low-income countries. Evidence show that the number of C-sections being done globally has increased to unprecedented levels, currently at 19 percent of all births worldwide (Temmerman, 2016). In some regions of the world, including Eastern Asia and South America, population level C-section rates are up to about half of all births, resulting in millions of women undergoing unnecessary surgery (Temmerman, 2016). However, few countries still have low C-section rates while other countries are observing wide disparities in their C-section rates (Cavallaro, 2015).

According to Cavallaro, Victora, Barros, & Ronsmans (2013), both low and high C-section rates, as well as disparities in access to C-section, pose major public health challenges. The low C-section rates may mirror women's lack of access to emergency obstetric care and the latter may indicate overuse of C-section surgery (Kyu, Shannon, Georgiades, & Boyle, 2013; Long et al.,

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2013). Since C- section is a surgical procedure that is sometimes associated with adverse maternal and perinatal health outcomes and also may divert scarce health care resources from other medical priorities in many resource-poor developing countries, unnecessary C-section should not be encouraged by any region as noted by Betran et al., (2015), Long et al., (2015) and Wilmink et al., (2010).

Scholars estimate that annually, 18.5 million C-sections are performed globally, however 3.2 million additional C-sections were needed in 54 countries and 6.2 million unnecessary C-sections were done in 69 countries (Pallasmaa, 2014; Hou et al., 2014; Xing Lin Feng et al., 2012). The cost of the global unnecessary C-sections was estimated to be 2·32 billion U.S. dollars while that of global deficits of C-sections was about 432 million U.S. dollars in 2010 (Gibbons et al., 2010). These estimates indicate that, the economic cost of unnecessary C-section can cover more than five times the required finance for the unmet C-section needs (Vogel, Seuc, Betrán, & Souza, 2013). Consequently, the burden of unnecessary C-section on the health system can set up potential barriers to provide coverage of necessary care for disadvantaged women and can create marked inequality within maternal and perinatal health outcomes (Vogel, Seuc, Betrán, & Souza, 2013). At the population level, the recommended minimum necessary C-section rate to avoid death or severe morbidity to the mother is estimated to be five percent (Gibbons et al., 2010) and for both mother as well as neonatal outcomes it tends to improve up to a C-section rate of 10 percent. It has also been shown that, neonatal and maternal morbidity is not reduced when the C-Section rate exceeds 15 percent. Rather, a higher C-section rate is associated with higher mortality and morbidity in mothers and neonates (Gibbons et al., 2010). Accordingly, there has been a review of the optimum C-section rate from 5-15 percent, to 10-15 percent by WHO's consensus conference in 1992 (WHO, 1992). However, only approximately 10 percent of the countries in the

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world have a C-section rate of 10-15 percent, which is the required WHO C-section threshold rates (Gibbons et al, 2010). Again, costs of C-section may also strain individual patient resources for out-of-pocket expenses such as medication, hospitalization and physician fees (Nazir, 2015).

No single factor can explain the unnecessary C- Section deliveries. However, researchers indicate that, they are high in middle– and high–income countries among women of high economic standing, those advanced in age, and those who deliver at private hospitals. Meanwhile, recent evidence highlights wide disparities in C-section rates both between and within countries (Cavallaro et al., 2013), ranging from 0.4 percent to 40 percent of all births (Kyu et al., 2013). A study across 31 European countries in 2010 indicates that there was more than a 3-fold disparity in C-section rates, from 14 percent at the lower end to 52 percent at the higher end (Macfarlane et al., 2015). Similarly, a U.S. study showed that the rate for C-section varied from seven percent to 70 percent across 573 hospitals nationally and this variation was fifteen-fold (2 percent to 36 percent) for low risk women (Kozhimannil, Arcaya, & Subramanian, 2014). This variance raises three arguments which are of public health concern. Firstly, it highlights the performance and quality of EmOC services in a country, as extreme C-section rates are indicators of obstetric care performance and quality (Sinnott, Brick, Layte, Cunningham, & Turner, 2016; Turner, 2011). Secondly, variations within countries point to the fact that gains made in maternal and infant mortality could be compromised. Thirdly, variation is likely to undermine any gains made in achieving Sustainable Development Goal (SDG) 10 which seeks to reduce all forms of inequalities (Molina et al., 2015; World Health Organization, 2015).

This implies that all women irrespective of their background, must receive necessary C-section intervention so as to save lives. This is to ensure that targets set for the reduction of child and maternal mortality are achieved, which are enshrined in the SDG 3, which seeks to ensure healthy

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lives and the promotion of wellbeing for all at all ages (Molina et al., 2015; World Health Organization, 2015).

In most middle- and high-income countries, increasing C-section rates have been an issue of concern, but in low-income countries like Ghana, the challenge is both the rise in the C-section rates and the wide disparities in C-section rates (Cavallaro, 2015; Ronsmans et al., 2006). In Ghana, C-section rate has more than tripled in just a decade from 3.7 percent in 2003 to 11.4 percent in 2014 (Ghana Statistical Service et al., 2015; Ghana Statistical Service, Noguchi Memorial Institute for Medical Research, & ORC Macro, 2004). Apart from this rise, there are also wide disparities in the C-section rates across the regions of the country. This may be an indication of overuse of the intervention in one part of the country and lack of access of the procedure in other parts of the country. This is very worrying, as some women and neonates may be dying due to lack of access to C-section intervention. The high rate of C-section in some parts of Ghana could also be as a result of high concentration of EmOC facilities, gynaecologists, high female education and economic status of the women in the region compared to the Northern Region and others.

In Ghana, although there has been a rise in C- section births and wide C- section disparities across the various regions within the country, over the period of 1991 to 2016, none of the ten identified published studies conducted in Ghana on C- section examined the phenomenon of increasing C-section delivery. Moreover, all these articles were conducted in hospital settings, using either qualitative or quantitative methods (Adageba & Danso, 2008; Adanu & MacCarthy, 2007; Amporfu, 2014; Danso et al., 2009; Danso & Adu-Sarkordie, 1998; Gulati & Hjelde, 2012; Mensah, Mogale, & Richter, 2014; Mock, Visser, Elkins, & Wilson, 1991; Oppong, Tuuli, Seffah, & Adanu, 2014; Tunçalp et al., 2013). Studies have shown that there exists a relationship between

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individual, medical, institutional factors and mode of child delivery among subpopulations (Kottwitz, 2014; Long et al., 2015; Mancuso et al., 2008; Nippita et al., 2015; Roth & Henley, 2012). Unfortunately, these studies which have explored the factors driving C-section deliveries have not proved if community factors could also influence mode of child delivery. However, a review of health literature indicates that, the community in which a person lives could influence her health behaviours. McLeroy, Bibeau and Steckler, (1988) opined that, health is influenced by multiple factors and so a study which looks at the influence of multiple factors on health outcome is important, since such researches are good in clarifying linkages between various characteristics and health outcomes. In his study, Wang (2003) proposed that there is the need to conduct studies on health outcome at different levels, in order to provide empirical evidence to inform policies that could improve health outcomes. Also, although the influence of community factors on mode of child delivery has largely been ignored in C-section studies, it has been explored in infant and maternal health researches (Adedini, 2013; Ejembi, Dahiru, & Aliyu, 2015; Yebyo, Gebreselassie, & Kahsay, 2014). In recent years, scholars have demonstrated that, contextual factors in particular could shape the attitudes and behaviours of individuals. Therefore, such factors need to be explored in all health behaviours, if possible. Moreover, the extent to which these factors contribute to this rise of C-section remains poorly understood because earlier studies were limited in scope and did not assess the contribution of factors such as community factors to the problem.

Furthermore, studies on drivers of current C-section trends have largely been done in a more institutional driven framework, making it difficult to generalise findings of one hospital to the rest of the community. This therefore makes it difficult to draw conclusive policies on researches based on such small samples. Again, majority of these studies have adopted either qualitative or

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quantitative approaches ignoring the fact that mixed methods approach could be adopted to provide a more comprehensive understanding to the problem.

Only few studies have been conducted to identify community-level and interpersonal-level factors accounting for C-section deliveries (Roth & Henley, 2012). In recent times, policymakers have sought not only to improve populations' health, but also to reduce or eliminate disparities in health outcomes (Arcaya, Arcaya, & Subramanian, 2015). This has necessitated the study of disparities in many health outcomes such as disparities in infant mortality, maternal mortality and non-communicable diseases (Liss & Baker, 2014; Loggins, 2013; Obot, 2010; Weedn, Hale, Thompson, & Darden, 2014). These studies have mainly focused on individual and institutional characteristics, ignoring the community in which the woman resides as well as other factors such as the prevailing health policies. The present study therefore examines C-section deliveries in Ghana focusing on the levels and trends, beliefs, as well as community factors influencing them.

1.3 Research Questions

The present study examined C-section deliveries in Ghana focusing on the levels and trends, beliefs as well as community factors influencing the C-section deliveries.

The study answers three basic research questions:

i. What are the spatial levels and trends of C-section deliveries in Ghana from 2003 to 2014?
ii. What are the beliefs of childbearing women on mode of child delivery?
iii. What are the community-level factors driving C-section deliveries in Ghana?

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1.4 Rationaleof the Study

C-section birth is a major operation with risks to both mother and neonate. Higher infant and maternal morbidity and mortality rates have been shown with cesarean births (Puia, 2015). In fact, the elevated cesarean birth rate is believed to be a contributing factor to the significant increase in the maternal morbidity rate between 1998 and 2011 (Callaghan, Creanga, & Kuklina, 2012). C-section disparities on the other hand remain a daunting challenge in many low-income countries, including Ghana. In 2016, Ghana set an ambition target of reducing maternal and neonatal mortality from 319 to 70 per 100,000 livebirth and 26.9 to 12 per 1000 livebirth respectively by 2030 as enshrine in the SDG 3. The high, low as well as wide C-section rates have the potential to erode any gains made in achieving this set target (Ghana Health Service, 2016). In low-income countries, research suggests that there are disparities in the access to C-section (Cavallaro, 2015). The SDG 10 indicates that, removing disparities in access to lifesaving C-section is key to achieving SDG 3, which is the target for reducing maternal and infant mortality (Loewe & Rippin, 2015).

In addition to this, Ghana is particularly relevant to this discourse of C-section deliveries due to the current rise in C-section delivery in just a decade, and the wide disparities observed in the rates of delivery by C-section which seem to have persisted over time between the Northern and the Greater Accra regions. A quantitative study to determine the community-level factors influencing the C-section deliveries in Ghana and a qualitative study to ascertain the beliefs of childbearing women (women aged 18-49 who had a child in the last five years) in Greater Accra and Northern regions on the different modes of delivery is useful in providing a holistic understanding of the problem in a Ghanaian context where beliefs are likely to shape the health seeking behaviour of the people and for targeting particular subgroups for interventions.

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This study helps clarify how to intervene differently in the two contexts, which is low C-section delivery community and high C-section delivery community. The findings may highlight the need to treat women resident in southern and northern of Ghana as subpopulations uniquely and differentially vulnerable to the problem of C-section disparities. In other words, this study helps to ascertain if truly, people in these different residential contexts experience C-section delivery differently and if so, whether it is as a result of the community in which they live or even due to their beliefs on the mode of delivery.

The study is also beneficial to population scientists who can use this study's outcome as a guide in the analysis of health disparities among the various subpopulations in a holistic manner. This study can also be used by research communities as a foundation for further research. Also, it was to inform policy makers and Non-Governmental Organizations (NGOs), who have interest in addressing public health issues such as child and maternal health in Ghana on where to target health interventions, in order to achieve value for resources.

Overall, this study aims to extend the current knowledge on the drivers of C-section deliveries by exploring other factors such as community drivers of C-section deliveries in a more population-driven framework using a mixed method approach. It is hoped that this study will inform policy and also impact on the reduction of C-section disparities in Ghana for the enhancement of perinatal and maternal health outcomes.

1.5 Research Objectives

The main objective of this study is to examine the C-section delivery trends and factors influencing C-section deliveries in Ghana. Specifically, the study seeks;

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i. To describe the spatial levels and trends in C-section deliveries in Ghana from 2003 to 2014.

ii. To examine the beliefs of childbearing women on mode of child delivery.

iii. To identify the community-level factors driving C-section deliveries in Ghana.

1.6 Organization of the Thesis

This thesis is organized in eight chapters. Chapter one presents the background and basis of the study. This also covers the statement of the problem, the rationale behind the study, the research questions that address the problem and the objectives that guided the study.

In chapter two, the review of research literature on C-section trends and influencing factors to identify key findings and research gaps are presented. The review centres on C-section trends and factors previously found to influence C-section deliveries such as individual and institutional factors. This chapter discusses theories that have been used in C-section literature and theories underpinning this study.

Chapter three presents the research methodology and data analysis of the study. This chapter describes the design of the study, sampling techniques and the research tools used in the qualitative study. The instruments for the qualitative study focus on the construct of the Health Belief Model to measure the beliefs of childbearing women (women aged 18-49 who had a child in the last five years) on the various modes of child delivery. The plans for binary logistic regression analysis of the various factors and ethical issues were also described. The databases used for the quantitative study consist of the 2003, 2008 and 2014 Ghana demographic and health survey data collected from women who gave birth in Ghana, to establish any caesarean birth trends and factors influencing mode the of child delivery. Data for the qualitative study consisted of in-depth

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interviews (IDIs) to establish the beliefs of women in high C-section delivery settings and low C-section delivery settings on mode of delivery. Also, the profile of the study area is described to provide a sound foundation for the suitability of the chosen sites for the current study.

In chapter four, the profile of the study sample for both the quantitative and qualitative studies were described. The chapter also describes the characteristics of respondents based on the variables in the model using frequency distributions and summary tables.

Chapter five uses the GDHS within the period of 2003-2014 to establish trends of C-section deliveries in Ghana. Variables analysed include: individual-, interpersonal -, institutional-, and community-level factors while controlling for confounding variables using trends, graphs, and charts. This chapter also seeks to establish whether the observed trends are statistically significant.

Chapter six focuses on the beliefs of childbearing women from the Northern and the Greater Accra regions on the different modes of child delivery that might have influenced the observed disparities. This is explored using IDIs from the qualitative part of the study underpinned by the HBM.

Chapter seven investigates the relationship between community factors such as region of residence, place of residence, community-level maternal education and community-level poverty, and C-section delivery while controlling for the relevant factors using the 2014 GDHS. This chapter also establishes the extent to which community-level factors account for C-section deliveries in Ghana.

The summary of this study's findings, the conclusion and recommendations for further action are given in the eighth chapter of this study. Finally, other important details are presented in appendices.

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CHAPTER TWO

LITERATURE REVIEW

2.1 Definition and Historical Overview of C-section Delivery

C-section delivery has been part of human culture since ancient times and there are tales in both western and non-western cultures of this procedure (Lurie, 2005; Sewell, 1993). According to Greek mythology, Apollo removed Asclepius, founder of the famous cult of religious medicine from his mother's abdomen. Again, several references to C-section deliveries appear in early Egyptian, Chinese, Hindu, Roman and other European folk tales (Sewell, 1993). However, the first written evidence of C-section birth dates to the era of Hammurabi from 1795 to 1750 BC, reporting the birth of a male child who was pulled out of the womb of a deceased woman. The name *section Caesarea* first appeared in print and was used by a French obstetrician Guillimeau in 1598, during which the operation was used to deliver live babies from dead mothers (Pallasmaa, 2014). Following his publication on midwifery, Guillimeau introduced the term "section" which led to the name of caesarean operation being changed to C-section (Sewell, 1993).

However, literature suggests that there are three different accounts about the source of the name of the operation. The first explanation was provided in 715 BC when a Roman King, Numa Pompilius ordered that all women who were destined to die by childbirth must be cut open to remove the baby hence, caesarean operation (Sewell, 1993). The second explanation indicated that Julius Caesar was delivered by C-section and given the name Caesar. This is considered unlikely because his mother is known to have been alive during Julius Caesar's adulthood and during his reign about 100 BC, where no woman is known to have survived the operation (Todman, 2007). The third account which is the more plausible explanation to the origin of the name C-section is that, C-section is derived from two Latin words "caedere" and "seco" both meaning to cut

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(O'Sullivan, 1990). As both words mean to cut, most scholars believe that C-section which is a method of child delivery where birth is done through an incision on the abdomen is originated from Latin (O'Sullivan, 1990; Todman, 2007).

Most of the earliest literature on C-section delivery is based on how to improve the operation, so in 460-377 BC, Hippocrates wrote about difficult labour and noted that the midwives were uneducated but worked based on experience. In furtherance to this, few scholars wrote textbooks to educate the midwives on such difficult labour and how to go about them (O'Sullivan, 1990). However, there was no reference to C-section in any of these literature. Unfortunately, from the second to the sixteenth century, rational medicine gave way to superstition and the knowledge from these scholars were forgotten (Pallasmaa, 2014). However, after the sixteenth century, Vesalius published *De Corporis Humani Fabrica* in 1543, which gave a detailed description of the female anatomy and made the understanding of the female anatomy clearer. This formed the foundation of the operative obstetrics emerging in the 1700s and physicians became interested in obstetrics which led to reports of successful caesarean deliveries being performed in different countries across the globe (O'Sullivan, 1990).

In Western society, the first reported case of C-section was performed in 1610 by Jeremias Trautmann of Wittenberg who operated on a woman who had difficult labour, the baby survived but the patient died few days after (O'Sullivan, 1990). The first known caesarean delivery in England, Britain and Italy, which the patients survived, were performed in 1793, 1815 and 1876 respectively (O'Sullivan, 1990).

Later, key medical advancement in preventing maternal deaths due to C-section were introduced. Instances of medical advancement were anaesthesia by Jackson and Morton in 1846, and antisepsis by Lister in 1867 (Todman, 2007). Others were the introduction of the transverse uterine incision

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in USA in 1926 by James Munro Kerr, blood transfusions in specialist units in early 1900s, and penicillin in 1941 to reduce the risk of sepsis. These advances reduced maternal mortality associated with C-section deliveries from about 10 percent by the end of the 1800s to 0.1 percent by 1950 (O Sullivan, 1990; Lurie 2005; Todman, 2007).

At the end of the 20th century, maternal mortality related to C-section delivery dropped in high-income countries but was still 3-4 times higher than vaginal delivery (Callaghan, 2012). In the early 1900s, DeLee of USA indicated that all pregnancies are potentially abnormal and must be managed by experts in order to achieve good results. In view of this, obstetrics became a specialty practised by surgeons (Cyr, 2006) and by the latter half of the 1900s, obstetrics specialist units with all the needed staff increased and hospital deliveries increased dramatically (Pallasmaa, 2014).

In sub-Saharan Africa, there were reports of traditional people successfully performing C-section with traditional medicine. In 1879 for instance, a British traveller, Felkin, witnessed C-section being performed by Ugandans using traditional medicine (Sewell, 1993). According to the report, the native doctor used banana wine as anaesthesia to clean his hands and the patient's abdomen before the surgery. He used a midline incision to minimize haemorrhage. Similar accounts from Rwanda on C-section performed where plant preparations were used to anesthetize the patient and promote wound healing (Sewell, 1993).

2. 2 Indications for C-section Delivery

Before the seventeenth century, C-section was done for the reasons of saving the baby after the death of the mother (Lurie, 2005). C-section at that time was sometimes performed for maternal reasons of obstructed and prolonged labour. By the early eighteenth century, C-section was done

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for reasons of placenta previa, eclampsia and difficult labour (Pallasmaa, 2014). From the late 20th century, the key reasons for performing C-section shifted to protracted labour, foetal distress, malpresentation of the foetus and placental abnormalities (Stjernholm, Petersson, & Eneroth, 2010).

By the end of the 20th century, a new indication emerged which increased the rate of C-section globally. This indication is C-section without medical indication which led to controversies among gynaecologists and health policy makers with some accepting the policy and some not. Although there is evidence of higher maternal morbidity and even mortality related to C-section compared to vaginal delivery, many patients and gynaecologists consider it safe to be performed even without any medical indication (Gunnervik, Sydsjö, Selling, & Josefsson, 2008). Since then, there has been growing C-section trends and levels globally with vast variations between and within countries (Betrán et al., 2016).

2.3 Global Levels and Trends of C-section Delivery

The level of C-section rates worldwide varies a great deal. Wylie & Mirza (2008) found from data of 36 low-income countries that the C-section rates in these countries were normally less than five percent. However, C-section seemed to have been overused in most developed countries where in 2007, the rate in those countries stood at a third of all births (Betrán et al., 2007).

Between 2004 and 2008, a WHO global survey on maternal and perinatal health in 24 selected countries across Africa, Latin America and Asia indicated that China reported the highest C-section rate of 46.2 percent, with the lowest rate of 1.62 percent in Angola (Lumbiganon et al., 2010). In another study, Zizza et al. (2011) reported that in 2011, the world's C-section average stood at 14.8 percent with a range of 0.4 percent in Chad to 42.3 percent in Iran. However, a recent

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WHO C-section data from 2005 to 2012 show that the lowest C-section rate of 0.6 percent was recorded in South Sudan while the highest rate of 55.6 percent was recorded in Brazil (Molina et al., 2015). Other recent studies showed that there are high levels of C-section births reported in many countries across the globe. For instance, average C-section rate of 18 European Union countries in 2011 was 26.8 percent (Ji, Jiang, Yang, Qian, & Tang, 2015) and in 2012, Japan and USA reported C-section rates of 19.8 percent and 32.8 percent respectively (Hamilton, Martin & Ventura, 2013).

Other recent scientific studies confirmed a similar global growing C-section trend. In a report based on 2014 data, C-section rates in China increased from 54.9 percent (Liu et al., 2014) to 58.5 percent (Hu, Tao, & Cheng, 2016). A recent article indicates that C- section is one of the most performed surgery in some parts of USA with the rate increasing from 20.6 percent in 1997 to 31.5 percent in 2009 (Happel-Parkins & Azim, 2016). Current C-section rate in Europe ranges from 19 percent to 33 percent (Garcia-Armesto et al., 2015), in South America from 30 percent to 50 percent (Yuen, Painter, Abraham, Melian, & Denno, 2014), and in Africa and other regions, C-section rates are rising with wide disparities being observed (L. Wang, Xu, Baker, Tong, & Zhang, 2016). Two recent studies indicate that in Africa, the national C-section rate of two percent was reported in Burkina Faso (Davari, 2014), compared to the rate of 52 percent in Egypt (Mohammadi Soheila, 2016), indicating a similar pattern of extreme variation in C-section rates.

In Ethiopia, C-section rate increased from 2.3 percent between 1995 and 1996 to 24.4 percent between 2009 and 2010. Women with secondary and higher education, rich women, higher parity and private hospital users accounted for most of the rise (Gebremedhin, 2014). In Pakistan, C-section increased over the past decade. Clinical factors and socio-economic factors (high education, increasing age, higher wealth status, living in urban area and receiving ANC) are

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responsible for the rise (Nazir, 2015). In Mozambique, C-section rate decreased marginally from 2.5 percent between 1995 and 1997 to 2.1 percent between 2001 and 2003 and then increased to 4.7 percent between 2009 and 2011. This trend is associated with living in urban areas and in the southern region, having a formal education and living in a rich household as well as being a public hospital user (Long, 2015).

2.5 Theories and Conceptualization

Though a number of studies have investigated the factors influencing the global C-section rise, most of them are not theory-driven (Hou, Sabah Rakhshani & Iunes, 2014; Kealy, Small, & Liamputtong, 2010; Loke, Davies, & Li, 2015; Nilsen, 2014; Shahraki-Sanavi, Rakhshani, Navidiyan, & Ansari-Moghaddam, 2012; Shi et al., 2016). Nevertheless, the few identified studies which were driven by theory were not conducted with the aim to examine factors influencing C-section rise. For instance, Loke et al. (2015) explored the Health Belief Model to identify factors influencing mode of delivery in Hong Kong. Kealy, Small, & Liamputtong (2010) identified in women's descriptions of the reasons for their first C-section using the theory of the three zones of clinical practice in Australia. Shahraki-Sanavi, Rakhshani, Navidiyan & Ansari-Moghaddam (2012) used the theory of Planned Behaviour to examine the attitude of pregnant women with intention of elective caesarean in Iran, and Mensah, Mogale, & Richter (2014) used Rubin's framework to explain the birth experiences of women in Ghana. However, only one study on C-section was identified to have used theory grounded on the social ecological perspectives to interrogate the psychological factors influencing C-section deliveries. Oguta (2015) conducted a prospective cohort study using the Social Ecological Model (SEM) to identify the psychosocial predictors of elective C-section among 1,268 expectant women in two hospitals in Nairobi. In his study, Oguta (2015) argued that, in the social ecological model, human health is regarded as being

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affected by multidimensional levels of influence. He added that, studies based on social ecological viewpoints are important because they provide an inclusive understanding of the multidimensional levels of influences on health choices.

This study has its theoretical foundation in two theoretical perspectives – (i) Social Ecological Model (SEM) and (ii) Health Belief Model (HBM). The former, which is the main model, was promulgated by Bronfenbrenner (1978) and later modified by McElroy (1988), for studying the effect of factors at different levels of influence (i.e., individual, interpersonal, institutional and community levels) on health behaviours. The latter is a framework developed by Hochbaum in the 1950s to explore the beliefs of people on their health-seeking behaviours within the five domains (i.e., perceived susceptibility, perceived severity, perceived benefits, perceived barriers and cues to action). The HBM is adopted to examine the belief variable embedded in the individual- level factors of the SEM. Thus, in this study, the factors influencing C-section deliveries were conceptualized based on the foundation grounded in the two theoretical perspectives. The two theoretical models are described briefly.

2.5.1 Social Ecological Model (SEM)

The concepts of ecology have had an important influence on several disciplines such as population studies, education and public health (McLaren & Hawe, 2005). The concept is derived from biological science and it is defined as the interrelations between organisms and their environment (Stokols, 1996). A social ecological perspective is not established on one discipline or theory but rather on a wide range of disciplines across many diverse fields of research for understanding the interrelations among diverse levels of influence in the area of human health research (Stokols, 1996). While Bronfenbrenner (1978) was mostly concerned with how social factors affect

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individual development, many scholars have found his thinking useful in interrogating how community factors affect health-related behaviour such as physical activity and smoking behaviours (Simons-Morton, McLeroy, & Wendel, 2012). Simons-Morton et al. (2012) redefined health choices as not only individual choices but rather individual choices that have been influenced by the relationship with significant others and contextual factors within which the person interacts (Simons-Morton et al., 2012).

Literature indicates that, the terms "ecological model" and "social ecological model" are often used interchangeably (Adedini, 2013; Simons-Morton et al., 2012). The use of the latter underscores the influence of community, individual and interpersonal factors to a specific problem under study (McLaren & Hawe, 2005). Social ecological models provide a complete understanding of health-related choices which provide a basis for effective health intervention for the population coming from complex social milieus (Grzywacz & Fuqua, 2000).

Following Bronfenbrenner's (1978) work, contemporary scholars have viewed health as occurring within multiple systems and there has been growing interest in social ecological models in health and health promotion. Moos (1979), McLeroy et al. (1988), Stokols et al. (1992, 1996) and Simons-Morton et al. (2012) have all proposed the SEM for application to health-related behaviours. For instance, McLeroy et al. (1988) proposed five sources of influence on health-related behaviours which included individual, interpersonal, institutional and community-level factors. Table 2.1 presents the various social ecological models of health.

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Table 2. 1 Summary of Contemporary Social Ecological Models of Health

Model	Influence on Health choices
Social Ecological Model of Health by Moos	i. Physical settings ii. Organizational settings-size iii. Sociocultural characteristics iv. Social climate characteristics
Social Ecological Model of Health by McLeroy et al.	i. individual-level factors ii. Interpersonal-level factors iii. Institutional-level factors iv. Community level factors v. Public policy-level factors
Social Ecological Model of Health Promotion by Stokols et al	i. Physical, social environments and personal attributes ii. Environments and multidimensional interactions iii. Human-environment interactions iv. Mutual influence between the agents
Social Ecological Model for Health Promotion by Simons-Morton et al.	i. individual factors ii. Interpersonal factors iii. Organisational factors iv. Community factors v. Public policy vi. Physical environment vii. Cultural factors

This study is based on the McLeroy et al's (1988) social ecological model for health and only the first four levels of influence were used. These were individual, interpersonal, institutional and community. McLeroy et al.'s (1988) Social Ecological Model places health-related choices of individuals within a wider social milieu. In this study, the model was used to explore the influence of community factors on childbearing women's mode of child delivery behaviours and how the

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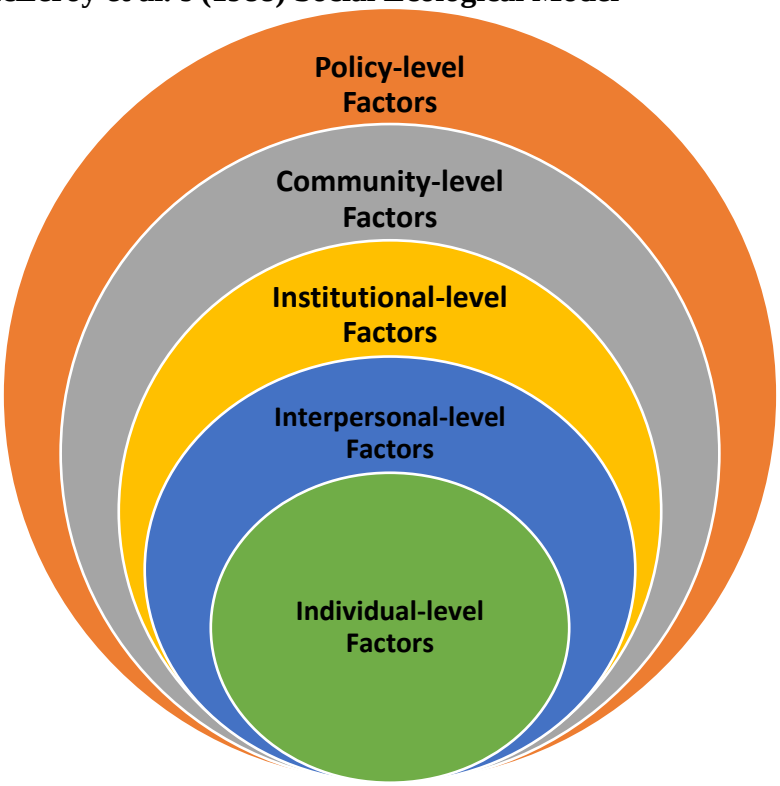
other factors mediate the relationship. The specific dimensions of influence in the McLeroy et al.'s (1988) Social Ecological Model were selected based on its construct, variables in the 2014 GDHS data and themes emerging from literature. These include: individual, interpersonal, institutional and community. A diagram of McLeroy et al.'s (1988) Social Ecological Model and a brief explanation of the key constructs of the model is presented in Figure 2.1.

Figure 2. 1 McLeroy et al.'s (1988) Social Ecological Model



Source: McLeroy et al. (1988)

2.4.1.1 Individual-level Influence

The individual level examines individual characteristics such as perceptions, beliefs and demographic characteristics on health choices (McLeroy et al., 1988; Simons-Morton et al., 2012). These individual characteristics can influence a person's health behaviour either directly or in

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conjunction with a variety of other factors (Kumar et al., 2012). Several studies have identified age, parity, educational level and wealth index as individual factors that could influence mode of child delivery globally (Feng, Xu, Guo, & Ronsmans, 2012; Ghosh, 2010; Long, Kempas, Madede, Klemetti & Hemminki, 2015; Nazir, 2015; L. Wang, Xu, Baker, Tong & Zhang, 2016).

2.4.1.2 Interpersonal-level Influence

Interpersonal factors are defined as the influence of social support systems and social networks including family and friendship networks which could influence health-related behaviours (McLeroy et al., 1988). A recent study suggests that individual preferences for mode of child delivery is influenced by support from partner (Sapkota, Kobayashi, Kakehashi, Baral, & Yoshida, 2012).

Research indicates that women receiving support from their husbands during the ANC period, labour and delivery, have positive birth outcomes which reduce medical intervention for expectant mothers (Ngoma & Chongo, 2013). An earlier study indicates that the type of support provided to expectant and women in labour has diverse including: emotional or empathetic support, husband being present during antenatal visits and labour, giving encouragement, soothing and touching, providing support with household chores and taking care of baby-related preparations (Corbett & Callister, 2000). This support from husbands offer women many benefits including increased self-esteem, better health, reduction in the duration of labour, anxiety and operative deliveries (Ngoma & Chongo, 2013). The present study hypothesized that the likelihood of an individual having vaginal birth or C-section could be influenced by the partner being present during ANC visits.

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2.4.1.3 Institutional-level Influence

The organisational or institutional level refers to social institutions which are formal and informal environment such as schools, hospitals and business environment (McLeroy et al., 1988). In this study, access to healthcare, place of delivery and number of ANC visits were viewed as institutional factors which could influence mode of child birth. For example, multiple studies have shown that private hospital delivery has had an increasing effect on C-section delivery (Belizán et al., 2016; Gartland, Taryor, Norman, & Vermund, 2012; Gebremedhin, 2014; Uzma Ilyas & Anila Hanif et al., 2013).

2.4.1.4 Community-level Influence

According to McLeroy et al. (1988), there are three distinct meanings for community. Firstly, they defined community as a face-to-face primary group to which a person belongs. These include personal friendship networks, neighborhood values and voluntary associations. Secondly, community was viewed as the relationships among organizations and groups within a defined area, such as local health care providers and schools. Thirdly, community can be defined as an ecological area. In this study, we view the community as a geographical area where a woman resides. The study also assumes that community resources in which the woman lives could influence her mode of child birth. The community-level factors included in the study are region of residence, place of residence, community-level maternal poverty and community-level maternal education. Apart from place of residence, the relationship between the rest of the variables and mode of child birth have not been well understood. However, many of such work on these factors have been done in child and maternal health which could be useful to the current study (Belachew, Kahsay, & Abebe, 2016; Mekonnen, Lerebo, Gebrehiwot, & Abadura, 2015; Yebyo, Alemayehu, & Kahsay, 2015;

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Yebyo, Gebreselassie, & Kahsay, 2014). The operationalization of the community-level maternal poverty and community-level maternal education factors were explained in chapter three.

2.5.2 Health Belief Model (HBM)

The second model that underpinned this study is the Health Belief Model. It was developed to predict health behaviour (Stretcher & Rosenstock, 1997). According to Rosenstock (1966), the initial goal of the proposers of the HBM was to focus the effort of scholars whose aim is to improve public health by understanding why people adopt certain behaviours.

Since its development, HBM has been used in a variety of health-related studies (Harrison, Mullen & Green, 1992). For example, it has been used to determine the factors influencing women's decision on their mode of child delivery (Loke et al., 2015), in obesity study (Goer, Romano & Sakala, 2012), for condom use study (Zhao et al., 2012) and communicable disease studies (Smith, 2012). Also, it has been used for child immunization researches (Abdallah Salamatu Magaji, Umar Babangida Dangani & Haruna, Salami Ovosi, MD, 2016), for non-communicable diseases researches (Köhler, Nilsson, Jaarsma & Tingström, 2016; Tarkang & Zotor, 2015) and for tobacco cessation study (Renuka & Pushpanjali, 2014).

The HBM postulates that an individual's likelihood of engaging in a health-related behaviour is determined by his/her perception of the four variables: perceived susceptibility, perceived severity, perceived benefit and perceived barrier. Each of these variables, individually or in combination, has been used to explain health behaviour. Later, two more variables were added to the construct as self-efficacy and cues to action.

Unlike the SEM which is rarely used in mode of child birth studies, the HBM has been used in several mode of child birth studies to examine the perception or beliefs of women on the mode of

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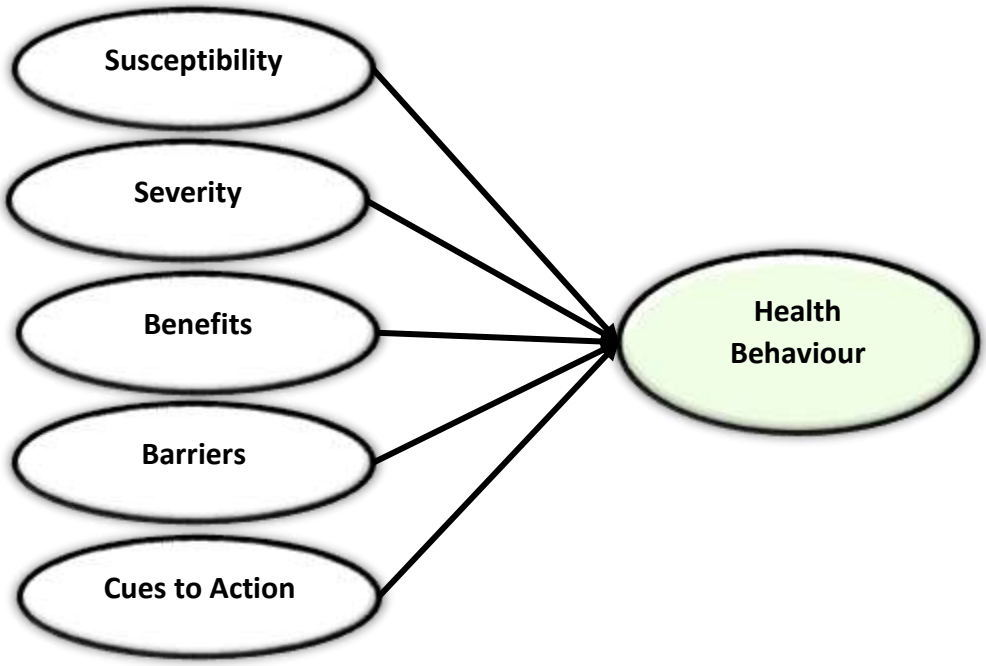
delivery (Browne et al., 2015; Hajian et al., 2013; Loke et al., 2015; MacMillan, 2010; Rahnama, Mohammadi, & Montazeri, 2016; Zamani-Alavijeh, Shahry, Kalhori, & Araban, 2017). The application of the HBM in other fields of study is presented in Figure 2.2.

Figure 2. 2 Application of the Health Belief Model to Explore Health Behaviour



Source: Orji, Vassileva, & Mandryk (2012)

2.5.2.1 Beliefs of Women on Modes of Childbirth Based on the HBM

Understanding and responding to women's beliefs during the childbearing period constitute an important focus on international maternity health policy (Rahmati-Najarkolaei, Eshraghi, Dopeykar, & Mehdizadeh, 2014). Considering the side-effects of C-section delivery, attempts have been made to provide C-section only to women in need in different societies. One of the ways to

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fulfil this is to identify the specific beliefs influencing mode of childbirth and to target intervention at specific areas.

Previous studies on C-section have demonstrated that beliefs of women are an important confounding factor because they can, to a large extent, influence the choice on mode of child delivery. The Health Belief Model (HBM) was adopted as a conceptual framework for providing an understanding for the beliefs of childbearing women (women aged 18-49 who had a child in the last five years) on mode of childbirth. The HBM can help in understanding why a woman chooses a particular mode of childbirth. Through the use of the Health Belief Model and qualitative interviewing, it was possible to dive deep into the health beliefs of women and understand how their beliefs affected their mode of child delivery.

2.5.1.1 Perceived Susceptibility

Perceived susceptibility is a person's belief in his/her susceptibility to a particular medical state. The more a person believes he/she is at risk of a medical condition, the more likely that person will adopt a particular health-related behaviour to reduce such risk (Munro et al., 2007). For instance, undesirable experiences in a previous birth could influence a woman's preference in subsequent births (Loke et al., 2015). In a recent hospital-based qualitative study using 36 in-depth interviews among pregnant women in Iran, a 26-year-old, secondary school leaver believed that one should be strong enough to give birth vaginally. According to her, she is incapable of doing so since she is so fragile (Rahnama et al., 2016). Several studies suggest that reasons behind the rise in C-section births is fear of vaginal delivery (Habib, Abdulla, & Yacoub, 2011; Schei et al., 2016) and labour pains from vaginal delivery (Akintayo et al., 2014).

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2.5.1.3 Perceived Severity

Perceived severity is defined as one's belief in the intensity of the medical condition and its adverse outcomes (Janz & Becker, 1984). If it is believed that there are very serious complications associated with a specific mode of birth, women are more likely to express a preference for an alternative method of delivery, so as to moderate their risk. For both vaginal birth and C-section, the most severe complications are maternal and neonatal mortality. It was noted that C-section can have several maternal and perinatal adverse outcomes (Dursun et al., 2011). However, vaginal birth is not without risk as maternal and perinatal complications associated with vaginal birth has been noted as pelvic organ prolapse and prolonged labour (Lumbiganon et al., 2010; Volpe, 2011). The study suggests that perceived severity of vaginal birth and the notion that the baby would suffer fewer health risks are the main risk factors for C-section delivery.

2.5.1.4 Perceived Benefits

Perceived benefits are defined as one's belief that outcomes can be positively affected by engaging in a particular health-related behaviour (Janz & Becker, 1984). When considering the perceived benefits for the health of childbearing women (women aged 18-49 who had a child in the last five years), it has been noted that in a number of countries women associate vaginal birth with a greater number of benefits than C-section. Women in high and middle-income countries believe that vaginal birth offers a faster recovery, earlier discharge, and the absence of a C-section scar (Loke et al., 2015). When focusing on neonatal health, nearly all women believe that vaginal birth is safer for the baby (Dursun et al., 2011). In comparison, a fear of labour and repetitive vaginal examinations were underlying reasons why women showed a preference for C-section (Dursun et al., 2011).

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These studies suggest that women normally weigh the maternal-foetal benefits, complications associated with a particular mode of birth and limited possibility of false alarms or repeated pelvic examination (Liu et al., 2013; Loke et al., 2015). For instance, a hospital-based descriptive study conducted among 840 Turkish women to determine women's attitudes regarding vaginal delivery and C-section suggests that perceived benefits of both vaginal birth and C-section influence the women's choice of mode of child birth. In the study, the most significant reasons of vaginal delivery were healthy and swift recovery period after delivery. Again, perceived benefits of C-section delivery were safety of babies and the fact that women perceive C-section to be easier than vaginal delivery (Yilmaz, Bal, Beji, & Uludag, 2013). Evidence from Loke et al (2015) which confirm the above findings suggest that perceived benefits such as ability to plan for maternity leave, choosing an auspicious date to deliver and C-section being a more convenient way to deliver one's baby were the main factors affecting mode of childbirth among 319 Hong Kong Chinese women.

2.5.1.5 Perceived Barriers

Perceived Barriers refer to a person's perception of the difficulties stopping them from following a specific health behaviour (Janz & Becker, 1984). The desire to choose vaginal birth is prevented by existing medical contraindications. In some countries, such as Hong Kong, C-section without medical indications is only available in the private hospitals. Public hospital policy and low financial status could act as barriers to choosing C-section delivery. Studies have shown that insurance coverage is a vital element in the maternal choice of delivery, with studies conducted in Australia and Chile indicating that, insurance coverage encourages women to attend private

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hospitals and hence encourages C-section delivery without medical indications (Einarsdó Ttir et al., 2012).

2.5.1.6 Cues to Action

Cues to action refer to the factors that help individuals make health-related decisions.(Orji et al., 2012). A study indicate that cues to action includes, advice from peers, relatives and healthcare professionals as well as stories told by significant others on mode of child delivery (Buyukbayrak et al., 2010). In this study the health belief model was used to answer the beliefs of women on the various modes of child delivery. This variable "belief" which is embedded in the individual level factors of the Social Ecological Model was explored in the qualitative part of this study and was useful in answering objective two. Literature suggests that cues to action is one of the main reasons for the rising C-section deliveries.

In a cross-sectional study using 797 pregnant women in Iran, Gholami & Salarilak (2013) demonstrated that cues to action such as physician's advice accounted for the high C-section deliveries (Gholami & Salarilak, 2013). Several scholars have confirmed that women's beliefs continue to influence their mode of childbirth generally. These scholarly works indicate that cues to action such as doctors' influence, is one of the major causes of the rise in C-section delivery (Azami-aghdash, Ghojazadeh, Dehdilani, & Mohammadi, 2014; Gholami & Salarilak, 2013; Hou et al., 2014; Liu et al., 2013; Xing Lin Feng et al., 2015).

In a more comprehensive study using 319 women to determine the factors influencing childbearing women's decision on mode of delivery in Hong Kong, Loke et al. (2015) demonstrated that cues to action were the main factors affecting mode of childbirth. The study concluded that cues to action from health professionals, negative stories of vaginal birth from relatives and friends as well

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as family history of difficult births were significantly correlated with maternal preference on mode of birth.

Other available evidence from a study conducted by Shi et al. (2016) to establish the influencing factors associated with the mode of birth among 977 childbearing women in China suggests that cues to action such as doctors' suggestions and previous negative birth experiences were the main risk factors affecting C-section delivery.

2.5.1.7 Community Beliefs

These are beliefs that are associated with a person's faith or the beliefs from a particular group of people. These beliefs could be religious, social, cultural or even personal, which could influence a woman's mode of child delivery. Although community beliefs are not a construct of the HBM, several scholars have indicated that community beliefs are thought to have shaped women's mode of childbirth behaviours (Hou et al., 2014; Liu et al., 2013; Rahnama et al., 2016; Ugwu & de Kok, 2015).

In a qualitative study, with the objective of understanding women's preferences and motivational factors for a mode of delivery using 29 nulliparous Argentinean pregnant women, the study indicated that women who gave birth by C-section did not play any active role in the birth process and therefore they did not transit from womanhood to motherhood. The study further indicated that for those women, childbirth is less emotionally touching experience that could be a cause of depression later in the future (Liu et al., 2013).

In a hospital-based qualitative study using 36 in-depth interviews among pregnant Irani women, Rahnama et al. (2016) indicate that God has ordained women to go through labour pain. In the study, a 35-year old educated woman reported as saying that, *"it is God's plan for women to go*

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through labour pains and that when women do that their sin will be forgiven" (Rahnama et al., 2016, pp 4).

In a mixed method study to understand how the socio-cultural context influences uptake of C-sections in Nigeria, 22 percent of maternity clients refused C–section. The study also indicated that more than 90 percent of C-sections performed in the hospitals were emergencies which may indicate late arrival (Ugwu & de Kok, 2015). The study suggested that the women believe that an enemy could attack someone spiritually and impose punishments such as inability to have vaginal delivery. Again, the study indicated that it is believed that C-section can be avoided by emphasizing one's faith in God through divine intervention. Conversely, a C-section delivery could cast doubt on one's religious status since it is seen as an abnormal procedure for a believing woman.

2.4 Maternal Healthcare Service in Ghana

Almost all maternal, neonatal, infant and child deaths arise in low- and middle-income countries like Ghana. In Ghana, health care services during pregnancy, childbirth and after delivery are essential for the survival and well-being of both the mother and the infant (Ghana Statistical Service, Ghana Health Service, & DHS-Program-ICF, 2018). For the past two decades, there has been an improvement in Ghana's maternal health care service largely due to interventions put in place by Ghana Health Service to enhance service provision in order to prevent death and achieve the SDG 3.

These interventions include free maternal health services, High Impact Rapid Delivery (HIRD) approach, Safe-Motherhood Initiative, Emergency Obstetric and Neonatal Care (EmONC) as well as the Health Insurance Policy (Ghana Ministry of Health, 2015). These initiatives have led to an

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overall decline in under-5 mortality rates and infant mortality from 155 deaths per 1,000 live births in 1988 to 52 deaths per 1,000 77 deaths per 1,000 live births to 37 deaths per 1,000 live births in 2017 respectively. Also, maternal mortality ratio declined from 760 per 100,000 live births in 1990 to 310 per 100,000 live births in 2017 (Apanga & Awoonor-Williams, 2018; Ghana Statistical Service et al., 2018). However, the pace of decline in maternal mortality has been slow and this has led to Ghana's inability to achieve the Millennium Development Goal target of 190 per 100,000 live births in 2015 due to these challenges.

These challenges include: lack of primary health care infrastructure, issues pertaining to deployment of skilled health workers, lack of equipment, lack of logistics, inadequate staff accommodation, lack of transportation and ambulance services, and poor quality of care. Also, inadequate financial capabilities of families or mothers, low female literacy rate as well as poor health-seeking behaviours among the poor and socio-cultural factors (Ghana Health Service, 2017).

The components of maternal health services in Ghana includes antenatal care (ANC), number of ANC visits, places of delivery, assisted delivery, types of delivery and postnatal care (PNC). A recent survey suggest that almost all pregnant women in Ghana now receives antenatal care from a skilled provider, with higher proportion of them having four or more antenatal care visits, postnatal check during the first 2 days after birth, delivery by a skilled provider and delivery in a health facility (Ghana Statistical Service et al., 2018).

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2.6 Individual-Level Factors and C-section Delivery

A number of individual-level factors have been identified in C-section literature (Azami-aghdash et al., 2014; Long et al., 2015; Sinnott, Brick, Layte, Cunningham, & Turner, 2016; Yilmaz et al., 2013). In some of these studies, maternal age, highest educational attainment, marital status, wealth index, parity and working status among other factors have been found to significantly predict C-section delivery.

2.6.1 Maternal Age at Birth

Age at birth is another individual factor which seems to have an impact on recent trends of C-section deliveries. An increasing body of research suggests that C-section rates increase with maternal age and therefore maternal age is a key risk factor for C-section delivery (Smit, Wijk, Gouw, & Duvekot, 2012).

A recent study which seeks to ascertain the risk factors of delivering by C-section in Cameroon suggests that C-section delivery is significantly correlated to extreme maternal age (Tesu et al, 2016). According to the study which uses 125 C-section deliveries as cases and 244 women who delivered by vaginal birth as control, women in the 17-19 age group and women who are more than 39 years had the highest risk of C-section delivery. Similarly, a cross-sectional hospital-based study conducted among expectant mothers in China suggests that advanced maternal age is a significant predictor of C-section deliveries (Wang, 2016). Again, 20,514 Japanese singleton deliveries in hospitals were studied to examine the factors contributing to the high rates of C-section deliveries at the hospitals over a period of one year. The results indicate that there is significant increasing prevalence of C-section deliveries with advanced maternal age (Suzuki, 2014). More recent studies conducted in Irish maternity by Sinnott et al. (2016) and WHO global

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survey on maternal and perinatal health by Yoshooka-Maeda et al. (2016) argued that C-section was predicted by increasing maternal age.

In variance to these four studies, two identified studies found no significant association between C-section and maternal age. In their study, Akinitayo et al. (2014) alluded to the fact that maternal age was not significantly related to the decision to deliver by C-section. This was after they had carried out a cross-sectional study in Nigeria on 752 expectant mothers at an ANC clinic to ascertain their perception and willingness to have C-section delivery. Instead, fear was the common motivation for C-section delivery.

Also, Roth (2012) indicated that maternal age was not a significant predictor of C-section rise and disparities in USA. This result was obtained after a hospital-based study on the differences in C-section delivery by racial-ethnic and socioeconomic status. The study concluded that women with higher socio-economic status had greater incidence of C-section, independent of age and other major factors.

2.6.2 Employment (Working) Status

Few authors have tried to link C-section delivery with working status of women and have indicated that working status was not found to be an influencing factor affecting C-section delivery. This assertion was made by Buyukbayrak et al. (2010) when they conducted a study on the preference of pregnant women on mode of child delivery in an uncomplicated pregnancy using 1,588 pregnant women attending an antenatal clinic in Iran. This finding was affirmed by Ghosh (2010) who studied women in their reproductive age using the National Family Health Survey data in India and wrote on the trends in C-section births in India. According to the author, a woman's working status is not a significant factor of C-section delivery. To buttress these findings, other population-

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based studies by Nazir (2015) and Yassin et al. (2012) also found that working status is not associated with the risk of C-section delivery in Pakistan and Egypt.

2.6.3 Marital Status

In Ghana, 56 percent of women aged 15-49 are currently in a union with 42 percent and 38 percent, being married and cohabiting respectively. Marital unions in Ghana are mainly of two types, the monogamous and the polygynous unions. The distinction has social significance and probable fertility implications. Polygyny, the practice of having more than one wife, has connotations for the frequency of sexual intercourse and thus may have an effect on fertility. Polygynous union are more prevalent in the rural areas than in the urban areas and across the regions, polygynous unions among women is highest and lowest in Greater Accra (Ghana Statistical Service et al., 2015).

Although marital status is a key indicator of social support, only few studies have attempted to establish the relationship between marital status of mothers and their mode of child delivery. Most of these studies established that marital status is not a predictor of C-section delivery (GamaNogueira et al., 2014; Roth & Henley, 2012; Tebeu et al., 2011). In a recent study, 90 postpartum women were surveyed on the factors associated with C-section deliveries among primiparous adolescents in Brazil between 2011 and 2012. The results indicated that marital status is not correlated with C-section delivery (Gama et al., 2014). This conclusion is consistent with the findings of two different studies undertaken in Cameroon (Tebeu et al., 2011) and Sweden (Hildingsson et al., 2002). In the Cameroon study, 125 women who had C-section were compared with 244 women who delivered vaginally during the study period and concluded that marital status is not a risk factor of delivery through C-section. Also, an earlier study in Sweden using 3,061 women established that a wish for C-section was not associated with marital status. Contrarily,

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Roth & Henley (2012) used 2006 birth data from birth certificates to demonstrate that married women are 0.88 times more likely to have C-section than their unmarried counterparts.

2.6.4 Wealth Index

A household's ability to afford a C-section delivery is thought to be a significant contributing factor to C-section deliveries (Arsenault et al., 2013; Gartoulla, Liabsuetrakul, Chongsuvivatwong, & McNeil, 2012). The cost of C-sections can be catastrophic for households (Gartoulla et al., 2012). Although user fee exemptions have been one of the key strategies to increase access to delivery care in sub-Saharan Africa (Meessen et al., 2011), their impact on caesarean delivery rates is yet to be rigorously evaluated in the sub-region. Nevertheless, a number of cross-sectional studies conducted in hospitals in Egypt (Farghali, Rashed, Fathi, Moustafa, & Rahman, 2014), Nigeria (Faremi et al., 2014) and Bangladesh (R. Khan, Blum, Sultana, Bilkis, & Koblinsky, 2012) suggested that C-section level among women from the rich backgrounds were significantly higher than those from the middle and poor households. Similarly, a population-based study conducted in India (Ghosh, 2010) and Mozambique (Long et al., 2015) using DHS data confirmed that women from poorer backgrounds are less likely to give birth by C-section. Contrarily, a hospital-based study by Räisänen et al. (2014) with the aim of establishing whether giving birth by C-section was associated with socio economic status among singleton births in Finland concluded that incidence of C-section deliveries is higher among poor women than their rich counterparts.

2.6.5 Parity

Contributing to the discussion on the relationship between individual factors and C-section deliveries, Yassin et al (2012) conducted a cross-sectional study using the Egyptian DHS data and

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found that women with less than three live births were two times more likely to undergo C-section birth than women with higher parity. In a similar cross-sectional study with the aim of assessing the factors indicating C-section deliveries in two major hospitals in Cairo, Farghali et al (2014) interviewed 2,544 women who were admitted for labour and delivery at the study hospitals and underwent a C-section. They concluded that primiparous women played a critical role in the high rate of C-sections in Egypt to unreasonable levels.

In an earlier retrospective case-control study, extreme parity was found to be associated with C-section delivery. In the study of Tebeu et al (2011) on the identification of the possible risk factors associated with caesarean delivery in Nigeria, women who gave birth by C-section were more likely to be primiparous and grand multiparous women.

Supporting the latter discourse by Tebeu et al (2011), Azami-aghdash et al (2014) concluded in a systematic review of 34 articles that explored the prevalence and causes of C-section in Iran that grand multiparous women are most likely to have C-section delivery. A contrary view was recorded by Akintayo et al. (2014) in their cross-sectional study of 752 antenatal clinic attendees at Ekiti State University Teaching in Hospital in Nigeria. The study which was to determine the factors influencing the willingness to deliver by C-section showed that parity was not significantly correlated with the decision to have C-section.

2.6.6 Maternal Education

There is evidence that maternal education is associated with C-section delivery with most findings suggesting that higher maternal educational status is positively correlated with C-section delivery. This was identified in several studies which quantitatively explored maternal education and C-section delivery and found a positive relationship between education and C-section delivery

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(Azami-aghdash et al., 2014; Ghodrati, Javadi, & Ahmadi, 2016; Kamal, 2013; Long et al., 2015). Azami-aghdash et al (2016) conducted a systematic review and meta-analysis on the prevalence and causes of C-section deliveries in Iran and concluded that maternal education is the main demographic factor causing the rise of C-section delivery. The authors indicated that C-section among higher educated women is more than their counterparts having lower education. Further to this, a descriptive hospital-based study conducted in Turkey (Yilmaz et al., 2013) and a cross-sectional population-based study conducted in Mozambique (Long et al., 2015) on factors influencing C-section delivery, alluded to the fact that C-section deliveries increase with higher maternal education.

2.7 Interpersonal-Level Factors and C-section Deliveries

According to McLeroy et al (1988), there are several factors that could influence health behaviour and one of such factors are interpersonal factors. Research suggested that individual preferences for mode of child delivery is influenced by support from partner (Sapkota, Kobayashi, Kakehashi, Baral, & Yoshida, 2012). A recent study indicates that women receiving support from their husbands during the period of ANC, labour and delivery have positive birth outcomes and reduces medical intervention for expectant mothers (Ngoma & Chongo, 2013). Studies suggest that the type of support provided to expectant mother have been in various forms. This include, husbands accompanying spouse to ANC, being present during delivery, giving encouragement, touching and soothing, helping with household chores and taking care of baby-related issues (Corbett & Callister, 2000). This support from husbands offer women many benefits including increased self-esteem, reduction in the duration of labour, reduction in anxiety and reduction in operative deliveries (Ngoma & Chongo, 2013).

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2.7.1 Partners' Presence at ANC Visits

The present study hypothesized that the likelihood of an individual having vaginal birth or C-section could be influenced by the partner accompanying the woman to ANC check-ups. A descriptive cross-sectional study which explored and described husbands' perceptions of providing support during pregnancy and labour from a sample of 385 Zambian men revealed that most partners did not accompany their spouses to ANC check-ups. According to the study, in general, very few husbands accompanied their wives to the antenatal clinic for check-ups arguing that this behaviour had negative impact on birth outcomes of the women in the study (Ngoma & Chongo, 2013).

A similar finding was obtained by Iliyasu, Abubakar, Galadanci & Aliyu (2010) in a descriptive cross-sectional survey using in-depth interviews and administered questionnaires to evaluate delivery preparedness and male involvement in maternity care in a Northern Nigerian community. This study indicates that in a low-income setting, except for transportation cost, husbands rarely accompany their partners to ANC, which according to the study, increases birth complications which require medical intervention (Iliyasu et al., 2010).

Contrary to the behaviour of partners in the above studies, a quasi-experimental study was conducted in Nepal to assess the experiences of spouses whose husbands were present during delivery compared to that of women who were supported by others and those who had no support at all. Evidence from this study shows that support from husband makes the pregnant woman feel more in control during labour as well as reduces the use of medical intervention such as C-section and operative vaginal delivery (Sapkota, Kobayashi, Kakehashi, Baral, & Yoshida, 2012).

In addition, there has been reports that currently Ghana Health Service is encouraging male involvement in anti-natal (ANC) and post-natal care (PNC) to extent that, women who report to

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ANC and PNC clinics with their partners are seen first. This according to the anecdotal evidence has led to an increase in the number of partners attending ANC and PNC clinics with spouses. Also, evidence suggest that the women who attend these clinics with their partners are giving preferential treatment and so lots of more women are inviting their partners to such clinics in order to be treated special.

However, researches show that the decision on whether to have C-section delivery or not, does not rest on the partners. However, several studies conducted mostly in low-and middle-income counties suggest that decision to have C-section delivery rest mainly on the gynaecologist.

2.8 Institutional-Level Factors and C-section Deliveries

Institutional factors include social institutions such as school and hospital factors that could influence health behaviours (McLeroy, Bibeau, Steckler, 1988). Studies have identified few institutional-level factors influencing C-section delivery. These studies suggest that number of ANC visits, access to healthcare and place of child delivery could influence C-section delivery globally.

2.8.1 Access to Healthcare

One evidence-based intervention for reducing maternal morbidity and mortality is promoting access to healthcare (Harrison & Goldenberg, 2016). Access to healthcare is believed to influence the rates of C-section deliveries globally. Most studies on the discourse of the effect of access to healthcare on C-section delivery have concluded that access to healthcare is positively correlated with C-section delivery (Ghosh, 2010; Hou, Sabah Rakhshani, & Iunes, 2014; Kottwitz, 2014; Lauer, Betrán, Merialdi & Wojdyla, 2010). Ghosh (2010) wrote in his population-based cross-

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sectional study to explore the relationship between the factors influencing the decision for C-section delivery in India and argued that access to healthcare facilities has contributed significantly to higher proportion of caesarean births in India. Similarly, a study conducted by Lauer, Betrán, Merialdi, & Wojdyla (2010) on the population-level determinants of C-section trends in developed countries concluded that regardless of medical needs, the greater the capacity of the health system to deliver surgical obstetric care, the more the likelihood that C-sections will be performed.

These findings were affirmed by a recent systematic review conducted by Hou, Sabah Rakhshani, & Iunes (2014) on determinants of high caesarean delivery rates in China and Brazil. The study suggested that economic development has significantly improved population's access to health services in both countries which has caused C-section rates to be alarmingly high. Furthermore, the above assertion was demonstrated by Kottwitz (2014) in a study conducted on the access to healthcare as a driving force behind the social discrepancies in caesarean delivery. The study observed that irrespective of educational background when access to obstetric care is high, inequalities in access to C-section delivery seems to balance out.

2.8.2 Number of ANC Visits

WHO recommends that every pregnant woman needs to attend at least four ANC visits for effective antenatal care. A number of countries and institutions have underscored the importance of ANC visits in achieving positive birth outcomes and have pursued programmes that lead to an increase in ANC visits. In Ghana, it is recommended that every pregnant woman must attend at least six ANC visits for positive birth outcomes (GHS, 2010). Evidence from the 2014 Ghana Demographic and Health Survey suggests that 97 percent and 87 percent of childbearing women giving birth in Ghana have had at least one and four or more ANC visits respectively for their last

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child (Ghana Statistical Service et al., 2015). This high ANC turn out rate among Ghanaian women shows the seriousness Ghanaian women attach to ANC.

Although there is so much importance attached to ANC, only few studies have explored the association between the number of ANC visits and mode of childbirth. These studies indicate that the number of ANC visits is positively significant to C-section deliveries. Yassin et al. (2012) conducted a study on the determinants of C-section births in Egypt. This population-based cross-sectional study suggests that caesarean deliveries are significantly higher among women who have received more ANC during pregnancy.

Lending credence to this discourse, another population-based cross-sectional study carried out on the determinants of the caesarean deliveries in Pakistan using a total sample size of 7,439 women from the 2012 DHS indicates that pregnant women who had more than three ANC visits, were more likely to have C-section birth (Nazir, 2015).

In another development, Rahman and colleagues (2015) in their cross-sectional study on factors associated with mode of child delivery using 1,142 delivery cases in Bangladesh confirmed that increasing use of ANC services leads to increasing chances of having C-section delivery. Contrarily, Tebeu et al.(2011) conducted a case-control study in Cameroon using 369 women and concluded that women who had C-section deliveries were likely to have had less than four ANC visits.

2.8.3 Place of Child Delivery

Multiple studies have shown that private hospital delivery has had an increasing effect on C-section rates (Belizán et al., 2016; Gartland, Taryor, Norman, & Vermund, 2012; Gebremedhin, 2014; Uzma Ilyas and Anila Hanif et al., 2013). A population-based cross-sectional study by

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Gebremedhin (2014) which seeks to explore socio-demographic determinants of C-section rate in Addis Ababa showed that the C-section rate among women who gave birth in private hospitals was twice higher than women who gave birth in public hospitals. Further to this, a population-based descriptive ecological study by Belizán and colleagues (2016) on the occurrences of C-sections in Latin American countries attest to the above assertion that higher C-section rates were recorded in private hospitals than in public hospitals. In contrast to the above argument, Long et al. (2015) indicate that in Mozambique C-section rates were higher in public hospitals than in private hospitals.

2.9 Community-Level Factors and C-section Deliveries

Studies linking a population's health status and the community or neighbourhood characteristics in which the individual resides are not new (Adamba, 2013). Evidence suggests that residing in a deprived community is related to higher rates of adverse effects on the health of the people. In this study, key selected variables which could influence mode of child delivery, specifically C-section deliveries according to literature, were reviewed.

Apart from place of residence, community-level factors influencing C-section delivery have not been well documented. Nevertheless, there is literature to show that such studies have been done in the areas of infant mortality, maternal health and contraceptive usage (Adedini, 2013; Belachew et al., 2016; Ejembi et al., 2015; Yebyo et al., 2014). Therefore, variables such as community-level female education, community-level poverty, region of residence and place of residence used in these studies were explored in the current study to add knowledge to C-section literature (Ejembi, Dahiru, & Aliyu, 2015). A study conducted in Nigeria with the aim of assessing the role of contextual factors on the use of modern contraceptives among 13,835 women suggests that

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community-level female education is a positive predictor of positive attitudes towards contraceptive usage (Ejembi et al., 2015). In a similar study to determine the effect of individual and community-level factors on women's decision to deliver at home, community-level female poverty is reported to be associated with poor health behaviour such as higher proportion of home delivery (Yebyo, Gebreselassie, & Kahsay, 2014).

2.9.1 Region of Residence

Studies have explored the effect of region of residence on C-section deliveries and argued that region of residence significantly influences the rates of C-section births (Long et al., 2015; Maharouei Najmeh, Moalaee Mansoureh, Ajdari Saeed, Zarei Maasoumeh, 2012; Mancuso et al 2008; Nazir, 2015; Shabila, 2017). The study by Mancuso et al., (2008) to assess differences in women's motivations and in obstetricians' attitude in Italy found that C-section rates in southern regions of Italy were higher than rates in the northern regions. To buttress these findings, Long et al (2015) in Mozambique, and Shabila (2017) in Iraq support the finding that C-section rates were more common in the southern regions than in the northern regions due to socio-economic differences between the south and the north of these two countries .

2.9.2 Place of Residence

Studies on the association between place of residence and mode of child delivery showed that there is a correlation between the two variables. In a study by Ghosh (2010), place of residence is seen to significantly correlate with mode of child delivery. Corroborating this finding, Ilyas (2013) conducted a retrospective cohort study among Argentinean women and concluded that urban living is associated with higher rates of C-section delivery than rural living.

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Lending credence to this finding, Xing et al (2015) conducted a cross-sectional study among Chinese women and established that urban dwellers are more likely to give birth by C-section than their counterparts in the rural areas. Also Begum et al (2018), conducted a qualitative study in Matlab in Bangladesh among women attending antenatal visit and those with recent caesarean births, and concluded that women from rural community had a strong preference for normal vaginal birth. Long et al (2015), in their population-based cross-sectional study among Mozambican women to determine the changes in C-section rates between 1995 and 2011 using DHS data, provided evidence that suggests that indeed, rural dwellers are less likely to have C-section births than urban dwellers.

2.9.3 Community-level Poverty

Community-level poverty is another variable which has not been well documented in C-section research**.** Researchers believe that regardless of a woman's wealth status, the poverty-level of the community in which the woman resides could also determine her health behaviour. The poorer the community the more likely it is for the people living in the community to have poor health-seeking behaviour and to make less informed health choices (Adamba, 2013).

Although researchers have ignored the influence of community-level poverty on C-section delivery rates, studies have established the association between wealth index of an individual and C-section deliveries. These studies argued that wealthier women are more likely to have C-section than their poorer women. For instance, recent studies conducted in middle- and low-income countries indicate that women from richer backgrounds are more likely to give birth by C-section than their poorer counterparts from less-endowed backgrounds (Faremi et al., 2014; Farghali et al., 2014; R. Khan et al., 2012). From this debate, it is expected that the richer a community is, the

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more likely is it to have a higher incidence of C-section deliveries compared to the poorer communities.

2.9.4 Community-level Female Education

As earlier stated, the relationship between community-level female education and C-section deliveries has not well been interrogated. However, studies at the individual level indicate that female education has a mixed effect on the rates of C-section globally. Several studies indicate that female education is inversely related to C-section delivery. These studies argued that women with higher education are less likely to have C-section (Chung et al., 2014; Farghali, Rashed, Fathi, Moustafa, & Rahman, 2014; Kamal, 2013; Kottwitz, 2014; Roth & Henley, 2012). Few studies conducted mainly among African and Asian women have thought otherwise, indicating that female education is positively correlated with C-section deliveries (Azami-aghdash et al., 2014; Ghodrati et al., 2016; Long et al., 2015). Contrary, to this discourse, Akintayo et al (2014) and Xing Lin Feng et al (2015) found that there is no association between female education and C-section deliveries.

From the above argument, female education is likely to have the same mixed effect on C-section deliveries at the community level. That is, women living in communities with higher female education may have greater odds of giving birth by C-section (Azami-aghdash et al., 2014; Ghodrati et al., 2016; Long et al., 2015) and those living in communities with lower female education may be less likely to give birth by C-section (Chung et al., 2014; Kottwitz, 2014). Similarly, community-level female education may have no effect on C-section deliveries as seen in the studies done at the individual level (Akintayo et al., 2014; Ji, Jiang, Yang, Qian, Tang, et al., 2015).

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2.10 Proximate (Medical) Factors

Medical factors are the clinical factors which literature has identified as having influenced C-section delivery in many high-, middle- and low-income countries. The factors included in the current study were: history of pregnancy complications, history of previous C-section, birth order and size of babies at birth.

2.10.1 History of Pregnancy Complications

Inadequate management of pregnancy complications threatens the survival of many women and babies. Unfortunately, majority of these complications contributed to the high maternal and child mortality rates worldwide (Nikiéma, Beninguisse and Haggerty, 2009).

Recent studies on the relationship between being aware of one's pregnancy complications and mode of delivery have established that women who had complications during pregnancy ended up having C-section deliveries. Gama et al. (2014) concluded that complications during pregnancy and labour are the most significant contributing factors for C-section deliveries. In another study on C-section, Chung et al (2014) using data from Korean National Health Insurance System and National survey on fertility and family health concluded that women who develop complications during pregnancy and labour have high odds of delivering by C-section. Confirming the above study, a more current study on C-section in Pakistan established that pregnancy complication is a significant predictor of C-section (Nazir, 2015).

2.10.2 Previous C-section

The effects of prior C-section deliveries on subsequent C-section deliveries have been studied extensively, but most of the literature exploring the determinants of prior C-section births on successive C-section deliveries have relied on hospital-based data. Also, these studies have been

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conducted outside the sub-Saharan African setting. Most of these studies provided evidence that prior C-section delivery is a major predictor of subsequent C-section deliveries (Busaidi, Al-Farsi, Ganguly, & Gowri, 2012; Card, Silver, & David, 2018; Gjonej et al., 2015; Habib et al., 2011; Schei et al., 2016; Suzuki & Nakata, 2013; unNisa, Raza, Shams, & Gul, 2016; Witt, Wisk, & Cheng, 2015). To buttress this finding, a systematic review conducted by Azami-aghdash et al (2014) concluded that previous C-section is an important predictor of C-section birth in Iran. Several other studies have also made similar conclusions (Busaidi et al., 2012; Gjonej et al., 2015; Habib et al., 2011; Suzuki & Nakata, 2013; unNisa et al., 2016).

2.10.3 Birth Order

Studies exploring the association between birth order and C-section delivery have consistently found birth order to significantly influence C-section. Few useful studies have investigated the interaction between birth order and C-section delivery and found that birth order is inversely correlated with C-section delivery. In a study using data on 7,916 women from the Egyptian Demographic and Health Survey of 2000, Yassin et al. (2012) found that the risk of having C-section was much higher for first and second birth orders than for a higher birth order in an adjusted logistic regression model. This finding is consistent with a study by Rahman et al. (2015) which indicates that women with low birth order are more likely to have C-section deliveries than their counterparts with higher birth orders. In support of the two studies, a recent cross-sectional population-based study on the demographic and clinical determinants of C-section births in Pakistan found that the incidence of C-section is negatively related to birth order. According to the study, the higher the birth order, the less likely it is to deliver by C-section (Nazir, 2015).

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2.10.4 Size of the Child at Birth

Studies show that size of the child at birth is an important determinant of C-section delivery (Ghosh, 2010; Nazir, 2015). Ghosh (2010), conducted a cross-sectional population-based study to ascertain the association between the factors driving the decision for C-section delivery. In this study, the multivariate analyses showed that the incidence of C-section was positively correlated with the size of child at birth. Women who had smaller-sized babies were less likely to have C-section delivery. Contrarily, Nazir (2015) in his study demonstrated that the baby's size at birth was not a significant predictor of the rise of C-section deliveries in Pakistan.

2.11 Conceptual Framework for the Study

This section describes the conceptual framework which underpins this study. This study was guided by both the reviewed literature and the two theoretical models. The Social Ecological Model for the study of the factors influencing mode of child delivery and the Health Belief Model framework for interpreting the beliefs of childbearing women (women aged 18-49 who had a child in the last five years before each survey) on various modes of child delivery were adapted for this study. The constructs of the SEM are: individual-level factors (beliefs and personal characteristics), interpersonal-level factors (relational factors), institutional-level factors (factors related to hospital attendance) and community-level factors (community characteristics).

Studies have indicated that, the levels of factors in the SEM could either influence mode of child delivery directly or indirectly. Indirectly, lower levels of factors in the SEM could be nested in higher level factors to influence health-related behaviour (McLeroy, Bibeau, Steckler et al., 1988; Richard, Gauvin, & Raine, 2011). For example, Adedini (2013) used this technique where lower-level factors were nested in the higher-level factors in the SEM to influence infant and child

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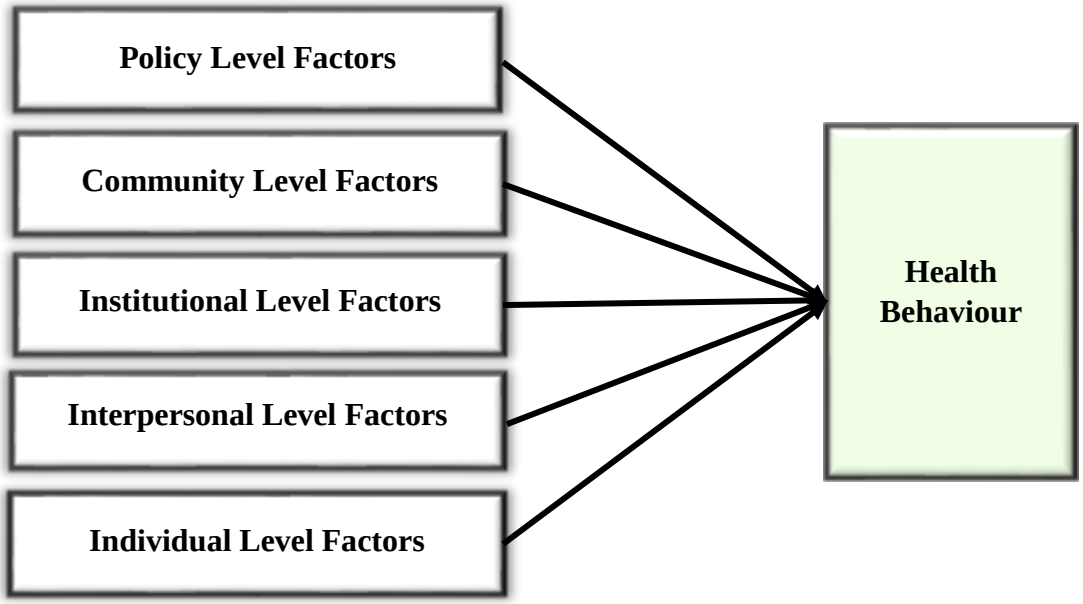
mortality in Nigeria. However, Kumar et al., (2012) alluded to the fact that levels of factors in the SEM could influence an outcome variable directly. In their cross-sectional study with the aim of examining the significance of each level of factors of the SEM in predicting H1N1 vaccine uptake in the United States of America, Kumar et al (2012) consider how the different levels of health factors influence vaccination behaviour directly using the SEM. The direction of the arrows on how each level of factors influence behaviour in Kumar's model is shown in Figure 2.3.

Figure 2. 3 Application of the Socio-Ecological Model to the Study of H1N1 Vaccine Uptake



Source: Kumar et al.(2012)

The current study adopts, combines, and modifies the models used by Kumar et al (2012) and McLeroy et al (1988) to consider how mode of child delivery is influenced by the level of factors directly. However, from the framework, only the last four levels were considered in this study. Also, medical factors which were not in the original framework were included in the model. Therefore, any medical variables found in the GDHS which are known to have increased a woman's risk of having C-section birth were included in the study. They include birth order,

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complications during pregnancy, size of child at birth and previous C-section which have been seen to influence the rise of C-section deliveries globally (Akinola et al., 2014; Faremi et al., 2014; Gartland et al., 2012; Guzman, Ludmir, & DeFrancesco, 2015; Nguyen, 2013; O'Neill et al., 2013). The arrows showing the pathways in Figure 2.4 indicate the direction of factors influencing mode of child delivery.

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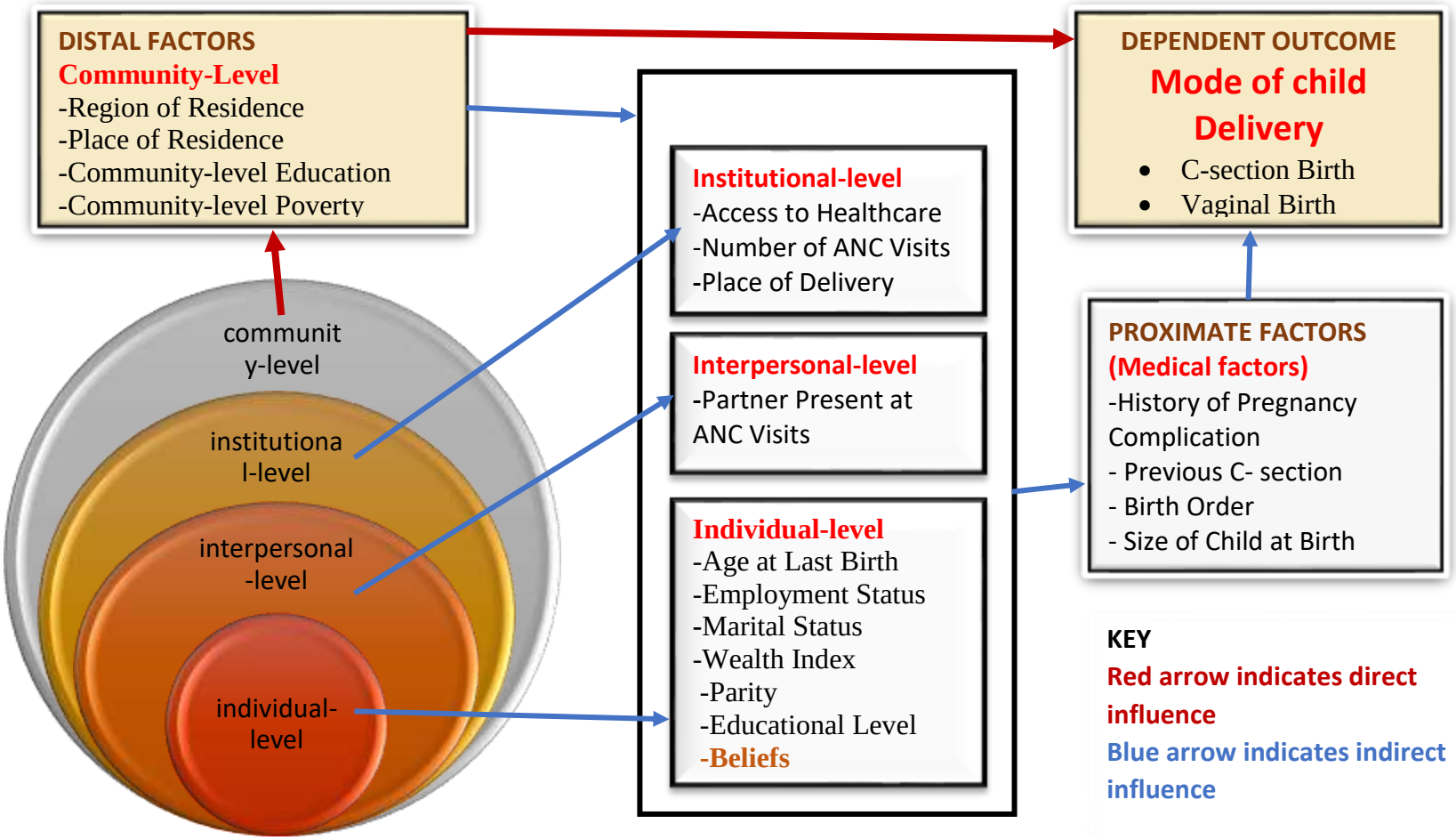
Figure 2. 4 Conceptual Framework of Community Factors on Mode of Child Delivery



Source: Adopted and modified from Kumar et al. (2012) and McLeroy et al. (1988)

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Illustrated in Figure 2.4 are the distal, mediating and proximate pathways indicating the key variables perceived as having a significant impact on mode of child delivery. This study examines the distal influence of community-level factors on mode of child delivery. Variables included in this study were woman's region of residence, place of residence, community-level poverty and community-level education. These factors would influence mode of child delivery directly as shown by the red arrows and indirectly as indicated by blue arrows in the framework. Adedini (2013) stipulates that, the contextual factors could influence the health of the individuals and as such the prevailing characteristics of the society in which the individual lives affect their health behaviour. For instance, if women from high socio-economic backgrounds are likely to give birth by C-section then you would expect that women from societies of high economic characteristics would also have high C-section rates. Therefore, regardless of a woman's personal characteristics, the society in which the woman resides is likely to mediate her chances of having C-section delivery. As indicated in the previous chapters, studies on contextual influence on C-section delivery have largely been ignored so the current study examines the direct influence of community-level factors on C-section delivery.

The blue arrows in Figure 2.4 indicate the indirect influence of community-level factors on C-section. The model suggests that irrespective of the features of a woman's community of residence, her risk of C-section delivery could be mediated by individual-level factors, interpersonal-level and institutional-level factors. The influence of community-level factors on C-section delivery could be mediated by interpersonal-level factors defined as spousal support or the presence of the spouse before and during delivery. According to the reviewed literature, the spousal encouragement before and during delivery empowers the woman to overcome fear of labour and decreases the risk of birth intervention such as C-section delivery (Sapkota et al., 2012).

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Again, the effect of community-level factors on C-section delivery could be mediated by institutional-level factors defined as place of delivery, access to healthcare and number of ANC visits. For instance, regardless of a woman's community background, the odds of having C-section would be absent when there is no access to healthcare facility defined as the visit to a health facility within 12 months preceding the survey. In furtherance to this, the relationship between community-level factors and C-section delivery could be mediated by medical factors identified as history of pregnancy complications, previous C-section experience, birth size and birth order. For example, pregnancy complications could predispose a woman to C-section birth. In this study, the levels of influence do not connote superiority. The study simply focuses on the effect of the factors on C-section delivery as indicated in the study by Kumar et al. (2012).

2.12 Summary

The review of literature indicates that several studies have been done on the influence of individual-level, institutional-level, medical factors on mode of child delivery. However, few studies were identified on the influence of interpersonal-level factors and beliefs on mode of child delivery. No study was identified to have examined the influence of community-level factors such as community-level poverty, community-level education and community beliefs on mode of child delivery. These factors have been examined in infant mortality and contraceptive usage literature. However, community-level factors such as place of residence have been well interrogated in mode of child delivery research.

The review indicate that a number of individual-level factors have been identified in C-section literature (Long, Kempas, Madede, Klemetti, & Hemminki, 2015; Sinnott, Brick, Layte, Cunningham, & Turner, 2016). In some of these studies, maternal age, highest educational

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attainment, marital status, wealth index, parity and working status among other factors have been found to significantly predict C-section delivery. The few studies that were identified to have examined the relationship between partners presence at ANC visits and C-section delivery indicate that partners presence at ANC visits is correlated to C-section delivery (Sapkota, Kobayashi, Kakehashi, Baral, & Yoshida, 2012). Also, several studies were identified on the correlation between institutional-level and C-section delivery and suggest that number of ANC visits, access to healthcare and place of child delivery predict C-section delivery (Belizán et al., 2016; Nazir, 2015). Furthermore, studies on the relationship between medical factors and mode of child delivery suggest that history of pregnancy complications, history of previous C-section, birth order and size of babies at birth significantly predict C-section delivery (Gjonej et al., 2015; unNisa, Raza, Shams, & Gul, 2016).

In addition, literature indicate that few studies exist on the influence of beliefs on mode of child delivery and found that perceived susceptibility (fear of labour pains), cues to action (doctor's advice), perceived barriers (health insurance cover) and community beliefs (religious beliefs) were found to have influence C-section deliveries mostly in low- and middle- income countries. In addition, this study has conceptualised the Social Ecological Model of health by (McLeroy et al., 1988) to include medical factors. The impact of medical factors in health research such as C-section delivery research cannot be under estimated, as extensive research has been done on the influence of medical factors on mode of child delivery. This addition to the model is a major contribution to literature and provides the latitude to merge both medical and social variables in a single framework which can underpin future social science studies.

Although several studies has been done on the determinants of C-section rise and disparities globally, what is clearly missing in the literature is whether community factors and beliefs have

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also played a role in the current C-section delivery level, trends and disparities. Research has however shown that this information is important because the health seeking behaviour of the people could be shaped by the factors in the community as well as the belief systems of the people.

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CHAPTER THREE

METHODOLOGY

3.1 Study Area and Rationale for the Selection

Ghana, one of the countries with the highest levels of C-section delivery in sub-Saharan Africa (Cavallaro et al., 2013) was selected for the study. The country is located on the West African sub-regional coast and bordered by the Gulf of Guinea to the south and three neighbouring French-speaking countries: Burkina Faso on the North, Togo on the East and Côte d'Ivoire on the West. The Western, Central, Greater Accra, Volta, Eastern, Ashanti, Brong Ahafo, Northern, Upper East, and Upper West are 10 administrative regions in Ghana (Ghana Statistical Service, 2013). In 2014, Ghana's population was estimated to be 27 million with 50 percent of the population residing in the Ashanti, Eastern and Greater Accra regions (GSS, 2014). The least populated region is Upper East Region, constituting two percent of the total population of Ghana (Ghana Statistical Service, 2013).

To ensure equitable allocation of resource and effective administration at all levels, the country is subdivided into 216 districts (Ghana Statistical Service, 2013). The Ghanaian population is made up of several ethnic groups, with the Akan constituting the largest group 48 percent, Mole-Dagbani 17 percent, Ewe 14 percent, Ga-Dangme seven percent (Ghana Statistical Service, 2013). The qualitative study was conducted among women who delivered in the Greater Accra and the Northern regions in Ghana. These regions were used as case studies because Greater Accra Region has the highest C-section rate and the Northern Region is one of the regions with the lowest C-section rates in Ghana.

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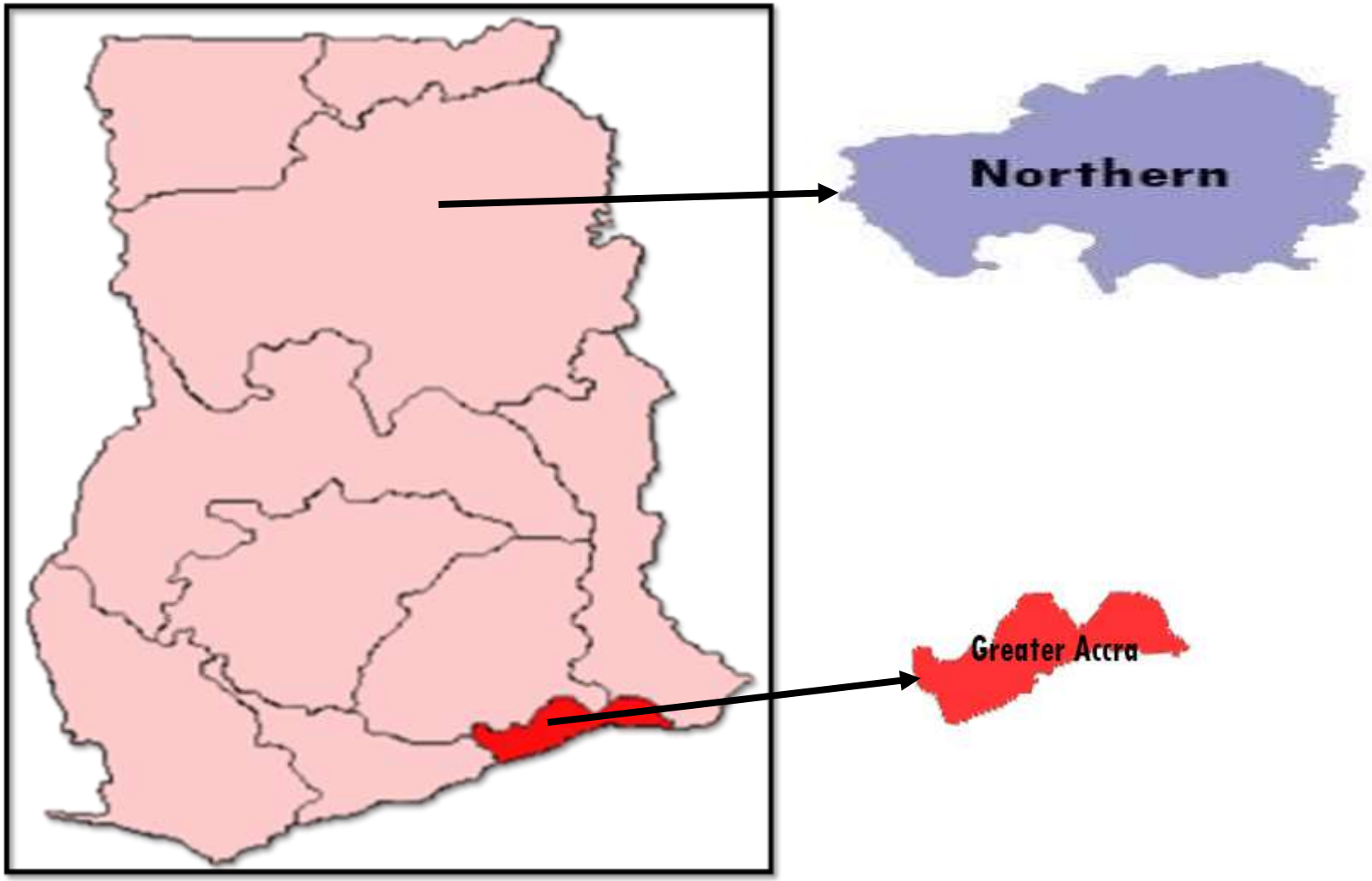
Figure 3. 1 A Map of Ghana the Location of the Quantitative Study and Showing the Location of the Qualitative Study Areas



Source: https://en.wikipedia.org, March 2019.

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3.2 Study Design

The current study adopted a mixed method approach consisting of the use of quantitative survey data and qualitative data. The quantitative part is a population-based cross-sectional analytical study using secondary datasets of the 2003, 2008 and 2014 Ghana Demographic and Health Survey. The qualitative part is a thematic analysis of primary data collected on beliefs about mode of child delivery through in-depth interviews of women who gave birth in the selected hospitals in Northern and Greater Accra regions of Ghana.

3.3 Purpose for Using Mixed Methods

The mixed methods research approach is an emerging trend in research (Sousa, Driessnack, & Mendes, 2007). The method is normally used due to the deficiency of the solitary use of qualitative techniques or quantitative techniques (Doyle, Brady, & Byrne, 2009). Doyle et al. (2009) argued that the use of either qualitative or quantitative approaches has some advantages and disadvantages. For example, studies based solely on quantitative approaches have strengths of transferability and consistency, whereas qualitative approaches can produce a comprehensive understanding of the lived experiences of the respondents. Conversely, understanding provided from quantitative research can be too abstract and the results from qualitative research may not be generalized to other settings (Doyle et al., 2009). Therefore, the blend of the two approaches in one study is consequently intended to produce an enhanced understanding of the complex problems than either technique exclusively employed (Creswell & Plano Clark, 2007; Meissner, Creswell, Klassen, Plano, & Smith, 2011).

The use of several research approaches in a study can take diverse procedures. One style is to use quantitative approaches for the initial stage and qualitative procedures for the second stage,

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conducted either sequentially or concurrently. Scholars normally adopt this approach to provide a more comprehensive understanding by using data from diverse sources (Denscombe, 2008).

The current study adopted a two-phase study approach where quantitative study based on the secondary data from GDHS, in the first study and qualitative study in the latter research. This methodology which is known as sequential mixed methods approach was used for three key purposes. First, the quantitative study, helped to identify the kind of respondents to select for the qualitative study. This method is mostly useful when investigators need to recruit important respondents to study qualitatively to appreciate their lived experiences (Creswell, Clark, & Plano Clark, 2007).

Secondly, the use of a mixed method strategy allowed for the increase in the scope of the current study. The study is intended to understand the factors driving C-section delivery rates in Ghana. The issue of factors influencing C-section rate is complex. Therefore, the scope of this study was increased through an initial study of the factors driving women to have C-section delivery through quantitative study, followed by the valuation of the beliefs on mode of child delivery. Hence, both the quantitative and the qualitative study delivered important sources of data embedded in the constructs of the Social Ecological Perspective and the Health Belief Model.

The mixed method design was also used for the purpose of complementarity where one data source is used to complement the other (Sousa et al., 2007). As factors driving mode of delivery behaviours are multifaceted, the evidence from either a qualitative or a quantitative study alone may not produce a satisfactory explanation of the reasons for the C-section disparities in Ghana. The results from the qualitative study were meant to complement the findings of the quantitative study by exploring factors which are not found in the GDHS.

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3.4.1 Study Population

For the quantitative study, the relevant data are drawn from the women's data file of the 2003, 2008 and 2014 GDHS data targeting women who are 18-49 years of age, who have had at least one live birth within the five years prior to the survey. For the analysis, SPSS 20 was used and for uniformity of respondent ages for both qualitative and quantitative study, persons under 18 (minors) were excluded from both studies. Also, the proportion of women aged 15-17 years who gave birth in the GDHS data were negligible and cannot be used to make any meaningful statistical inferences. The unit of analysis was the woman, aged 18-49 who gave birth within five years before each of the surveys.

3.4.2 Data Sources

These three datasets are nationally representative cross-sectional data which elicited information on the demographic and health indicators on women 15-49 years of age, men aged 15-59 years old as well as households. Out of 6,251 households, 5,691 women in 2003 (Ghana Statistical Service et al., 2004) . A sample size of 4,916 women aged 15-49 from 6,141 households were interviewed in 2008 (Ghana Statistical Service, Ghana Health Service, & ICF-Macro, 2009). In the 2014 survey out of 11,835 households and 9,396 women aged 15-49 were interviewed in 2014 (Ghana Statistical Service et al., 2015).

3.4.3 Sample Design for the Quantitative Study

The 2003, 2008 and 2014 GDHS used a two-phase sample design. In the initial phase for both the 2003 and 2008 GDHS clusters (enumeration areas) were selected from an updated sampling frame constructed from the 2000 Ghana Population and Housing Census (Ghana Statistical Service et al., 2004). Similarly, the initial stage for the 2014 GDHS involved choosing clusters from a

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sampling frame made from the 2010 Ghana population and housing census. The first stage involved selecting clusters using systematic sampling and probability proportional to size to arrive at a total of 412 clusters. The clusters were selected from the master sampling frame of the 2003 and 2008 datasets (Ghana Statistical Service et al., 2009, 2004) and 427 clusters from the 2014 data (Ghana Statistical Service et al., 2015).

In 2003, the second stage of selection of 6251 households from which a total of 5,691 women were selected to be interviewed (Ghana Statistical Service et al., 2004). In 2008, a total sample size of 6,141 households were selected out of 11,778 households. A total of 4,916 women aged 15-49 years aged from 6,141 households were interviewed (Ghana Statistical Service et al., 2009).

Similarly, in 2014, a total of 216 clusters in urban areas and 211 clusters in rural areas were selected from the sample clusters consisting of enumeration areas (EAs) at the initial stage (Ghana Statistical Service et al., 2015). The latter stage involved the systematic sampling of households which yielded a total sample size of 12,831 households out of which 11, 835 households were selected to be interviewed (Ghana Statistical Service et al., 2015). A total of 9,396 women aged 15-49 years were identified and interviewed (Ghana Statistical Service et al., 2015). Interviews were completed for 5,691 women with a response rate of 96 percent. For this study, after filtering the data by ages 18 and above, the sample size for the 2003, 2008 and 2014 datasets were 2,671, 2,066 and 4,134 women respectively (Ghana Statistical Service et al., 2015). The data were further filtered by those who delivered in hospitals as home delivery will not influence C-section delivery. A final sample size for the study is 5,222 childbearing women. This is made up of 2003, 2008 and 2014 datasets comprised of 1,168, 1,180 and 2,874 women respectively.

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3.5 Variables and their Measurements

The outcome variable and most of the independent variables for the study were obtained from the 2003, 2008 and 2014 GDHS datasets. However, few variables of interest that were not found in these datasets were extracted from the qualitative aspect of the study which is based on the health belief perspective.

3.5.1 Dependent Variable

The dependent variable in this study was "mode of child delivery". This question was first asked in the 2003 GDHS and subsequently in the succeeding rounds of the GDHS. The question asked in all the three surveys was: "Was (NAME) delivered by caesarean section?" This was asked for the last birth, next–to-last birth and second-from-last birth to ascertain the mode of delivery for each of those births (Ghana Statistical Service et al., 2015). Responses – yes or no – were given to this question. This study was based on whether the last birth was by C-section or not. The most recent birth was selected for the study because it, at least, captures all the women who have ever delivered in the era or prior to the survey. This could also reduce the problem of recall bias. In this study, multiple and foetal births were excluded so only singleton deliveries were included as used by the study of Guihard and Blondel (2011) on the trends in risk factors for C-sections in France. Based on this, C-section rate was calculated as births by C-section divided by all live births using only singleton deliveries. This is to allow for easy calculation of C-section rate without any ambiguity.

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3.5.2 Independent Variables for the Quantitative Study

The independent variables for this study include factors at the individual, interpersonal, institutional and community levels. The selection of independent variables for the study was guided by the literature and theoretical foundation of the research. Empirically, the selected independent variables are those known to influence mode of child birth behaviours in the literature.

3.5.2.1 Individual–Level Factors

Maternal age at last birth: This was calculated from the date of the last birth and date of birth of the mothers as well as the age of the last child. The information was coded into three categories: 18-19 years, 20-34 years, and 35-49 years. The categorisation was done to capture information from the teenagers (18-19 year group), those in the prime of the reproductive ages and those approaching the end of their reproductive age. Also, this categorisation was adopted in the 2014 GDHS report (Ghana Statistical Service et al., 2015).

Employment status: This is a measure of the employment status. The original category in the GDHS was adopted with no change as 'not working' and 'currently working'.

Current marital status: For this variable, the original categorization in the GDHS was adopted with no change as 'never married', 'formally married' and 'currently married'.

Wealth index: The wealth index classifications were in quintiles as 'poorest', 'poor', 'middle', 'rich' and 'richest'. This variable was derived from the different assets of the households in order to assess the household's cumulative living standard (Adedini, 2013). However, the variable was recoded into three categories to prevent some of the cells being too small. 'Poorest' and 'poor' were recoded as 'poor', while 'rich' and 'richest' were recoded as 'rich'. The categorization was therefore 'poor', 'middle' and 'rich'.

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Parity: This is the number of children reported to have been given birth to by women at the time of the survey. This variable was originally classified into 1, 2, 3, 4, 5, 6, 7…….13 but was recoded as 'primiparous' (parity 1) 'multiparous' (parity 2-3) and 'grand multiparous' (parity 4 or more).

Women's educational level: In this variable, the categorization in the GDHS was adopted with a little change as: 'no education', 'primary education', 'secondary education/higher'.

The categories 'secondary' and 'higher education' were combined, since the proportion of the higher categories was too small. Also it was, based on the assumption that mothers who attained secondary school and mothers with higher levels of education may not differ significantly in the choice of mode of their child's delivery.

Beliefs on mode of delivery: The variable "belief" embedded in the individual-level factors in the SEM was explored using the HBM. Perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and community beliefs (Loke et al., 2015) were the key constructs explored using in-depth interviews (IDI) in the qualitative study.

3.5.2.2 Interpersonal-Level Factors

Partner presence at ANC visits: Partners were asked the question to ascertain the social support received by the women during and after birth from the partners. The responses were encoded as 'present' and 'not present', which were maintained in the current study.

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3.5.2.3 Institutional-Level Factors

Access to healthcare: In the absence of access to healthcare variable in the GDHS, the visit to a health facility within 12 months variable in the GDHS was used as proxy for service availability. This approach was also used by Ejembi et al (2015) and Wang et al. (2014) in their respective studies. It is assumed that if a woman has access to health facility that will warrant its use and this may influence her mode of child delivery because there will be no barriers to the use of health facilities by the woman. This variable was classified as having high access if the woman visited the health facility within the last 12 months and low access if the woman did not visit the health facility within the last 12 months.

Number of ANC visits: This was assessed from the question "How many times did you receive antenatal care during this pregnancy". For the purpose of this study, this variable was categorized into 0-3 (less than four visits) and four and more visits. The first category 0-3 visits include no visits, one, two and three visits while four and more include all other number of visits. The classification was based on the studies by Ghosh (2010) and Nasir (2015) where the classification was done for below four visits and four or more visits.

Place of delivery: This was determined by asking mothers where they gave birth. The original categorisations were as follows: home delivery, public sector, government hospital, government health post, other public sector, private sector, private hospital or clinic, family planning clinic, maternity home and other place of delivery were the options available for participants to choose from (Ghana Statistical Service et al., 2015). In this study, two categories: public and private places of delivery were used. 'Government hospital', 'government health centre/clinic', 'government health post /CHPS', 'other public', 'mobile clinics' and 'maternity home' were recorded as public (Ghana Statistical Service et al., 2015). 'Private hospital' and 'other private

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medical clinic' were also recorded as 'private'. Women who gave birth at home were excluded from the study because home delivery cannot influence C-section rise.

3.5.2.4 Community-Level Factors

The community-level factors included in this study are place of residence, region of residence, community-level maternal education and community-level maternal poverty. Except for place of residence and region of residence, all the community-level characteristics were created from the individual-level factors. Using SPSS version 20, individual-level variables were combined to generate the needed community-level variables. The understanding on how to construct the community-level variables used in this study was obtained from reviewed literature (Belachew et al., 2016; Ejembi, 2015; Mekonnen et al., 2015; Yebyo et al., 2014).

The community-level factors are the contextual factors prevailing within the community in which women reside, which may invariably shape their attitudes and beliefs beyond their personalities. The community-level variables were constructed by combining individual-level characteristics at the cluster-level and comparing them with the national value to classify communities as high-level and low-level community in relation to the variable of interest.

The mean value for each variable was computed for the national sample and for each cluster (community). Thereafter, categorization of the variables was done as high or low based on the distribution of the mean values obtained for each community. The mean values were used as the threshold for the cut-off point for the classification, because the aggregate variables in the sample were not normally distributed. The methods used for the aggregation was found in the studies by Belachew, Kahsay, & Abebe (2016), Mekonnen, Lerebo, Gebrehiwot, & Abadura (2015) and Yebyo, Gebreselassie, & Kahsay (2014).

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Region of residence: This was ascertained by asking mothers the region where they currently live. The original coding in the GDHS was adopted without change as: Western, Central, Greater Accra, Volta, Eastern, Ashanti, Brong Ahafo, Northern, Upper East and Upper West(Ghana Statistical Service et al., 2015).

Place of residence: This was determined by asking mothers where they currently reside. The original responses were rural or urban which were maintained as such in this study.

Community-level maternal poverty: The GDHS survey data categorized households into five classifications of wealth index as poorest, poor, middle, rich and richest (Ghana Statistical Service et al., 2015). Community-level poverty was classified as high if less than 50 percent of the women in the community are found to be in the two lowest wealth quintiles and low if more or equal to 50 percent of the women were found to be in the middle, rich and the richest wealth quintile. This method was adopted from the study of Bela chew et al. (2016) on individual and community-level factors associated with introduction of feeding in Ethiopia.

Community-level maternal education: This variable was calculated from the average educational attainment of women in the community (EA). For each data, the mean educational attainment (number of years) is also obtained for the entire sample. The mean number of years spent in school or the mean educational attainment was also obtained for each community (EA). Communities were classified as having lower maternal education if the mean value for the community is lower than the calculated sample figure and high levels if the mean value for the community is higher than the calculated sample figure (Ejembi, 2015).

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3.5.2.5 Medical (Proximate) Variables

Previous C-section: This was ascertained using the questions on the mode of delivery for the next –to- last birth and second-from-last birth. The responses – yes or no – were given to the question –"was (NAME) delivered by caesarean section?" to ascertain whether there was previous C-section (Ghana Statistical Service et al., 2015). Mothers who have previously had a C-section are more likely to have another C-section than mothers who have never had a C-section.

History of pregnancy complications: This question was asked to determine whether the women were told of any complications during pregnancy and labour that warrant any birth intervention. The response coded in the DHS was maintained in this study as: No/ Yes.

Size of child at birth: Here, women were asked to recall the sizes of their babies at birth. In the GDHS the responses have been coded as, very large, larger than average, average, smaller than average, very small and don't know (Ghana Statistical Service et al., 2015). In this study, the variables were recoded into three categories as large (very large, larger than average), average and small (smaller than average, very small). The categorisation was done based on reviewed literature (Nazir, 2015).

Birth order: This variable showed ranking of the last birth in relation to the other siblings and in the GDHS. However, for the purpose of this study the variable was recoded into four categories as 1, 2-3, 4-5 and 6+ as done in the GDHS 2014 report on pages 113, 114 and 115 (Ghana Statistical Service et al., 2015).

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3.6 The Binary (logit) Logistic Regression Model

Logistic regression is a type of analysis used to assess the impact of a set of predictors on a dependent variable. Binary (logit) logistic regression allows you to test models to predict categorical outcomes with two categories.

We define the function:

$$\text{Logit (log odds)} = \ln [p/ (1-p)] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_{19} X_{19}$$

$$\text{Logit} = [(\exp \beta_0 + \beta X) / (1 + \exp \beta_0 + \beta X)]$$

Where P = Probability of having C-section delivery

1-P = Probability of having vaginal delivery (Not C-section)

β_0 = Intercept

β_1 = Regression coefficient (slope)

X = Predictor variables

Where X is defined as follows:

X_1 is maternal age at birth

X_2 is employment status

X_3 is marital status

X_4 is wealth index

X_5 is educational level

X_6 is parity

X_7 is partner presence at ANC

X_8 is access to healthcare

X_9 is number of ANC visits

X_{10} is Place of delivery

X_{11} is region of residence

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X_{12} is Place of residence

X_{13} is community-level maternal poverty

X_{14} is community-level maternal education

X_{15} is Place of delivery

X_{16} is history of pregnancy complications

X_{17} is previous C-section

X_{18} is birth order

X_{19} is size of child at birth

3.7 Statistical Procedure and Methods

After the three datasets were entered into SPSS version 20, the datasets were pooled together and weighted by controlling for year of survey. The pooling of the data was done to increase the sample of the women in the study, especially the sample size for the women who have had C-section delivery. The exclusion criteria were used to filter the data and after which a variety of statistical techniques were employed to answer the research questions. Descriptive statistics in terms of univariate analysis were used to explore the data and then bivariate analysis was run to establish the association between each independent variable and dependent variable. How the quantitative study objectives were addressed in relation to methods of statistical analysis and the statistical software used were as follows:

First objective: - To describe the trends in C-section in Ghana from 2003 to 2014. This was addressed based on the individual datasets and appropriate descriptive statistics were used to assess the trends and levels of C-section in Ghana at all the levels of influence. The data were analysed using SPSS Version 20 for windows. Pearson's chi-square test was used to test the statistical

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significance of the levels of C-section delivery among women in each survey and across the survey years.

Second objective: The procedure on how the second objective was addressed was described under the data analysis procedure for the qualitative study, as this objective was based on the qualitative study.

Third objective: - To identify the community-level factors associated with C-section disparities in Ghana. This was addressed by pooling together the 2003, 2008 and 2014 datasets and appropriate inferential statistics were adopted. First, both bivariate analyses and chi-square test were conducted to ascertain the association between C-section and the selected individual, interpersonal, institutional, community-level and medical factors. To answer the third research questions to assess the effects of community-level factors on C-section delivery in Ghana, five different binary logistic regression models were run. These models were run based on the pathways in the conceptual framework.

Model 1 is made up of only community-level factors and in Model 2, institutional-level factors and medical factors were added to the model. Model 3 is made up of community-level factors, individual-level factors and medical factors. Model 4 was run for community-level factors interpersonal-level factors and medical factors. In Model 5 community-level factors, individual-level factors, interpersonal-level factors, institutional-level factors and medical (proximate) factors were considered. In each case, chi-square test was used to assess the significance of a variable. The differences were significant when the p-value obtained was less than or equal to 0.05. Nagelkerke R-square was used to test the strength of the variables in the model in relation to explaining the variation in the dependent variable.

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3.8.1 Purpose of the Qualitative Study

The second stage of this study used a qualitative method to provide attain a comprehensive account of the beliefs of women who have delivered. It is expected that their beliefs could shape their preferences for a particular mode of childbirth in the Ghanaian social milieu. This study specifically aimed to understand the beliefs of women in the Greater Accra and Northern regions of Ghana on the modes of childbirth underpinned by the Health Belief Model.

3.8.2 Selection of Health Facilities

Both private and public health facilities were randomly selected based on the facilities with the highest C-section rates within the Northern and the Greater Accra regions. The sampling frame for the selection of the hospitals, which was obtained from the Ghana Health Service was made up of top five private and public hospitals which performed the most C-sections deliveries in 2016 for each region. Justification for the selection of these two regions for the qualitative part of the study was because these two regions show the widest disparities in C-section rates in Ghana which appeared to have persisted over a decade (2003-2014). It is therefore important to explore the beliefs of women on child delivery in these regions to understand the reasons behind these C-section deliveries.

This part of the study conducted in-depth interviews with the respondents who have given birth in Greater Accra and Northern Region. Sample selection was a three-stage process. In the first stage, using the list of hospitals with the most performed C-sections, two hospitals were randomly chosen from Greater Accra and Northern regions. One of the hospitals in each region was private and the other was public. This selection was based on the hospital with the highest C-section rates in the region for 2016. This information was obtained from the Ghana Health Service Research Division

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and is presented in Table 3.1. Medifem Hospital and Ridge Hospital (Accra Regional Hospital) were chosen from the Greater Accra Region while Kings Medical Centre and Tamale Teaching Hospital were randomly selected from the list provided from the Northern Region.

Table 3. 1 Top five hospitals with the highest C-section rates in Greater Accra and Northern Region, 2016

Greater Accra Region		Northern Region	
Private Hospital	**Public Hospital**	**Private Hospital**	**Public Hospital**
Pentecost Hospital	Korle-Bu Teaching Hospital	Saboba Medical Centre	Tamale Teaching Hospital
Mother of God Clinic	Tema General Hospital	Kings Medical Centre	Tamale Central Hospital
Medifem Hospital	Accra Regional Hospital	God Cares Community Hospital	Bimbilla District Hospital
Trust Hospital (Osu)	37 Military Hospital	Modern Surgical Centre	ECG Hospital
Community Hospital	La General Hospital	Suglo Hospital	Tamale West Hospital

Source: Research & Development Division -GHS, 2017

3.8.3 Selection of Respondents

To select the participants for the study, first, posters were posted and flyers were distributed at the maternity wards as well as the antenatal clinics of the selected hospitals six weeks before the start of the study. This was to create the awareness about the study before the start of the interviews. The sample of the poster and flyer are displayed in Appendices 3 and 4 respectively. At this stage most of the women showed their readiness to participate in the study but requested to be interviewed at the wards or the ANC instead of their homes when the study starts. The study started six weeks after the awareness creation and the selection of the respondents was based on their readiness to participate and meeting the inclusion criteria for selection.

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The inclusion criteria for the women in the qualitative study are:

i. Those who have given birth in the last five years from the date of the interview.
ii. Those in the 18-49 years age bracket.
iii. Those who have had live births in both or either public and private hospital.
iv. They must be residents of Greater Accra or Northern regions of Ghana.
v. Those who delivered in either Greater Accra or Northern regions.

However, the following clients were excluded from the study:

i. Women who have given birth but are underage (below 18 years of age).
ii. Women who have delivered but are more than 49 years of age.
iii. Women who delivered but with known mental or psychiatric problem.

Secondly, each woman was purposively approached at the ANC or maternity wards based on their eligibility and the three age segments of 18-19s, 20-34s and 35-49 years old. This was to ensure that different generations of women (teenagers and women who are approaching the end of their reproductive years) were captured for variety of beliefs on mode of delivery to be obtained. The number of respondents interviewed in the various hospitals is shown in Table 3.2.

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Table 3. 2 Number of Respondents Interviewed in the Various Hospitals

Age groups	Total Interviews	C-section Birth				Vaginal Birth			
		RH	MH	TH	KM	RH	MH	TH	KM
18-19 years	12	2	-	2	2	2	-	2	2
20-34 years	19	3	2	2	2	4	2	2	2
35- 49 years	I7	2	2	2	2	3	2	2	2
TOTAL	**48**	**23**				**25**			

Authors own construct, 2018

RH = Accra Regional Hospital (Public Hospital) **MH** = Medifem (Private Hospital) **TH** = Tamale Teaching Hospital (Public Hospital) **KM** = Kings Medical (Private Hospital)

Before the start of the interview, the women were asked to sign an informed consent form. The interviews were started with demographic questions on the participants. This was followed by questions on their beliefs on the mode of delivery. In the initial stages of the interviews, questions on demographic characteristics were asked to create a more relaxed atmosphere (Whiting, 2008). Throughout the interviews, probing based on answers provided was done to reveal further in-depth evidence on the beliefs of mode of child birth. A sample of 48 in-depth interviews (IDI) were conducted in the study. Also, 12 expert and key informant interviews (KII) were conducted. The interviewees included four gynaecologists, four midwives and four TBAs. With the exception of the TBAs who were selected from the communities, the other interviewees were selected from the four selected hospitals by purposive sampling techniques. Snowballing technique was used to select two Traditional Birth Attendants (TBAs) from the Greater Accra Region and two TBA from the Northern Region for the interviews. In the Greater Accra Region, Loum and Gigedeoku communities were purposively identified from the Shai-Osudoku District through the Dodowa

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Health Directorate. In the Northern Region, two TBAs were identified in Kukuo community, a suburb of Tamale and, Tolon District and interviewed.

3.8.4 Study Instrument for the Qualitative Study

In the qualitative part of the current study, an in-depth interview guide was prepared based on the five constructs of the Health Belief Model. These constructs are perceived susceptibility, perceived severity, perceived barriers, perceived benefits and cues to action. The question guide for the in-depth interview was developed from the literature on beliefs and perceptions of participants on C-section and modified to suit the Ghanaian local context. The questionnaire was pretested in Agomeda Health Centre in the Greater Accra Region. However, the final questionnaire was developed with the aim of collecting information about Ghanaian women's beliefs on mode of child birth based on the Health Belief Model. Two female fieldworkers, who have had experience in qualitative fieldwork and spoke English and local language especially those spoken in the Greater Accra and Northern regions were recruited and trained to collect the data. The guide was developed based on the previous studies of Akintayo et al. (2014), Buyukbayrak et al. (2010) and Loke et al (2015) which identified the women's preference for C-section or vaginal birth based on their beliefs. Loke et al (2015) for example validated their questionnaire using a panel of experts that included an obstetrician, a mid-wife as well as a nurse, and rated the questionnaire items on the interview guide suitable and relevant to the study, with the Content Validity Index of 0.94. Again, the questionnaire was given an overall Cronbach's alpha of 0.896, indicating that the instrument has a high level of internal reliability after a pilot study (Loke et al., 2015).

Although these studies were quantitative in nature, this questionnaire was modified for the qualitative aspect of the current study. Also modification was done based on the outcome of the

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pre testing of the questionnaire. For example, women below 18 years were not available to be interviewed so were excluded in the main questionnaire. The interview guide consists of three parts. Part A is on the socio-demographic characteristics of the participants. Part B of the guide covers questions on the beliefs relating to vaginal births and C-section births based on the five constructs of HBM (perceived susceptibility, perceived benefits, perceived severity, perceived barriers and cues to action). Part C was on the debriefing aspect of the interview and very vital information was gathered in this section. The variables used by Loke et al. (2015) in the construction of their questionnaire is shown in Table 3.3 and the adopted interview guide for this study is also shown in Appendices 5 and 6.

Table 3. 3 Constructs of the Health Believe Model

Perceived Severity i. Health concerns for baby ii. Health concerns for mother. iii. Health concerns for both mother and baby	Perceived Benefits i. Vaginal delivery is natural process ii. For early initiation of breastfeeding iii. Shorter hospital stay iv. Faster recovery after birth v. No surgical wound pain vi. No anaesthesia and operation vii. Nature process viii. Less expensive ix. Covered by health insurance
Cues to action i. Healthcare professionals ii. Relatives and peers iii. Negative stories	Perceived Barriers i. Cost of C-section
Perceived Susceptibility i. Painful labour procedure ii. Postpartum haemorrhage	

Source: Loke et al, 2015

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3.8.5 Data Analysis Procedure for the Qualitative Study

The analysis for qualitative part of this study was presented in three major stages. These are preparation, organizing and reporting (Elo & Kyngäs, 2008). The analysis for the qualitative study led to the answering of the second objective of this study.

In the first stage, a total of 48 interviews and 12 expert and key informants' interviews from the regions were recorded and transcribed verbatim by the investigator. Transcripts were reconciled with the interview record for consistency. The conceptualization of the data was done based on the research aims and underpinned by HBM. This was followed by the selection of the unit of analysis which is the woman in this regard. Finally, review of the interview records was conducted and transcripts were read severally to familiarize with the data.

In the second stage, the investigator read and re-read the transcripts, broke down the transcripts into meaningful units and put them in sentences. Then, codes were created for each sentence, a coding sheet was used to put each sentence of similar information in one category. To prevent too broad and overlapping information, codes were assessed for closeness (Joffe & Yardley, 2004). After, categories were generated, themes were identified and similar codes were put together to create subcategories. This was done with the theory underpinning the research in mind. With the help of the field supervisors, the emerging codes, subcategories and categories were constantly developed until the codes and categories were finalized in line with the HBM. The NVIVO version 11 software was used for the qualitative data analysis in this section of the work.

In the third stage, the reporting of the findings in relation to the aims of the study was presented. This was guided by the Health Belief Model which is the underpinning theory of the qualitative part of this study.

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3.9 Ethical Considerations for the Qualitative Study

Ethical approval for the qualitative part of this study was acquired from two sources. Prior to the data collection, an initial ethical clearance was acquired from the University of Ghana Ethics Committee for Humanities with approval number ECH 090/16-17 (see Appendix 2). A second approval letter was obtained from the Ghana Health Service Ethical Review Committee (GHS-ERC) with approval GHS-ERC Number GHS-ERC: 07/04/17 (see Appendix 1). The GHS-ERC provides ethical approval for all social science research and for researches that will be conducted in Ghana Health Service facilities. Ethical approval would ensure respect for the rights of all voluntary participants in the study, access to information from health facilities, and adherence to standard ethical guidelines and regulations in the conduct of scientific research.

Permission to conduct the study in public and private health facilities were also obtained from chosen hospitals with a written letter to facilitate data collection. Informed consent of all respondents in the study was obtained before the start of the interviews. Participants were guaranteed confidentiality and anonymity. They were assured that, the research was being carried out purely for academic reasons. A recruitment poster and flyer (Appendices 3 and 4) was posted and distributed in advance in the selected health facilities with all information about the study and contacts of the researcher where interested participants could contact the investigator for further clarification were also provided. The purpose of the study, the likely benefits and risks of involvement in the study and the right to withdraw from the interview were all explained to participants.

Based on their preferences and convenience regarding where and when the interview was to be carried out was arranged with each participant. Each interview took approximately 30 minutes. Respondents were given 10 Cedis worth of air time as a token of appreciation for their time spent.

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For the quantitative part of the study, analysis of the 2003, 2008 and 2014 datasets were conducted. No personal information such as names of the women were identified in the datasets. As such, there were no issues of confidentiality and anonymity of the study participants.

3.10 Strengths and Limitations of the Study

A major strength of this study is that the GDHS data which were used were collected based on a nationally representative sample of women. Therefore, a population-based C-section rate could be estimated. These data were complimented by the primary data from the in-depth interviews to account for variables that were not found in the GDHS data. In addition, this study is one of the first studies to examine the community-level factors influencing C-section deliveries conducted based on a more population-driven framework using a mixed research methods approach.

However, the findings from this study and the conclusions emanating from it may have been influenced by a number of limitations that are worth mentioning. First, the characteristics of the partners of the women in the study were not controlled for, thus the findings and conclusions on the interpersonal factors may be clouded. Second, the use of Greater Accra and Northern regions as case studies for Ghana in the qualitative study may have concealed a number of beliefs in the other regions. Third, the GDHS data were collected using a cross-sectional survey, thus making conclusions on causal inferences between independent variables and the dependent variable not possible. Lastly, the GDHS data was collected retrospectively as such there may be issues with recall bias due to memory lapses. For example, personal information such age of respondents could be over or under estimated.

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Therefore, the study was only able to estimate the strength of association between the independent variables and outcome variable. Nevertheless, the findings and conclusions from this study hold true in spite of these limitations.

3.11 Summary

In this chapter, a mixed method design was adopted using both quantitative and qualitative approaches to answer the research questions. The quantitative aspect focused on two areas: (i) the spatial levels and trends of C-section deliveries in Ghana. The source of data was the individual datasets of 2003, 2008 and 2014 GDHS. Also, (ii) community-level factors and other factors associated with C-section deliveries in Ghana. This was based on pooled data of 2003, 2008 and 2014 GDHS dataset to increase the power of the study. The sample size was 5222 respondents with the inclusion criteria being women aged 18-49 years who delivered at private or public health facility. Data analysis was done at univariate, bivariate and logistic regression levels.

On the other hand, the qualitative method was used to explore beliefs of child bearing women on mode of child delivery. Data was obtained from primary data of in-depth and key informants interviews. This was achieved through semi-structured individual interview based on the HBM. Greater Accra and Northern regions being the region with highest and lowest C-section rate in Ghana respectively were selected for the study. Two hospitals, one private and the other public were selected from each region using simple random sampling. The sampling frame for the selection of the hospital which was obtained from Ghana Health Service Research Division and was made up of top five hospital that performed the most C-section delivery in Ghana in 2016. In Greater Accra Region, Ridge and Mediferm hospitals were selected while Tamale Teaching Hospital and Kings Medical Centre were selected from Northern Region. Participants were

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purposively recruited from the four hospitals out of which 48 mothers and 11 health workers comprised four gynaecologist, four midwives and four traditional birth attendants were interviewed.

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CHAPTER FOUR

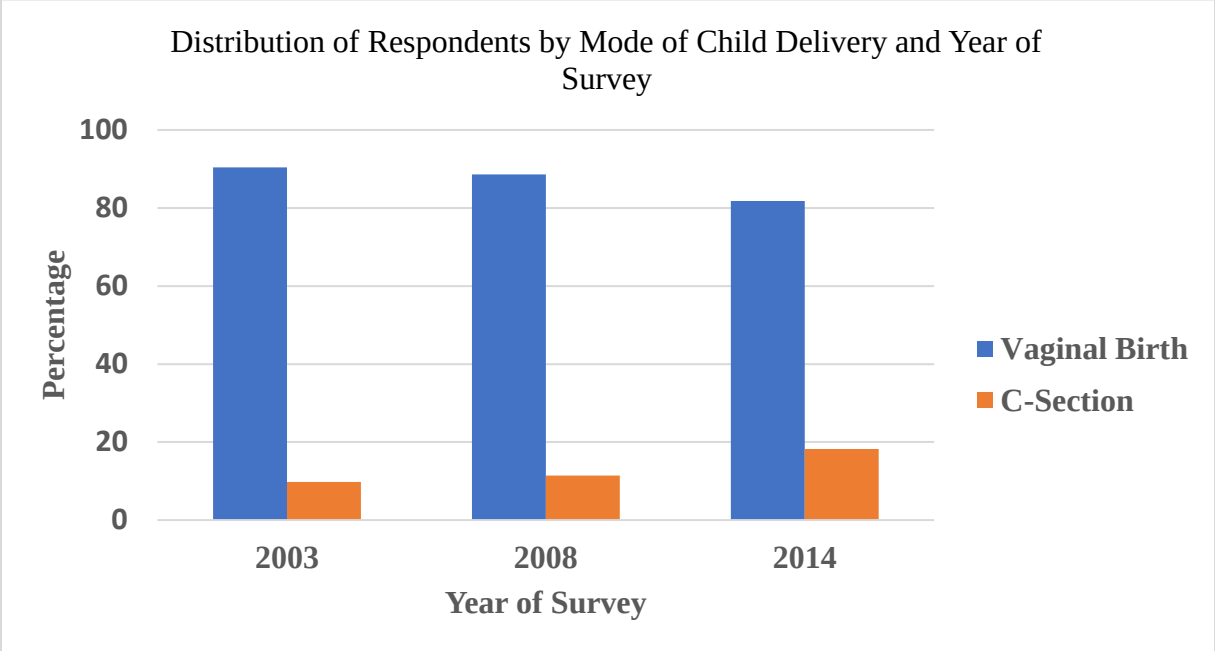
CHARACTERISTICS OF RESPONDENTS

4.1 Characteristics of Respondents in the Quantitative Study

This section presents the distribution of respondents according to selected individual-level, interpersonal-level, institutional-level, community-level and medical factors.

Figure 4.1 presents the distribution of the profile of the study population by mode of child delivery in Ghana from 2003 to 2014.

Figure 4. 1 Percentage Distribution of Respondents by Mode of Child Delivery



Source: Generated from the Ghana Demographic and Health Survey (GDHS) 2003, 2008 and 2014 data.

Figure 4.1 indicates that in 2003 the percentage of women who had C-section was approximately 10 percent (9.8 percent). The percentage of women who had C-section deliveries rose form 11.4% in 2008 and reached close to double (18.2 percent) by 2014. This implies that the proportions of

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the respondents that had C-section increased significantly from 2003 to 2014. This further suggests that by 2014 approximately one out of every five of the women gave birth by C-section in Ghana.

4.1.1 Individual-Level Factors

The selected individual characteristics which could impact C-section rate includes maternal education, maternal age at last birth and parity. Others are employment status, marital status and wealth quintile (see Table 4.1).

Table 4. 1 Individual characteristics of childbearing in the 2003-2014 GDHS Surveys

Characteristics	2003		2008		2014	
	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number
Age at delivery						
18-19 years	7.7	90	6.9	81	5.6	162
20-34 years	71.8	839	75.3	888	72.8	2091
35-49 years	20.5	239	17.8	211	21.6	621
Employment status						
Unemployed	14.0	164	14.8	174	20.0	574
Employed	86.0	1004	85.2	1006	80.0	2300
Marital Status						
Never Married	3.7	44	5.9	70	8.0	230
Currently Married	89.5	1045	87.4	1032	85.0	2444
Formerly Married	6.8	79	6.7	78	7.0	200
Wealth index						
Poor	23.5	274	27.5	324	29.4	843
Middle	18.2	213	19.8	235	20.7	595
Rich	58.3	681	52.7	621	49.9	1436
Parity						
Primiparous	26.9	315	26.8	316	25.2	723
Multiparous	41.3	482	42.7	504	43.7	1256
Grand multiparous	31.8	371	30.5	360	31.1	895
Educational level						
No education	23.9	279	19.2	227	19.3	554
Primary	20.1	235	22.5	266	17.4	501
Secondary/Higher	56.0	654	58.3	687	63.3	1819
Total % / Number	100.0	1168	100.0	1180	100.0	2874

Source: Computed from GDHS 2003, 2008 and 2014 survey data.

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It can be seen from Table 4.1 on age at delivery that, women aged 20-34 years constitute almost three-fourth (71.8 percent in 2003, 75.3 percent in 2008 and 72.8 percent in 2014) of the respondents. Nearly one-fifth of the women are 35-49 years old (20.5 percent 2003, 17.9 percent 2008, and 21.6 percent 2014) and less than a tenth of them are 18-19 years (7.7 percent 2003, 6.9 percent 2008, 5.6 percent 2014). This implies that in all the surveys greater proportion of the women were in the 20-34 year group, because this is the peak ages at childbearing in Ghana. This is followed by the 35-49 year olds with the smallest proportion of them being within the 18-19 year group.

The results of the analysis in Table 4.1 on employment status of the women show that a substantial proportion of the women were working (86 percent, 85.2 percent and 80 percent respectively in 2003, 2008 and 2014). This suggests that the proportion of the women who were working decreased and those who were not working increased over the period.

Considering marital status, the results of the analysis indicate that about 9 out of every 10 of the women were currently married (89.5 percent in 2003, 87.4 percent in 2008 and 85 percent 2014). The percentage that were formerly married was approximately 7 percent for all the years (6.8 percent, 6.6 percent and 7 percent respectively in 2003, 2008 and 2014). The proportion that were never married was 3.7 percent in 2003, increased to 5.9 percent in 2008 and 8 percent by 2014. This suggests that in all the surveys, larger proportions of the study population were married. However, the proportion of the women who were currently married decreased and those who never married increased over the study period (see Table 4.1).

With regard to wealth index, Table 4.1 indicates that the percentage of those in the categories classified as poor increased from 23.5 percent in 2003 to 29.4 percent in 2014. The percentage that were within the middle quintile was approximately 20 percent for all the years (18.2 percent, 19.8

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percent and 20.7 percent respectively in 2003, 2008 and 2014). More than half (58.3 percent) of the women were in the rich category in 2003. This percentage dropped gradually to 52.7 percent in 2008 and 49.9 percent by 2014. This shows that in all the surveys, higher proportions of the study population were in the rich category. However, whilst the proportion of women in the poor category increased those in the rich category decreased over time.

The results of the analysis in Table 4.1 on parity indicate that a little more than one-fourth of the women in 2003 (26.9 percent), 2008 (26.8 percent) and 2014 (25.2 percent) were primiparous. Approximately 4 out of every 10 of the women were multiparous (41.3 percent, 42.7 percent and 43.7 percent, respectively in 2003, 2008 and 2014). The results of the analysis further show that close to one-third (31.8 percent in 2003, 30.5 percent and in 2008 and 31.1 percent in 2014) of the respondents were grand multiparous women. The results of the analysis indicate that greater proportion of the women were multiparous, followed by those in the grand multiparous group with the least proportion of them being primiparous. This pattern of distribution was observed in all the three survey years.

Regarding maternal education, the results of the analysis show that more than one-fifth (23.9 percent) of the women in 2003, slightly below one-fifth (19.2 percent) in 2008 and 19.3 percent in 2014 had no education. The proportion that had primary education was 20.1 percent in 2003. It increased slightly to 22.5 percent in 2008 and then decreased to 17.4 percent by 2014. The analysis further indicates that approximately 6 out of every 10 of the women had secondary/higher education (56.0 percent in 2003, 58.3 percent in 2008 and 63.3 percent in 2014). The pattern of distribution suggests that in all the three surveys larger proportions of the women were educated to secondary/higher level. This pattern indicates that the proportion of women with secondary/higher education increased over the period of time (see Table 4.1).

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4.1.2 Interpersonal-Level Factors

This section presents the distribution of the characteristics of the respondents by key relational factors with regard to delivery. The relational characteristics pertaining to delivery were asked of the men and were pulled from the men's data. Questions on these relational factors in the DHS were not asked in the 2003 survey, but only in the 2008 and 2014 surveys. In this study, the only relational variable was whether husband was present during check-ups for the most recent child. However, before this question the partner was asked whether the mother of the child attended ANC. So, in this study, only one variable was considered as the relational factor between the woman and the partner to be studied. The analysis on interpersonal-level factor is presented in Table 4.2. On whether the partners were present during ANC visits and delivery, the results of the analysis show that, about 7 in every 10 (65.5 percent) of the respondents in 2008 and more than 5 in every 10 (54 percent) of the women in 2014 were not accompanied by the partners to the ANC clinics. This distribution suggests that although most women were not accompanied by their partners, the proportion of women whose partners were present for ANC visits has increased significantly over the period (see Table 4.2).

Table 4. 2 Interpersonal characteristics of Childbearing women in the 2003- 2014 GDHS Surveys

Characteristics	2008		2014	
	Percentage (%)	Number	Percentage (%)	Number
Partners presence at ANC				
Not present	66.5	342	54.0	346
Present	33.5	172	46.0	295
Total%/ Number	100.0	514	100.0	641

Note: Information on partners' presence at ANC visits is missing for most women because partners claim they did not father a child in the last five years, so they were not asked this question.
Source: Computed from GDHS 2003, 2008 and 2014 survey data.

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4.1.3 Institutional-Level Factors

At the institutional level, the variables under consideration in this study are place of delivery, access to healthcare and number of ANC visits (see Table 4.3). The quantitative results with regard to access to healthcare show that, approximately 40 percent of the women in 2003 and close to one-third (31.2 percent in 2008 and 30.1 percent in 2014) of them had low access to healthcare. The reverse is, therefore, true for the women who had high access to healthcare. The distribution indicates that higher proportion of the women had high access to healthcare. This proportion of the women who had high access to healthcare has increased from approximately 60 percent in 2003 to 70 percent in 2014.

Table 4.3 indicates that majority of the women in the three surveys had more than 4 ANC visits. More than 9 out of every 10 (90.9 percent in 2003, 90.8 percent in 2008 and 94.5 percent in 2014) of the women had more than 4 ANC visits. The pattern suggests that there has been increasing access to ANC for women over the period of the study.

Considering place of delivery in Table 4.3, the results of the analysis on all the three surveys indicate that the majority (78.7 percent in 2003, 83.2 percent in 2008 and 88.5 percent in 2014) of the women delivered at public hospitals. The pattern further suggests that women who deliver at private hospitals dropped while those who deliver at public hospitals increased over the period.

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Table 4. 3 Institutional characteristics of childbearing women in the 2003-2014 GDHS Surveys

Characteristics	2003		2008		2014	
	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number
Access to healthcare						
Low access	39.7	464	31.2	368	30.1	866
High access	60.3	704	68.8	812	69.9	2008
Number of ANC visits						
1-3 visits	9.1	106	9.2	108	5.5	157
4 or more visits	90.9	1062	90.8	1072	94.5	2717
Place of delivery						
Public hospital	78.7	919	83.2	982	88.5	2544
Private hospital	21.3	249	16.8	198	11.5	330
Total %/ Number	100.0	1168	100.0	1180	100.0	2874

Source: Computed from GDHS 2003, 2008 and 2014 survey data

4.1.4 Community-Level Factors

At the community-level, the important variables used in this study were place of residence, region of residence, community-level maternal poverty and community-level maternal education (see Table 4.4). Overall, in the three surveys, nearly one out of every four (25.9 percent in 2003, 22.8 percent in 2008 and 20.3 percent in 2014) of the women resides in the Ashanti Region. Approximately, one-fifth (19 percent in 2003, 18.2 percent in 2008 and 20.9 percent in 2014) of the women were residents of Greater Accra Region.

The results of the analysis in Table 4.4 further indicate that in all the three surveys**,** less than one-tenth of the sample were drawn from each of five regions, namely; Volta Region (7.7 percent in 2003, 8.1 percent in 2008 and 6.8 percent in 2014), Eastern Region (9.8 percent in 2003, 9.5 percent in 2008 and 8.6 percent in 2014) and Northern Region (4.3 percent in 2003, 7.0 percent in 2008 and 6.3 percent in 2014), Upper East (2.3 percent in 2003, 4.5 percent in 2008 and 4.8 percent

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in 2014) and Upper West (3.5 percent in 2003, 2.0 percent in 2008 and 2.4 percent in 2014). Again, about one-tenth (13.5 percent in 2003, 11.0 percent in 2008 and 9.4 percent in 2014) of the respondents were resident in the Brong-Ahafo Region.

Table 4. 4 Community characteristics of Childbearing women in the 2003-2014 GDHS Surveys

Characteristics	2003		2008		2014	
	Percentage (%)	**Number**	**Percentage (%)**	**Number**	**Percentage (%)**	Number
Region of residence						
Greater Accra	19.0	222	18.2	215	20.9	600
Central	6.5	76	8.0	94	10.3	295
Western	7.5	87	8.9	105	10.2	292
Volta	7.7	90	8.1	97	6.8	196
Eastern	9.8	115	9.5	112	8.6	248
Ashanti	25.9	302	22.8	269	20.3	581
Brong Ahafo	13.5	158	11.0	129	9.4	271
Northern	4.3	50	7.0	82	6.3	182
Upper East	2.3	27	4.5	53	4.8	139
Upper West	3.5	41	2.0	24	2.4	70
Place of residence						
Urban	59.3	693	55.8	658	56.6	1626
Rural	40.7	475	44.2	522	43.4	1248
Community Poverty						
Low poverty	41.9	489	38.6	455	36.5	1049
High poverty	58.1	679	61.4	725	63.5	1825
Community education						
Low education	48.6	567	51.0	602	46.4	1333
High education	51.4	601	49.0	578	53.6	1541
Total %/ Number	100.0	1168	100.0	1180	100.0	2874

Source: Computed from GDHS 2003, 2008 and 2014 survey data

Table 4.4 also indicates that the percentage of women residing in Central and Western regions increased slightly from 2003 to 2014. Both regions accounted for less than one-tenth each of the

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sample in 2003 and 2008 but increased to more than one-tenth each. The results of the analysis showed that 7.4 percent in 2003, 8.9 percent in 2008 and 10.2 percent in 2014 of the women reside in the Western Region while 6.5 percent in 2003, 8.0 percent in 2008 and 10.2 percent in 2014 of the women were sampled from the Central Region. This implies that overall, higher proportion of the sample were in Ashanti Region, followed by Greater Accra Region with the lowest proportion of the women residing in Upper West, followed by Upper East and then Northern Region.

The distribution of the respondents by place of residence reveals that more than half (59.3 percent in 2003, 55.8 percent in 2008 and 56.6 percent in 2014) of the study sample were urban dwellers. This pattern of distribution was observed for all the three surveys and indicates that most of the women are urban dwellers (see Table 4.4).

Table 4.4 further indicates that a considerable number of the women were living in communities with high levels of maternal poverty. Those who reside in high poverty communities made up close to 60 percent (58.1 percent) in 2003. The percentage was over 60 percent in the 2008 (61.4 percent) and 2014 (63.5 percent) surveys. The distribution suggests that the proportion of women residing in communities with high level of poverty increased over the period.

Regarding community-level maternal education in Table 4.4, the three datasets indicate that more than half of the women in 2003 and 2008 (51.4 percent and 53.6 percent respectively) and slightly less than half (49 percent) in 2014 stay in communities with high levels of maternal education. This pattern suggests that women residing in communities with low level of maternal education and residing in communities with high level of maternal education had similar proportion. However, the percentage of those residing in communities with high maternal education were slightly higher than their counterparts in 2003 and 2014 but lower than their counterparts in 2008 (see Table 4.4).

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4.1.5 Medical Factors

Medical factors are the factors that may mediate the effect of individual-level, interpersonal-level, institutional-level and community-level factors on C-section deliveries in Ghana. The medical factors considered in this study were experience of previous C-section, history of pregnancy complications, size of child and birth order (Table 4.5).

Table 4. 5 Medical characteristics of Respondents in the 2003-2014 GDHS Surveys

Characteristics	2003		2008		2014	
	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number
History of Pregnancy Complications						
No	30.8	360	24.3	286	13.7	394
Yes	69.2	808	75.7	894	86.3	2480
Previous C-section						
No	99.1	1157	96.9	1144	96.1	2762
Yes	0.9	11	3.1	36	3.9	112
Birth order						
1	24.7	289	25.2	298	23.9	687
2-3	39.5	460	41.8	492	41.2	1182
4-5	20.5	240	22.1	261	23.6	679
6 or more	15.3	179	10.9	129	11.3	326
Size of child at birth						
Large baby	44.8	523	56.9	670	51.3	1476
Average baby	40.5	473	32.5	383	33.1	951
Small baby	14.7	172	10.6	125	15.6	447
Total%/ Number	100.0	1168	100.0	1179	100.0	2874

Note: Information on size of child at birth is missing for one woman in 2008
Source: Computed from GDHS 2003, 2008 and 2014 survey data

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It can be seen from Table 4.5 that approximately seven in every ten (69.2 percent) of the women in 2003, close to eight out of every ten (75.7 percent) of the women in 2008 and nearly nine in every ten (86.3 percent) of the women in 2014 had a history of pregnancy complications. This pattern suggests that the proportion of women with pregnancy complications increased over time.

The distribution of the women in the surveys by history of previous C-section delivery shows that a very high proportion (99.1 percent in 2003, 96.9 percent in 2008 and 96.1 percent in 2014) of the women have had no prior C-section births (Table 4.5). Although the proportion of women who have had previous C-section increased over the period, the small percentage recorded suggests that C-section was not common among Ghanaian women in the past.

Considering birth order, the results of the analysis indicate that about one-fourth (24.7 percent in 2003, 25.2 percent in 2008 and 23.9 percent in 2014) of the women are women with first-order birth. Again, on the average, two in every five (39.5 percent in 2003, 41.8 percent in 2008 and (41.2 percent in 2014) of the women are women with second and third birth order. The results of the analysis further show that more than one-fifth (20.5 percent in 2003, 22.1 percent in 2008 and 23.6 percent in 2014) of the respondents have fourth and fifth birth order, whereas more than one in every ten (15.3 percent in 2003, 10.9 percent in 2008 and 11.3 percent in 2014) of the women are women with sixth or more birth order. As shown in this pattern, in all the surveys a higher proportion of the women had between second and third birth order (see Table 4.5).

With respect to the size of the child at birth in Table 4.5, the results of the analysis show that approximately two out of every five (44.8 percent) of the women had large-sized babies in 2003. This percentage increased to more than half (56.9 percent) of the women in 2008 and decreased slightly to 51.3 percent in 2014. The results of the analysis further indicate that close to two-fifth (40.5 percent) of the sample in 2003; slightly more than one-third (32.5 percent in 2008 and 33.1

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percent in 2014) of them had average-sized babies. Also, only a small fraction of the women delivered small-sized babies as indicated by all the three surveys. More than one-tenth (14.7 percent in 2003, 10.6 percent in 2008 and 15.6 percent in 2014) of the women gave birth to small-sized babies. The distribution shows that in all the three surveys a higher proportion of the study population had large-sized babies (see Table 4.5).

4.3 Characteristics of women in the Qualitative Study

A total of forty-eight mothers were recruited and interviewed for the qualitative study. Twenty-three mothers delivered by C-section and twenty-five of them delivered vaginally. In all, the participants were between the ages of 18 and 45 years with the mean age of 29 years. The women who delivered by C-section were between the ages of 19 and 41 years with the mean age being 30 years. The ages of women who delivered vaginally ranges from 18 to 45 years with the average age of 28 years (see Table 4.6).

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Table 4. 6 Background Characteristics of Women in the Qualitative Study

	C-section Delivery		Vaginal Delivery		Both	
Characteristics	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**	**Number**
Mean Age (years)	-	30	-	28	-	29
Marital Status						
Married	73.9	17	84	21	79.2	38
Single	26.1	6	16	4	20.8	10
Education level						
No education	8.7	2	16.0	4	12.5	6
Primary	4.3	1	12.0	3	8.3	4
J.H.S/Middle	8.7	2	12.0	3	10.4	5
Secondary	26.1	6	20.0	5	22.9	11
Higher	52.2	12	40.0	10	45.8	22
Region of Residence						
Greater Accra Region	60.9	14	46.1	11	53.1	25
Northern Region	39.2	9	53.9	14	46.9	23
Place of Delivery						
Ridge hospital	34.8	8	36.0	9	35.4	17
Medifem hospital	26.1	6	8.0	2	16.7	8
Tamale Teaching	26.1	6	28.0	7	27.1	13
Hospital	13.0	3	28.0	7	20.8	10
Kings Medical Centre						
Total of interviews	-	**23**	-	**25**	-	**48**

Source: Author's Fieldwork, October, 2017

It can be seen from Table 4.6 that participants were generally married women. About 74 percent and 84 percent of the women who delivered by C-section and vaginal delivery respectively reported being married. The educational level of the women in the study was generally high. Among the women who delivered by C-section a higher proportion (52.2 percent) had tertiary education. Also, among the women who delivered by vaginal process, a higher proportion (40 percent) of the mothers had tertiary education. A total of 25 women were recruited from Greater Accra Region. Out of this number 14 delivered by C-section and 11 by vaginal delivery. In the Northern Region, 23 participants took part in the study. Nine women gave birth by C-section and 14 vaginally (see Table 4.6).

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Seventeen women were recruited from Ridge Hospital (Greater Accra Regional Hospital). Eight of these women had C-section delivery and nine had vaginal delivery. At Mediferm Hospital, only eight participants were interviewed, out of which six had C-section and two had vaginal delivery. A total of 13 women were interviewed at Tamale Teaching Hospital. Six mothers out of this number had C-section delivery and seven had vaginal delivery. The participants from King's Medical Centre were ten in all. Three had C-section and the rest of the seven had vaginal delivery (see Table 4.6).

4.2 Characteristics of Expert and Key Informants in the Qualitative Study

Table 4.7 indicates that a total of eleven expert and key informants were recruited and interviewed. They are made up of four gynaecologists, four midwives and three Traditional Birth Attendants. The participants were between the ages of 23 and 63 years. The gynaecologists were between the ages of 28 and 34 years with the mean age being 31 years. The ages of the midwives ranged from 23 to 58 years with the mean age of 41 years. The ages of the TBAs ranged from 56 to 63 years with 59.5 years as the mean age. Greater proportion of the participants are married and majority of the participants are female. Two midwives were interviewed from Greater Accra Regional Hospital, one from Tamale Hospital and one was interviewed from Kings Medical Centre. Two gynaecologists each were interviewed from Tamale Teaching Hospital and Accra Regional Teaching Hospital. In all, four TBAs were interviewed, two were drawn from Greater Accra Region and Northern Region. Two of the TBAs have obtained Middle School Leaving Certificate and two of them had no education.

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Table 4. 7 Background Characteristics of Health Workers in the Qualitative Study

Characteristic	Gynaecologist (N=4)	Midwives (N=4)	TBA (N=4)
Sex			
Male	1	0	1
Female	3	4	3
Education-level			
No education	0	0	2
J.H.S/Middle	0	0	2
Tertiary	4	4	0
Region of residence			
Greater Accra	2	2	2
Northern	2	2	2
Place of work			
Ridge Hospital	2	2	0
Tamale Teaching Hospital	2	1	0
Kings Medical Centre	0	1	0

Source: Author's Fieldwork, October, 2017

4.3 Summary

C-section was approximately 10 percent in 2003. The percentage rose and reached close to double (18.2 percent) by 2014. Again, that in all the surveys greater proportion of the women were in the 20-34 year group, followed by the 35-49 year olds with the smallest proportion of them aged 18-19 years. Also, a higher proportion of the population were employed. The proportion who were employed decreased and those who were not employed increased over the period. With regard to marital status, a higher proportion of the study population were currently married women. This proportion decreased and those who never married increased over the study period. In all the surveys, a higher proportion of the study population were in the rich category. This proportion decreased while women in the poor category increased over time. Also, greater proportion of the women were multiparous, this is followed by those in the grand multiparous with the least

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proportion of them being primiparous. Furthermore, the pattern of distribution suggests a higher proportion of the women were educated to secondary/higher level. This proportion of women with secondary/higher education increased over the period of time. Again, the distribution suggests that although most women were not accompanied by their partners, the proportion of women whose partners were present for ANC visits had increased over the period.

Regarding access to healthcare, the distribution indicates that a higher proportion of the women had high access to healthcare. This proportion of the women who had high access to healthcare has increased from approximately 60 percent in 2003 to 70 percent in 2014. The pattern also suggests that although majority of the women had access to ANC, there has been further increase in the access to ANC for women over the period from approximately 91 percent in 2003 to 95 percent in 2014 (see Table 4.3). Again, this distribution indicates that higher percentage of the women deliver at public hospitals. The pattern further suggests that women who deliver at private hospitals dropped while those who deliver at public hospitals increased over the period.

Overall, a higher proportion of the sample resides in Ashanti Region followed by Greater Accra Region with the lowest proportion of the women residing in Upper West followed by Upper East and then Northern Region. This pattern of distribution was observed for all the three surveys and indicate that most of the women are urban dwellers. The proportion of women residing in communities with high level poverty increased over the period. This distribution suggests that women residing in communities with low level of maternal education and residing in communities with high level of maternal education had similar proportion. However, the percentage of those residing in communities with high maternal education were slightly higher than their counterparts in 2003 and 2014 but lower than their counterparts in 2008.

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The distribution suggests that the higher proportion of women in the population had history of pregnancy complications which increased over time. Although the proportion of women who have had previous C-section increased over the period, the small percentage recorded suggests that C-section was not common among Ghanaian women in the past. The pattern suggests in all the surveys, a higher proportion of the women had between second and third birth order. The distribution shows that in all the three surveys higher proportion of the study population had large-sized babies.

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CHAPTER FIVE

SPATIAL LEVELS AND TRENDS IN C-SECTION DELIVERIES IN GHANA

5.1 Spatial Levels and Trends in C-section Deliveries in Ghana

Table 5.1 is on the levels and trends of C-section delivery for the five-year period preceding the 2003, 2008 and 2014 surveys. Since 2003, there has been a steady increase in the use of surgical delivery by Ghanaian women. This suggests that as at 2014 the population-based C-section rate has exceeded the WHO recommended threshold of 15 percent. This finding supports earlier studies conducted in high-, middle- and low-income countries that indicate that the current C-section rise is a global phenomenon (Betrán et al., 2016; Gebremedhin, 2014; Y. Liu et al., 2014; Long et al., 2015). The findings may suggest that there could be the possibility that C-section is being misused by a section of the population. It is, therefore, important for the Ministry of Health to adopt some initiative which has worked elsewhere, to ensure that C-section is provided on medical indication only. For example, the US Healthy People 2000 Initiative which has helped US maintain an optimal C-section rate of 15 percent in many parts of the country (Yassin et al., 2012) can be adopted in Ghana. The approaches have been implemented in several developing countries and were shown to have worked in many low-resourced countries as well (Yassin et al., 2012).

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Table 5. 1 C-section rates by Interpersonal characteristics of women in the 2003-2014 GDHS

Characteristics	2003 (n =1168) %	2008 (n =1180) %	2014 (n =2874) %	p value1 2003 vs 2008	p value 2 2008 vs 2014
National C-section	9.8	11.4	18.2		
Age at delivery					
18-19 years	10.0	4.9	8.0	0.202	<0.001
20-34 years	9.2	11.8	17.1	0.083	<0.001
35-49 years	12.1	12.3	24.5	0.281	<0.001
p values 3	0.400	0.160	<0.001		
Employment Status					
Unemployed	4.9	13.1	17.3		
Employed	10.2	11.5	18.4	0.909	0.372
p values 3	<0.05	0.443	0.539		
Marital Status					
Never Married	6.7	2.9	16.5	0.500	0.100
Currently Married	10.2	12.0	17.8	0.258	<0.05
Formerly Married	6.3	10.3	24.0	0.216	0.095
p value 3	0.407	0.062	0.075		
Wealth Index					
Poor	7.7	7.4	10.3	0.008	<0.001
Middle	6.6	12.8	14.3	0.002	<0.001
Rich	11.7	12.9	24.4	0.198	<0.001
p value 3	<0.05	<0.05	<0.001		
Parity					
Primiparous	11.4	13.6	24.9	0.069	<0.001
Multiparous	11.4	10.5	16.7	<0.05	<0.001
Grand multiparous	6.5	10.8	14.6	0.106	0.300
p value 3	<0.05	0.364	<0.001		
Educational Level					
No education	6.8	8.4	10.1	<0.001	<0.001
Primary	7.2	9.4	15.8	<0.01	<0.001
Secondary/Higher	12.1	13.1	21.3	<0.05	<0.001
p value 3	<0.05	0.080	<0.001		

Source: Computed from GDHS 2003, 2008 and 2014 survey data

5.2 Individual-Level Factors Influencing the Levels and Trends in C-section Deliveries

Table 5.1 indicates that C-section delivery rate increases with increasing maternal age at birth except in 2003 when the rate for those 18-19 years (10.0 percent) was higher than that of the 20-34 years (9.2 percent). For example, in the most recent survey, a positive significant relationship

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($p<0.001$) was observed between age and C-section delivery. Here, 24.5 percent was recorded among the older women, and this is higher than the proportions among women aged 20-34 years (17.1 percent) and those aged 18-19 years (8.0 percent) respectively. Overall, from 2003 to 2014, C-section delivery rate declined among teenagers from 10.0 percent in 2003 to 8.0 percent in 2014 and increased among women aged 20-34 years (9.2 percent in 2003 to 17.1 percent in 2014) as well as older women (12.0 percent in 2003 to 24.5 percent in 2014). The trend of increase is more significant between 2008 and 2014 ($P<0.001$) across all age categories. The results of the analysis further indicate that older women contributed significantly to the rise of C-section delivery between 2003 and 2014. This finding is expected, as women in advanced maternal ages are more likely to suffer from obstetric and maternal complications that may subsequently contribute to the increasing rate of C-section deliveries. Apart from this, older women may be at risk of many other health complications which may be aggravated during pregnancy and, therefore, may be predisposed to surgical birth which saves their lives. It is therefore important for health workers to educate women on the need to avoid getting pregnant at advanced ages which will expose them to C-section deliveries. The findings on the increasing levels of C-section rates at advanced ages is supported by Suzuki et al., (2013) ; Tebeu et al., (2011); Wang et al., (2016). Nevertheless, this finding is contradictory to other research findings. For example, it is in contrast with findings by Roth (2012) that C-section delivery rates among older women are not different from the younger women.

Again, the datasets indicate a higher C-section rate among employed women (10.2 percent in 2003, 11.5 percent in 2008 and 18.4 percent in 2014) than unemployed women (4.9 percent in 2003, 13.1 percent in 2008 and 17.3 percent in 2014). However, this relationship is statistically significant ($p<0.05$) for only the women in the 2003 survey. The analysis further suggests that over the last

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decade (2003-2014), employed women had higher C-section rate (see Table 5.1). Results of the analysis indicate that C-section deliveries rose across all categories of women from 2003-2014. However, generally the rise in levels and trend of C-section delivery according to employment status seems marginal as the findings suggest no statistically significant differences in the C-section delivery rates. The findings confirm previous studies which suggest that globally, employment status is not associated with the rise of C-section delivery rate (Ghosh, 2010; Nazir, 2015).

Generally, the relationship between marital status and C-section delivery is not statistically significant in all the datasets (Table 5.1). However, the 2008 survey indicates a higher C-section delivery rate for formerly married women (24.0 percent) than currently married (17.8 percent) and never married women (16.5 percent). Again, the 2014 survey suggests a higher rate for formerly married women (24.4 percent) than the currently married (17.8 percent) and never married women (16.5 percent). This trend is significant only between 2008 and 2014 ($p<0.05$) for currently married women whose rates increased from 12.0 percent in 2008 to 17.8 percent in 2014. This is contradictory to what most studies have found where marital status was found to influence C-section, although studies that examine the relationship between marital status and C-section delivery are limited in number (GamaNogueira et al., 2014; Tebeu et al., 2011).

The study also indicated in Table 5.1 that the association between wealth index and C-section delivery was generally statistically significant in all the datasets. In the survey years, there were higher C-section rates among women from rich backgrounds (11.7 percent in 2003, 12.9 percent in 2008 and 24.4 percent in 2014) than women who are from middle backgrounds (6.6 percent in 2003, 12.8 percent in 2008 and 14.3 percent in 2014) and poor backgrounds (7.7 percent in 2003, 7.4 percent in 2008 and 10.3 percent 2014). The results of the analysis suggest that these categories

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of women may have significantly contributed to the rise of C-section delivery rates between 2003 and 2014. This finding confirms earlier studies that indicated that households' ability to afford surgical birth is significantly associated with C-section delivery (Arsenault et al., 2013; Faremi et al., 2014; Ghosh, 2010; R. Khan et al., 2012; Long et al., 2015). For instance, Long et al.'s (2015) study on the trends in C-section delivery established that women from rich households were one of the contributors to the rising trends in C-section deliveries in Mozambique. A number of reasons may have accounted for this difference. First, women from a higher socio-economic status generally choose private hospitals where C-section delivery is more common, and there may be interest among these women to attempt new birth interventions such as C-section. Second, poorer households may not be able to afford the surgery and the additional cost associated with.

Parity was found to be positively correlated to C-section delivery rate in that C-section rate increases with decreasing parity in 2003 ($p<0.05$) and 2014 ($p<0.001$). For example, in all the datasets the highest C-section delivery rates were found among primiparous women (11.4 percent in 2003, 13.6 percent in 2008 and 24.9 percent in 2014) followed by multiparous women (11.4 percent in 2003, 10.5 percent in 2008 and 16.7 percent in 2014) and then grand multiparous women (6.5 percent in 2003, 10.8 percent in 2008 and 14.6 percent in 2014). The trend was significant between 2008 and 2014 ($p<0.001$) for primiparous and multiparous women respectively and between 2003 and 2008 ($p< 0.05$) for multiparous women (see Table 5.1). The results of the analysis showed that primiparous women contributed significantly to the high levels of C-section in 2003 and 2008. This outcome buttresses what most studies have found that parity (most importantly primiparous women) has a strong influence on C-section levels and trends (Farghali, Rashed, Fathi, Moustafa, & Rahman, 2014; Yassin, Saida, & Yassin, 2012).

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Maternal educational status was found to be positively significantly related to C-section rates in 2003 ($p<0.05$) and 2014 ($p<0.001$) where C-section rates increased with increasing maternal educational level (Table 5.1). In all the three surveys, higher C-section delivery rates were found among women with secondary/higher education (12.1 percent in 2003, 13.1 percent in 2008 and 21.3 percent in 2014), followed by rates among women with primary education (7.2 percent in 2003 and 15.8 percent in 2014). The lowest rates were found among women with no education (6.8 percent in 2003, 8.4 percent in 2008 and 10.1 percent in 2014). Although the rates for women with no education were low, the rates rose steadily from 6.8 percent in 2003 to 10.0 percent in 2014. The results of the analysis in Table 5.1 further indicate a statistically significant increasing C-section delivery trend between 2003 and 2008 among women with no education ($p<0.05$), primary education ($p<0.05$), and secondary/higher ($p<0.05$). Also, a statistically significant trend was observed between 2008 and 2014 among women with no education ($p<0.001$), primary educated women ($p<0.001$), and secondary/higher educated women ($p<0.001$). This corroborates earlier findings of previous studies conducted in high-, middle- and low-income countries, which established that the procedure was more frequent among educated women and they accounted for the upward trend of the surgery globally (Azami-aghdash et al., 2014; Ghodrati et al., 2016; Yilmaz et al., 2013). The finding may suggest that educated women delay marriage and age at first delivery, which expose them to C-section delivery.

5.2 Interpersonal-level Factors Influencing the Levels and Trends in C-section Deliveries

Table 5.2 shows that spousal support significantly influenced the rate of C-section delivery in 2014 ($p<0.001$). For instance, in all the surveys, the highest C-section delivery rates were found among women whose partners were present at ANC visits (13.9 percent in 2008 and 23.0 percent in 2014)

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and the lowest rates found among women whose partners were not present at ANC visits (8.8 percent in 2008 and 11.0 percent in 2014). The rates among women whose partners attended ANC visits were higher in 2003 and in 2014 than those whose partners were generally absent. A strong statistical significance was found between 2008 and 2014 for women whose partners were present at ANC visits ($p<0.001$). This finding contradicts the findings of previous studies which suggest that women who receive spousal support are less likely to use birth intervention (Sapkota et al., 2012). The plausible explanation of this finding is that these women may already have some pregnancy complications that demand that the men provide some kind of support to help them through the child bearing process.

Table 5. 2 C-section rates by interpersonal characteristics of women in the 2003-2014 GDHS

Characteristics	**2008 %**	**2014 %**	**p value 1 2008 vs 2014**
Partners presence at ANC			
Not present	8.8	11.0	
Present	13.9	23.0	<0.001
p-value 2	*0.074*	*<0.001*	

Note: Information on partners' presence at ANC visits is missing for most women because partners claim they did not father a child in the last five years, so they were not asked this question.
Source: Computed from GDHS 2003, 2008 and 2014 survey data

5.3 Institutional-Level Factors Influencing the Levels and Trends in C-section Deliveries

The results of the analysis in Table 5.3 indicate a growing trend in C-section delivery between all categories of women in the past decade (2003-2014). The level of C-section delivery is higher for women who had high access to healthcare (10.2 percent in 2003, 11.5 percent in 2008 and 19.0 percent in 2014) than their counterparts who had low access to healthcare (9.3 percent in 2003, 11.4 percent in 2008 and 16.2 percent in 2014. Although the findings in this study indicate that women who have high access to healthcare have higher C-section rate, the relationship is not

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significant. Contrarily, a body of literature suggests that high access to healthcare is a significant predictor of C-section delivery and could be one of the determinants of rising C-section delivery trend (Ghosh, 2010; Kottwitz, 2014; Lauer et al., 2010). This development is unexpected because research indicates that the increased availability of emergency obstetric care facilities in Ghana could increase access to healthcare and more importantly access to C-section delivery (Ghana Ministry of Health, 2011), but the study proved otherwise. The possible explanation could be in the measuring of access to healthcare, which may not be reliable. Several scholars conceptualised access to healthcare as visits to healthcare facility in the last 12 months preceding the survey (Ejembi, Dahiru, & Aliyu, 2015; Wang, 2016). Therefore, the current study used visits to healthcare facility in the last 12 months as proxy for access to healthcare.

Table 5. 3 C-section rates by institutional characteristics of women in the 2003-2014 GDHS

Characteristics	2003 (n =1168) %	2008 (n =1180) %	2014 (n =2874) %	p value1 2003 vs 2008	p value 2 2008 vs 2014
Access to healthcare					
Low access	9.3	11.4	16.2		
High access	10.2	11.5	19.0	0.654	0.103
p value 3	0.590	0.984	0.071		
Number of ANC visits					
1-3 visits	7.5	5.6	7.6		
4 or more visits	10.1	11.9	18.8	0.060	<0.001
p value 3	0.409	<0.05	<0.001		
Place of delivery					
Public hospital	10.1	11.4	17.8		
Private hospital	8.8	11.1	20.9	0.587	0.462
p value 3	0.546	0.905	0.168		

Source: Computed from GDHS 2003, 2008 and 2014 survey data

Again, Table 5.3 indicates that apart from the 2003 sample, the number of ANC visits is significantly correlated to C-section deliveries in 2008 ($p<0.05$) and 2014 ($p<0.001$). In all the

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surveys, higher C-section delivery rates were recorded among women who had more than 3 ANC visits (10.1 percent in 2003, 11.9 percent in 2008 and 18.8 percent in 2014) than the women who had 1- 3 ANC visits (7.5 percent in 2003, 5.6 percent in 2008 and 7.6 percent in 2014). In furtherance to this, there was an upward trend of C-section delivery in Ghana between 2003 and 2014, among women who had 1-3 ANC visits and women who had more than 3 ANC visits. The trend is significant between 2008 and 2014 ($p<0.001$) for women who had more than 3 ANC visits. As has been found before (Khan, Islam, Shariff, Alam, & Rahman, 2017; Nazir, 2015; Yassin et al., 2012), this study demonstrated that number of ANC visits is an essential predictor of C-section births. Indeed, it is clear that women with the highest number of ANC visits have contributed to the rising trend of the surgery in Ghana. A possible explanation for this is that women who have higher ANC visits means availability and accessibility to healthcare facilities, where such interventions are provided. Also, this association is expected since most pregnancy complications that might indicate C-section delivery can be easily diagnosed through routine antenatal care.

In this study, place of delivery is not a significant predictor of C-section delivery among Ghanaian women. The analysis indicates higher C-section delivery rates for women who delivered at public hospitals (10.1 percent in 2003, 11.4 percent in 2008) than those who did so in the private hospitals (8.8 percent in 2003, 11.1 percent in 2008). This pattern changed in 2014 where a higher C-section delivery rate was recorded among private hospital users (20.9 percent) than public hospital users (17.8 percent). An increasing trend of C-section deliveries among private and public users was observed. However, there is no difference between the rates of C-section delivery among public and private hospital users over the study periods (see Table 5.3). Although private hospital users were shown to have higher rate of C-section birth in 2014 and public hospitals users were slightly more at risk of C-section delivery in 2003 compared to the women in 2008 and 2014. Both

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categories of women were not significantly different from each other and did not contribute to the rising trend of the surgery in Ghana. This finding is quite unexpected because many studies have documented otherwise (Belizán et al., 2016; Gartland et al., 2012; Gebremedhin, 2014; Long et al., 2015). For example, Long et al., (2015) found that women who deliver at public hospitals tend to have higher rate of C-section delivery and contributed to the rising trend of C-section rate in Mozambique. Gebremedhin (2014) also found that women delivering at private hospitals tend to have higher rate of C-section births and partly contributed to the rising C-section delivery trend in Ethiopia.

5.4 Community-level Factors Influencing the Levels and Trends in C-section Deliveries

Table 5.4 indicates that region of residence is statistically significant in its narrative with C-section delivery rate in 2003($p<0.001$) and 2008 ($p<0.001$). The level of C-section delivery is significantly ($p<0.001$) higher for women in Greater Accra (18.6 percent) and Eastern regions (11.4 percent) and lowest in Upper East (3.7 percent) and Upper West regions (2.5 percent) in 2003. Also, the level of C-section delivery rates is significantly ($p<0.001$) higher for women in Central (16.8 percent) and Ashanti regions (14.8 percent) and lowest for women in Upper East (7.2 percent) and Northern regions (8.2 percent) in 2014.

With the exception of Northern and Greater Accra regions which experienced decreases in C-section delivery rates between 2008 and 2014 (8.5 percent to 8.2 percent) and 2003 and 2008 (12.1 percent to 18.6 percent) respectively, there was an upward trend in C-section deliveries across all the other eight regions in Ghana. The Volta Region recorded the lowest increase compared to the eight regions between 2008 and 2014. Its rate rose marginally from 11.5 percent to 11.7 percent. The rate in Upper East Region doubled from 4.2 percent to 8.6 percent and that of Greater Accra

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Region also almost doubled from 12.1 percent to 24.1 percent between 2008 and 2014. Further, rate in Brong Ahafo Region almost doubled from 7.0 percent to 13.7 percent between 2008 and 2014. Also, Western (5.7 percent to 10.5 percent) and Central (6.6 percent to 16.8 percent) regions recorded more than double rate between 2003 and 2008. The trend was significant between 2003 and 2008 for women in Greater Accra ($p<0.05$) and Central Region ($p< 0.05$). Also, the trend was significant between 2008 and 2014 for women in Greater Accra ($p< 0.001$), Central Region ($P< 0.05$), Western Region ($p< 0.05$), Volta Region ($p< 0.05$) and Brong Ahafo ($p< 0.05$). Relatively, C-Section delivery is more prevalent among women residing in Greater Accra, Central and Eastern regions, whereas low rates were recorded in the Upper West, Upper East and Northern regions. However, the rising trend in the surgery is largely due to the fact that the surgery is more common in Greater Accra and Central Region and in the entire study periods and recently common in the Western, Volta and Brong Ahafo regions. The reasons for the regional differences in C-Section delivery rates could be that there is difference in the availability and accessibility of C-Section facilities and health professionals across the regions.

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Table 5. 4 C-section rates by community characteristics of women in the 2003-2014 GDHS

Characteristics	2003 (n =1168) %	2008 (n =1180) %	2014 (n =2874) %	P value1 2003 vs 2008	P value 2 2008 vs 2014
Region of residence					
Greater Accra	18.6	12.1	24.1	<0.01	<0.001
Central	6.6	16.8	22.4	<0.05	<0.01
Western	5.7	10.5	18.8	0.064	<0.01
Volta	7.8	11.5	11.7	0.216	<0.05
Eastern	11.4	10.7	14.9	0.118	0.290
Ashanti	8.9	14.8	22.0	0.080	0.128
Brong Ahafo	5.7	7.0	13.7	0.062	<0.01
Northern	8.0	8.5	8.2	0.385	0.296
Upper East	3.7	3.7	7.2	0.187	0.829
Upper West	2.5	4.2	8.6	0.907	0.589
p-value 3	<0.001	0.133	<0.001		
Place of residence					
Urban	12.0	11.9	21.5		
Rural	6.7	19.7	13.9	<0.05	<0.001
p-value 3	<0.01	0.553	<0.001		
Community poverty					
Low poverty	8.2	11.6	13.5		
High poverty	11.0	11.3	20.8	0.317	<0.001
p-value 3	0.105	0.859	<0.001		
Community education					
Low education	7.6	10.5	17.7		
High education	12.0	12.3	18.5	<0.05	0.226
p-value 3	<0.05	0.320	0.559		

Source: Computed from GDHS 2003, 2008 and 2014 survey data

With regard to place of residence, Table 5.4 shows that the level of C-section delivery is significantly higher for urban dwellers than their counterparts in rural areas in 2003 ($p<0.05$) and 2014 ($p<0.001$). In 2003, C-section delivery rate among the urban dwellers (12.0 percent) was higher than rural dwellers (6.7 percent). The latest survey indicates that the rate among urban dwellers (21.5 percent) was higher than the rate among rural dwellers (13.9 percent). However, a reverse pattern was seen at the 2008 survey where C-section delivery rate was higher among rural

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women (19.7 percent) than urban women (11.9 percent). Table 5.4 also indicates a rising trend in C-section delivery among almost all the categories of women. However, the trend observed between 2003 and 2008 ($p<0.05$) as well as between 2008 and 2014 ($p<0.001$) was significant for women residing in urban areas. The finding is consistent with previous studies conducted in mostly developing countries (Ghosh, 2010; Ilyas, 2013; Khan et al., 2017; Long et al., 2015). The reasons for the rural to urban differences in C-section delivery could be many. First, there are socio-economic differences between rural and urban areas and so is the affordability of C-section delivery. There are also disparities in the availability and accessibility of C-section facilities and health professionals across rural and urban areas.

Considering community-level poverty, the results of the analysis indicate that generally, C-section delivery rates are relatively higher for women residing in high poverty communities (11.0 percent in 2003, 11.3 percent in 2008 and 20.8 percent in 2014) than women in low poverty communities (8.2 percent in 2003, 11.6 percent in 2008 and 13.5 percent in 2014). In 2014, community-level poverty was found to be statistically significant to C-section delivery ($p<0.001$), with rates among high poverty community dwellers (20.8 percent) being higher than the rates among low poverty community dwellers (13.5 percent). Once again, there is an increasing trend of C-section delivery among women living in the two types of communities over the period. This shows a significant increasing trend ($p<0.001$) between 2003 and 2014 for women living in high community-level poverty areas (see Table 5.4). Although studies on the relationship between community-level poverty and C-section delivery are limited, one would expect that the results will be similar to the relationship between wealth index and C-section, but this was not the case. This finding may reflect the fact that the poorer a community is, the more likely for the people living in the community to have poor health-seeking behaviour and to make less informed health choices (Adamba, 2013).

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This behaviour may lead a lot of women into having complications during pregnancy and consequently, a delivery that requires an intervention, like emergency C-section.

Table 5.4 suggests that in all the surveys, higher C-section delivery rates were recorded among women residing in high educational-level communities (12.0 percent in 2003, 12.3 percent in 2008 and 18.5 percent in 2014) than their counterparts in low educational-level community (7.6 percent in 2003, 10.5 percent in 2008 and 17.7 percent in 2014). The relationship between community-level education and C-section delivery rate is statistically significant only in 2003 ($p<0.05$). The trend analysis indicates a growing trend in C-section delivery among all groups of women between 2003 and 2014. The analysis also indicates that the gap between low and high education communities narrowed over time with the trends showing statistical significance between 2003 and 2008 ($p<0.05$). As previously indicated, maternal education at the individual level was significant in explaining the rise in C-section delivery. It is not clear why community-level maternal education is not significantly predicting C-section delivery in the recent survey. It could be as a result of the fact that there are no differences among the communities in terms of maternal education in Ghana in recent years.

5.6 Medical Factors Influencing the Levels and Trends in C-section Deliveries

In all the survey periods (Table 5.5), higher C-section rates were recorded among women who have had history of pregnancy complications in 2003 (10.5 percent) and 2014 (18.8 percent), whereas in 2008 higher rate was obtained among those who had no history of pregnancy complications (13.2 percent). However, C-section delivery rate was significant ($p<0.01$) for 2014 where a higher rate of 18.8 percent was recorded among women who had history of pregnancy complications than women with no history of complications. The analysis also indicates an

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increasing trend in C-section deliveries among all groups of women. The trend is however significant only between 2008 and 2014 ($p<0.05$). This study demonstrated that generally there is a higher C-section delivery rate among women who have had history with pregnancy complications and contributed to the rising trend of C-section in Ghana. Previous studies conducted in mostly developing countries confirmed the finding and suggests that globally, women who developed complications during pregnancy and labour end up having C-section delivery (Chung et al., 2014; GamaNogueira et al., 2014; Nazir, 2015).

Table 5. 5 C-section rates by medical characteristics of women in the 2003-2014 GDHS

Characteristics	2003 (n =1168) %	2008 (n =1180) %	2014 (n =2874) %	P value1 2003 vs 2008	P value 2 2008 vs 2014
History of Pregnancy Complications					
No	8.3	13.2	13.9		
Yes	10.5	10.9	18.8	0.863	<0.05
p-value 3	0.247	0.271	<0.01		
Previous C-section					
No	9.2	10.1	16.1		
Yes	81.8	44.4	67.9	0.001	<0.001
p-value 3	<0.001	<0.001	<0.001		
Birth order					
1	10.7	12.1	25.0		
2-3	12.2	11.8	16.8	0.105	<0.001
4-5	6.2	10.3	15.6		
6 or more	7.2	10.9	13.8		
p-value 3	<0.05	0.913	<0.001		
Size of child at birth					
Large baby	10.7	12.5	18.8	0.105	<0.001
Average baby	8.7	8.9	14.3		
Small baby	9.9	12.8	23.9		
p-value 3	0.561	0.174	<0.001		

Source: Computed from GDHS 2003, 2008 and 2014 survey data

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Results of the analysis from Table 5.5 indicate a statistically significant relationship between history of previous C-section delivery and C-section deliveries among childbearing women (women aged 18-49 who had a child in the last five years) in Ghana in the survey years ($p< 0.000$ in 2003, 2008 and 2014). Generally, higher C-section delivery rates were found among women who have had prior C-section deliveries (81.8 percent in 2003, 44.4 percent in 2008 and 67.9 percent in 2014). These rates are higher in 2003, 2008 and 2014 than their counterparts (12.0 percent in 2003, 12.3 percent in 2008 and 18.5 percent in 2014). The trend analysis suggests that C-section rates among women with prior C-section delivery decreased sharply from 81.8 percent in 2003 to 44.4 percent in 2008 and increased to 67.9 percent in 2014. This is significant across the study periods ($p<0.001$ for 2003-2008 and 2008-2014). The findings of this study provide empirical support that prior C-section delivery significantly affects C-section delivery rates. Recent studies conducted in developed and developing countries provided similar evidence that prior C-section delivery is a major predictor of subsequent C-section delivery. The explanation to this finding is that previous C-section deliveries may suggest the existence of some health complications that could predispose a woman to more complications during delivery, which may lead to C-section delivery.

Considering birth order, the results of the analysis in Table 5.5 indicate that generally, C-section delivery rates is significantly higher for women with first birth order with 12.1 percent and 25.0 percent in 2008 and 2014 respectively. The corresponding lower rates were found for order 6 or higher women in 2003 (7.2 percent) and 2014 (13.8 percent). The analysis also indicates a rising trend in C-sections deliveries among all women. Birth of the first order among women accounted for most of the rise, which is significant between 2008 and 2014 ($p<0.001$). This finding is consistent with studies carried out in other developing countries, which indicate that birth order

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'1' women and order 2-3 women were at higher risk of C-section delivery (Nazir, 2015; Rahman et al., 2015; Yassin et al., 2012). The plausible explanation to the current findings is that, women who have had three C-section are advised by doctors to stop childbearing. This could suggest that any woman who goes beyond three deliveries has no labour complications which may require surgery.

Table 5.5 further indicates that, higher C-section delivery rates were found among women who had large-sized babies in 2008 (12.8 percent) and 2014 (23. 9 percent). This is followed by rates among women with small babies (12.3 percent in 2008; 18.8 percent in 2014) and then women who had average-sized babies (8.9 percent in 2008; 14.3 percent in 2014). The C-section delivery rates in 2014 was significant ($p<0.0001$) for women who had smaller-sized babies, where the rate was 23.9 percent. This rate was higher than the rates among women who had average-sized babies (14.3 percent) and those with large-sized babies (18.8 percent) respectively. In furtherance to this, an upward trend of C-section delivery rates was observed across the survey years among all categories of women. However, this trend was significant ($p<0.001$) only for the period of 2008 and 2014 where a sharp increase of C-section delivery rate was observed among women who had small-sized babies. This study found that the size of the child at birth is a significant predictor of C-section birth. The results of the analysis showed that the observed levels and trend in C-section delivery could be attributed to the prevalence of small-sized babies. These findings do not corroborate the findings from similar studies carried out in other developing countries. These studies suggest that size of baby at birth is not a significant predictor of C-section delivery (Nazir, 2015) and the fact that women who had smaller babies are less likely to have had C-section delivery (Ghosh, 2010). The current finding may suggest that small-sized babies could be pre-term babies who are born out of pregnancy related-complications which require surgery.

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5.7 Summary

The chapter describes the spatial levels and trends of C-section deliveries in Ghana from 2003 to 2014. This study showed that the population level C-section rate in Ghana in 2014 was 18.2 percent and was above the recommended WHO threshold of 15 percent with wide spatial disparities. This suggest that about one-fifth of the proportion of birth in Ghana is through C-section delivery. The results showed that the contributors of the current levels and trends of C-section rates in Ghana was multifaceted and interrelated, and this confirmed what previous studies have shown (Long et al., 2015; Nazir, 2015). The main contributors included individual factors (being currently married, wealthy, primiparous, employed, advanced in age and having secondary or higher education), interpersonal factors (partners presence at ANC visits), institutional factors (having 4 or more ANC visits), community factors (living in urban areas and Greater Accra Region) and medical factors. The findings were consistent with what the reviewed studies on mode of child delivery in Chapter 2 showed. Many of the studies in low- and middle- income countries showed that the two major contributors of low and high C-section rates as well as C-section disparity in any region are medical and individual factors (Gebremedhin, 2014; Long et al., 2015; Nazir, 2015).

Having established the existence of wide disparities in C-section rates in Ghana, the study proceeded to explore the "belief" variable embedded in the Social Ecological Model using the Health Belief Model. This is to ascertain whether the beliefs of women in Ghana might have contributed to the variations in the rates observed in the quantitative study. Therefore, in chapter six, the study used women in the Greater Accra Region and the Northern Region as case study to assess the beliefs of Ghanaian women on mode of child delivery.

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CHAPTER SIX

THE BELIEFS OF CHILDBEARING WOMEN ON MODE OF CHILD DELIVERY IN THE GREATER ACCRA AND NORTHERN REGIONS OF GHANA

6.1 Introduction

A person's belief has the tendency of influencing her behaviour. This chapter presents the findings from in-depth, expert and key informants interviews conducted with forty-eight mothers and thirteen health workers respectively. In the previous chapter the results suggested that, there are regional variations in the rates of C-section. This chapter, therefore, explores the regional differences in the beliefs of childbearing women (women aged 18-49 who had a child in the last five years) on mode of child delivery using Greater Accra Region and Northern Regions as case study. The study is underpinned by the Health Belief Model (HBM). Six themes emerged from the study, and these included: perceived susceptibility, perceived severity, perceived benefit, perceived barrier, cues to action, and community beliefs (see Fig.6.1). The first five themes were based on the constructs of the HBM. The sixth theme was based on the beliefs that emerged in the study.

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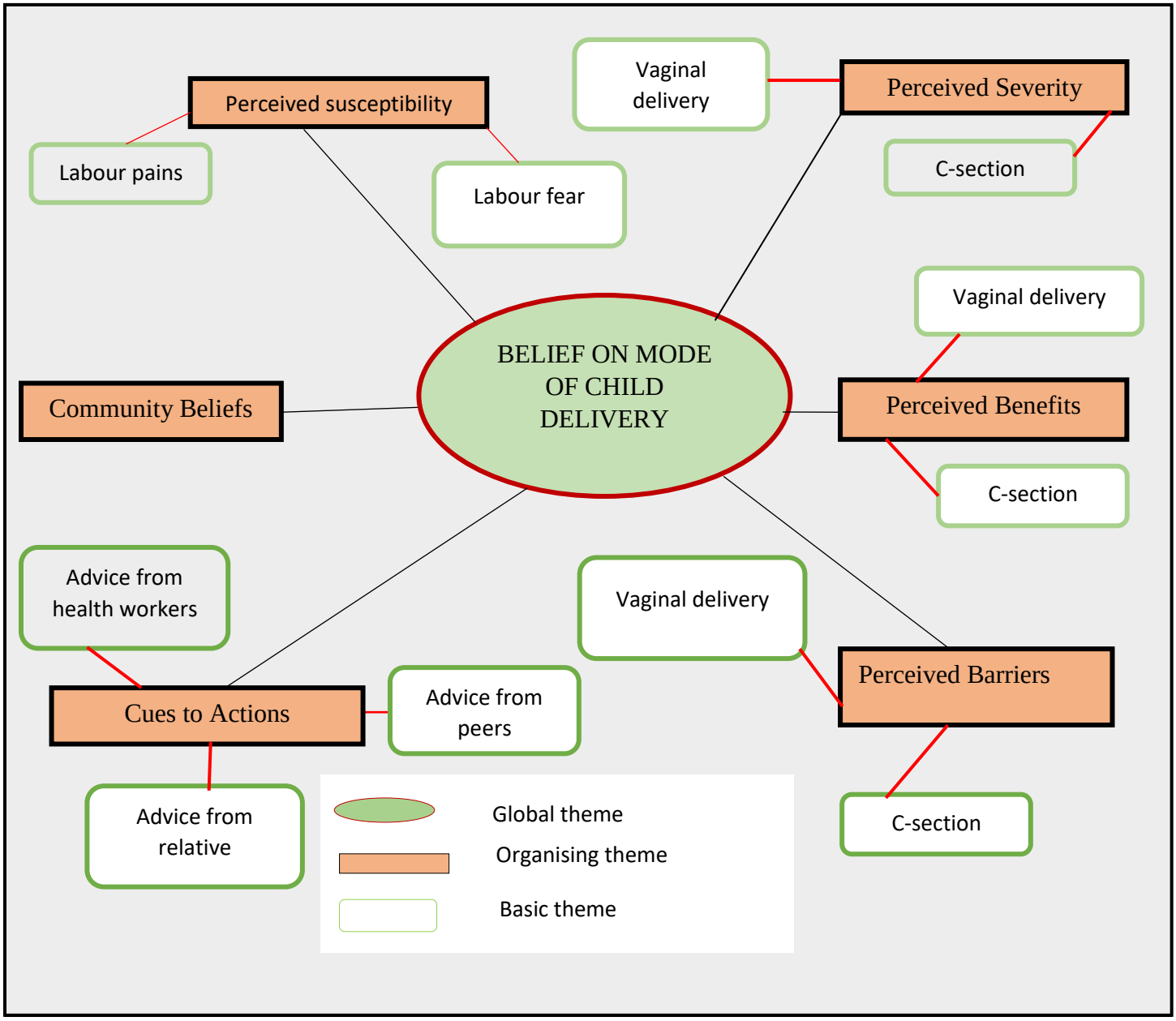
Figure 6. 1 Thematic Network on the Belief of Women on Mode of Child Delivery



6.2 Perceived Susceptibility to Labour Pains

Individuals differ greatly in their perception of susceptibility to health conditions. In most cases, the higher the perceived susceptibility, the higher the likelihood of an individual engaging in behaviours that decrease the perceived vulnerability (Loke et al., 2015). For instance, the

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probability that a woman will opt for one mode of child delivery may depend on how much she believes in her susceptibility to adverse effects of the other mode of child delivery. Indeed, perceived susceptibility has been found in a number of studies (Loke et al., 2015; Rahnama et al., 2016) to be predictive of a number of health-related behaviours, and mode of child delivery choices are no exception.

In this study, most of the women from both regions believe in their vulnerability to labour pain and considered labour pains to be a very undesirable experience. However, most of the participants felt that giving birth to a baby was worth the labour pains. The narratives of two women from the Greater Accra Region regarding their perceived susceptibility to labour pains are presented as follows:

> *"I have had the opportunity to taste all modes of child birth and I can say that whichever method, childbirth is very painful. But once you see your baby, you are filled with joy and you forget all the pains. In fact, God created women to forget labour pains, otherwise, women will stop giving birth after their first experience. So, every woman goes through some form of labour pains but that is the plan of God for women during delivery" (38-year-old; vaginal delivery; Greater Accra).*

> *"Yes. I think all women go through labour pain which for me is needless. Some express this pain by shouting and even crying before delivery. Now medicine has advanced and there is less painful option in C-section. My husband and I decided we want C-section delivery because we want to avoid the unnecessary labour pains and shouting during vaginal delivery. So, I did not go through labour, I was booked for C-section when the time was due and the next day the surgery was done. So, this situation where women had to suffer during childbirth must be done away with." (38-year-old; C-sectioned; Greater Accra).*

In addition, the results of the analysis indicate that the views of the women in the Northern Region were not different from the narratives from those in the Greater Accra. The accounts of two women from the Northern Region are presented as:

> *"Well before I had my child lots of people spoke about labour pain but I did not experience such great pains as described by people. Yes, it was painful but not so much". Whatever it is I will opt for vaginal delivery" (19-year-old; vaginal delivery; Greater Accra).*

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> *"Although childbirth is painful, it was normal for me because that is God's plan for women during childbirth. For me I will still prefer the vaginal delivery". (34-year-old; vaginal delivery; Northern Region).*

Most of the interviewees believed that all women are susceptible to labour pains. Some of them suggest that the pains must be endured as sign of motherhood. However, a few of the interviewees indicated that pain could be avoided through C-section. One key informant, a midwife at Ridge Hospital, confirmed the findings on women's susceptibility to labour pains. Her view was expressed as follows:

> *"Lots of women go through great pains during delivery and some even call their husbands names but immediately the baby comes out they forget all the pains. Some go and come back within 8 months for another ANC visit". (58-year-old; midwife; Greater Accra).*

Although most of the women perceived labour pains to be associated with vaginal delivery, they expressed the need to avoid C-section without medical indication due to negative consequences associated with it. Their views on this are presented in the second construct of the HBM, which is perceived severity.

6.2 Perceived Severity

Perceived severity refers to one's belief of how serious a condition is, as well as its associated consequences when one recognises their susceptibility to that condition. It is when one realises the magnitude of the negative consequences of a condition, that one could take the necessary actions to avoid them. In this study, although most of the women from both study sites perceived labour to be a painful experience, they believed that vaginal birth is worth the pains, as C-section

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carries more negative consequences in their view. For example, two women in the Greater Accra Regional Hospital and Medifem pointed out that:

> *"C-section delivery comes with so much negative health consequence because there are restrictions after the procedure. You are instructed to not lift heavy stuff, not to let water touch the surgery wound at a point. The stitches can open up again or can fill up with water and cause problems. But with vaginal delivery, you are able to massage your tummy, sit on warm water and others" (38-year-old; vaginal delivery; Greater Accra).*

> *"….from pregnancy to birth there are health concerns. Each method of birth carries health concerns. Anything can go wrong at any time so it depends on the expertise of the health worker delivering the baby. However, C-section is a major surgery and may carry more concerns" (30-year-old; vaginal delivery; Greater Accra).*

Two interviewees from Tamale Teaching Hospital and Kings Medical Centre summed up the views of the women in that region. These were similar to the accounts from the participants from Greater Accra Regional Hospital and Medifem Hospital. The following are the narratives of these two women from Tamale Teaching Hospital and Kings Medical Centre:

> *"There are a lot of health concerns with C-section. Firstly, after C-section delivery a woman becomes weak. Secondly, one can even die from C-section. Lastly, C-section is waste of money, you can use that money to buy necessary things instead" (20-year-old; vaginal delivery; Northern Region).*

> *"For me C-Section carries more health problems and must not be encouraged without medical problem. After C-section you'll always be weak, you can't do what at first you can do. Carrying of bucket, they said you should lie down, don't raise your head but upon all that, you feel severe pain. But the vaginal delivery, after delivering you are okay it's why the women here prefer vaginal delivery" (41-year-old; vaginal delivery; Northern Region).*

The participants from both regions indicated that C-section carries more health concerns because it is a major surgery. They mentioned death to mother, waste of money, body weakness, restrictions and issues with surgery wounds as some of the negative consequences of C-section delivery. Having expressed C-section as carrying the most health concerns, most of the women from both

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regions perceived vaginal delivery to be safer than C-section delivery. The expressed views are examined in the third construct of the HBM, which is on perceived benefits.

6.3 Perceived Benefits

Perceived benefits refer to one's perception that outcomes can be positively affected by engaging in certain health behaviours. In the current study, most of the interviewees from both regions perceived vaginal delivery to be more beneficial than the C-section. However, some women from Greater Accra Region had contrary views. Some perceived C-section to be more beneficial in the event of medical indication; and when one wants to have her baby on a specific day. Two women from the Greater Accra Regional Hospital and Medifem Hospital remarked:

> *"Oooooh, C-section delivery saved me and my baby's life because the baby was suffering in the uterus. I was struggling to push. I wasn't dilating anymore when I was 8cm. And then the water the baby was inside, the baby was "poopooing" (excreting) and drinking it in my womb so if not because of the Caesarean section the baby would have died and I don't know what would have happened to me. So; it's very good" (34-year-old; c-sectioned; Greater Accra).*

> *"I want to have my baby on Monday because we are family of Monday born. C-section delivery offered me the opportunity to have my baby on Monday. So our first baby is Monday born, the second one too is Monday so we choose Monday. I had the baby on Monday so I booked in on Sunday night and then Monday morning, within 45 minutes I was out of theatre with my baby" (38-year-old; c-sectioned; Greater Accra).*

However, two women from the Northern Region noted that vaginal delivery is beneficial because it allows early contact with the baby, shorter hospital stay after delivery, faster recovery, and no restrictions after delivery. They presented their views this way:

> *"Vaginal delivery is beneficial because after delivery I was not restricted as to what to eat. I had no surgery pain or any major wounds to nurse. My baby was fine. The recovery time is shorter, I did not pay anything, I was discharged the same day, I had contact with my baby almost immediately to breastfeed him and I was back on my feet in no time to do my normal routine. For that reason, I think it's more advantageous" (37-year-old; vaginal*

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delivery; Northern Region)

"With the vaginal delivery, if you have been discharged from the hospital, when you get home you are free and can do whatever you want. But if you have a CS delivery, it will limit the number of children you will want to have." (34-year-old; vaginal delivery; Northern Accra).

Having expressed their views on the benefits of each mode of child delivery, they however added that, there are factors that could prevent a woman from delivering by the preferred mode of child delivery. Their concerns were addressed in perceived barriers under the fourth construct of the Health Belief Model.

6.4 Perceived Barriers

According to Janz & Becker (1984), perceived barriers are a person's perception of the challenges preventing them from having a definite health-related behaviour. The desire to choose vaginal birth may be prevented by existing medical indications (Loke et al., 2015). In the same vein, the desire to give birth by C-section may be hindered by financial challenges (Loke et al., 2015) . In this study, most interviewees in Greater Accra Region identified health and financial barriers to mode of child delivery. However, participants from the Northern Region suggested beliefs exist as the main barriers to mode of child delivery. Two participants in the Greater Accra Region remarked:

"Cost of delivery is a barrier. I opted for C-section in a private hospital because I wanted to avoid labour pains and it cost 7,000 Ghana Cedis. Even in the face of insurance a friend gave birth at Tema General Hospital by C-section and paid 700 GHs. Raising this money was difficult for her. This cost can prevent lots of women from opting for C-section even if they want it." (38-year-old; c-sectioned; Greater Accra).

"Health of both the mother and baby can be a key barrier. I wanted to deliver vaginally but my blood pressure kept increasing so the doctors performed C-section to save my life" (29-year-old; c-sectioned; Greater Accra).

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Although few mothers from the Northern Region shared the same beliefs as the mothers in the Greater Accra Region on perceived barriers, most of the women in the Northern Region identified beliefs as the main barriers to C-section. A typical explanation was:

> *"Beliefs is a barrier in our locality. Women who deliver by C-section are considered less of women and are teased by their in-laws and rivals. So most of us want to have vaginal delivery. Some even avoid the hospital entirely to avoid C-section". (26-year-old; vaginal delivery; Northern Region).*

The views of these women in the Northern Region were confirmed by those of two health workers in the region as they noted that:

> *"…Mostly the women want to avoid hospital delivery because most of them believe that most hospital delivery end up in C-section. The women who deliver by C-section are mocked for not being women enough to deliver vaginally" (45-year-old-female; TBA; Kukuo-Northern Region).*
>
> *"Beliefs barriers exist here. They refer to what their pastors say and how they will be teased by their in-laws if they have C-section. For example, most of the time the Jehovah's Witnesses, because of their religious affiliation, they don't accept blood, so they usually don't agree to anything that may involve blood transfusion like C-section." (Female Gynaecologist; Northern Region).*

When asked whether the choice of mode of child delivery was influenced by others, they expressed their views under the fifth construct of the HBM, cues to action.

6.5 Cues to Action

The choice of delivery is influenced by others such as peers, health workers and relatives as indicated by the interviewees. It is an important component of the HBM. Cues to action are the influences that help individuals make health-related decisions (Orji et al., 2012). The influence from relatives, friends and health care professionals could shape a woman's attitude towards a

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particular mode of delivery (Buyukbayrak et al., 2010). The current finding of the study indicates that it is natural to have vaginal delivery, but health workers mostly influence women to have C-section. Some mothers in both Northern and Greater Accra regions commented:

> *"Some of the doctors in the private hospitals recommend C-section because of the money. And they won't force you but when they see it's within your means they talk to you about it. I have a friend, the husband works at Vodafone, she also works at a good place and the doctor knows they can afford. He recommended C-section to avoid unnecessary pain" (34-year-old; vaginal delivery; Greater Accra).*

> *"It is the doctors who influence women here to have C-section. The doctors perform C-section at the slightest problem but the TBA would give you herbs and you will deliver vaginally." (38-year-old; vaginal delivery; Northern Region).*

One TBA confirmed the views of these mothers and explained that:

> *"…most doctors are lazy so, when they see the slightest difficulty they recommend C-section". (56-year-old male; TBA, Luom-Greater Accra)*

6.6 Community Beliefs

In the study, the participants talked about how the people in their communities perceived the various modes of child delivery. Most of the community beliefs that emerged from this study were based on C-section delivery. The study indicates that most community members perceive vaginal delivery as a normal and perfect mode of child delivery because that the design way of child delivery by God. However, C-section is seen as abnormal; and only lazy, weak and disrespectful women go through C-section. The narratives of some participants are as follows:

> *…. "People believe all sorts of crazy things about delivery. I met a lady here last time; she was crying that her mother-in-law says she's made her son incur so much cost because they had to go and pay for C-section when every other woman is giving birth naturally. According to the mother-in-law, women who deliver by C-section are either lazy or disrespectful." (34-year-old; vaginal delivery; Greater Accra).*

> *"Oh, mostly people don't like the C-section but when it becomes critical what do you do, you have to because you are not for your life. Yes, our northern people here, they even use it to insult people that, they are disrespectful, not women enough and lazy hence their inability to deliver on their own. And it's very serious. If somebody should insult you that*

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you are not a woman so because of that you couldn't deliver, it's painful but it's normal in the part of the country. In some communities when you give birth at home vaginally people will give you Guinea fowls as gift (28-year-old; c-sectioned; Northern Region).

"Most people believe that if you are getting to your delivery time those helping you can give you some local medicine to help you deliver. This medicine, they believe can help the women avoid any complications leading to C-section. They don't like C-section because they believe it will restrict them in their daily chores and to prevent being teased." (19-year-old; vaginal delivery; Northern Region)

Some key informants shared the women's sentiments:

"Most of the clients always tell me that due to teasing, they don't want to go to the hospital for C-section delivery. If you go and deliver through C-section, you will be teased by your fellow women or your husband's relatives, so they all prefer delivering by themselves in the house. So, they don't even like to go to the hospital. Sometimes a woman might be in labour and due to complications, they are unable to deliver, so mostly we administer some herbs so they can deliver smoothly. But we have been asked to refer such cases now." (45-year-old female; TBA, Kukuo-Northern Region).

"... Women today are not as strong as the women in the past. Some women become quite disrespectful when they are pregnant and may not watch what they say, therefore they are likely to say something insulting to someone, which would result in them having a difficult delivery hence CS delivery" (56-year-old male; TBA; Luom-Greater Accra).

6.7 Discussion

This study explored the beliefs of childbearing women on mode of child delivery. It found that the participants differed on the perceived barriers and perceived benefits of the two types of child delivery. However, the mothers' perceptions were similar with regard to perceived susceptibility, perceived severity, and cues to action, and community belief.

The study observed that mothers who delivered at Medifem and Greater Accra Regional Hospital are not different from mothers at Tamale Teaching Hospital and Kings Medical Centre on perceived susceptibility to labour pain. Most of the mothers from both regions perceived child birth as a painful experience. The seemingly very high perceived susceptibility to labour pain could be partly attributed to the fact that labour pains are indeed a very painful experience for all the participants. They believed that pain should be endured as a sign of true motherhood from God.

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This finding confirms the assertion from other studies conducted in low- and middle-income countries which considered pain during vaginal childbirth as a channel into motherhood and as God's plan for all childbearing women (Gallagher, Bell, Waddell, Benoît, & Côté, 2012; Liu et al., 2013; Rahnama et al., 2016). The possible explanation for the findings may be that most of these women see vaginal delivery to be more natural and would not want to be exposed to C-section which is seen to be a major surgery in a locality where health delivery is believed to be impoverished. Probably, these women also view labour pains positively which they said last for just a while. However, few educated and wealthy women from Greater Accra Region indicated that labour pains are needless and should be avoided through C-section.

The study further indicated that most of these women who believe C-section is an option to avoid labour pains delivered at private hospitals. Other reasons that may have accounted for this difference are: First, private hospital users were seen to be affluent and better informed regarding choice of their desired mode of child delivery. Second, these women may have negative attitudes towards pains and their inability to withstand it, hence their choice of C-section delivery. This finding is similar to what was observed in high-income countries where women opt for C-section without medical indication to avoid labour pains (Dursun et al., 2011). The differentials in the C-section rates as indicated by the quantitative study could be explained by these observations.

Furthermore, the study demonstrated that childbearing women in Greater Accra Region and Northern Region do not differ on the basis of perceived severity construct of the HBM. The study indicated that most of the participants view C-section as implying more health concerns than vaginal delivery. Participants from both regions indicated that C-section delivery weakens the body and restricts one's ability to do normal daily activities and eat certain things. Moreover, few of the participants believed that, C-section is a major surgery which can cause death to both mother

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and baby. This result of the analysis confirms the finding of an earlier study by Dursun et al. (2011), Lumbiganon et al. (2010), and Volpe (2011) who noted that C-section can have several negative health consequences on both mother and child. This also explains the variation in the C-section rate observed in the quantitative analysis.

In addition, the views of the women from the two study sites were similar on the score of cues to action constructs of the HBM. The women reported that the decision to give birth by C-section lies in the hands of the health providers, particularly the doctors. The study thus demonstrated that doctors are the major decision makers when it comes to C-section delivery. The interviewees further indicated that doctors perform C-section because they are lazy and for financial gains. Research indicates that, the decision to perform C-section may have been influenced by three main reasons (Naeimi & Momeni, 2015). First, a doctor may perform C-section based on medical indications. Second, C-section may be done based on the mother's request. Finally, C-section may be performed as financial incentive for the doctors. To buttress these findings, several scholarly works indicate that cues to action such as doctors' influence is one of the major causes of unnecessary

C-section delivery (Azami-aghdash et al., 2014; Loke et al., 2015; Shi, Jiang, Zeng, Yuan, Yin, Chang, Pang, et al., 2016). On the other hand, avoidance of C-section when it is needed may result in death of mother and baby.

With regard to community beliefs, mothers from both study sites share similar views. Participants indicated that community members view vaginal delivery as natural and an approved way of childbirth. However, C-section is seen as not natural and that women who deliver by C-section are lazy, weak and disrespectful, hence their inability to give birth vaginally. These findings confirmed an earlier study conducted by Ugwu et al.(2015) which indicated that an enemy could attack a

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pregnant woman who is disrespectful spiritually and impose punishments such as inability to give birth.

In addition, this study has demonstrated that childbearing women in the Greater Accra Region differ from childbearing women in the Northern Region on the score of perceived barriers of the HBM. Participants in the Greater Accra Region identified health and financial reasons as the main obstacles to mode of child delivery. Furthermore, they suggested that financial barriers such as high cost of C-section delivery could be a barrier to C-section. The findings corroborate recent studies conducted by Loke et al. (2015) and Pallasmaa (2014), which indicate that obstacles to vaginal delivery have largely been due to the health of the mother and the unborn child. Further, a study by Einarsdóttir et al. (2012), indicated that low financial status could act as an obstacle to choosing C-section delivery.

Moreover, the study participants in the Northern Region attested to the fact that disparities exist between them and the women in the Greater Accra Region. They acknowledged that beliefs exist as barriers to C-section delivery in their locality. They reported that women who deliver by C-section become the subject of mockery among their kinsmen. As a result, most women from the Northern Region would want to avoid C-section even if it is necessary. They believe in local herbs which could help a woman who develops complications to deliver vaginally. The study confirms the critical role played by beliefs in the low C-section rates observed in the Northern Region, as shown in the quantitative study.

The accounts of most of the women regarding perceived benefits reveal that vaginal delivery is seen as more beneficial than C-section delivery. Participants believed that vaginal delivery was more beneficial for reasons of early contact with baby, shorter hospital stay, faster recovery and no restriction after delivery. These findings confirm the study conducted by Loke et al., (2015)

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which suggest that mothers who prefer vaginal delivery, do so for reasons of early contact with baby, shorter hospital stay, and faster recovery. However, few participants from the Greater Accra Region differed on that score and indicated that C-section is more beneficial for health reasons and choice of birth dates. The results of the analysis from the Greater Accra Region were expected since it corroborates an earlier study conducted in low-and middle-income countries which indicates that perceived benefits for C-section delivery were safety of babies and mother as well as the fact that women perceive C-section to be easier than vaginal delivery (Loke et al., 2015; Yilmaz et al., 2013).

In this chapter, the results suggest that beliefs to C-section delivery exist in Ghana, especially in the Northern Region where women who deliver by C-section are seen to be weak, disrespectful, and lazy and mocked by their kinsmen for not being women enough to deliver vaginally. This findings may explain the low levels of C-section rates observed in the Northern Region of Ghana. Furthermore, chapter five indicated that individual, interpersonal, institutional, community and medical factors have contributed to the variation in the C-section rates.

6.8 Summary

In this chapter, the study explore the beliefs of child bearing women on mode of child delivery and found that women in Northern Region perceived cultural beliefs and community beliefs as the main barriers of C-section delivery while women in the Greater Accra quoted lack of funds as the main barrier to C-section delivery. The findings in this study could be the reasons behind the low levels of C-section delivery observed in the Northern Region of Ghana as indicated in the quantitative study and confirms the findings of a study that suggest that religious beliefs exist as barrier to C-section delivery (Ugwu & de Kok, 2015). Also, the study demonstrated that doctors

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are the major decision makers when it comes to C-section delivery. The TBAs further indicated that doctors perform C-section because they are lazy and for financial gains, and confirms the findings of earlier study (Naeimi & Momeni, 2015).

In addition, this study helps to advance C-section delivery's' research in Africa by showing that both low and high C-section rates as well as C-section disparities can be understood by interrogating the beliefs values of the women and those in their communities on issues of child delivery. What this study has shown is that the impact of beliefs on low C-section rates and C-section disparities. Hence, in order to fully understand C-section disparities in any region, the methodology should consider the beliefs values of the women and those in their communities on issues of delivery. This will help in developing appropriate interventions targeted to specific communities to ensure that C-section is provided and accepted when needed.

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CHAPTER SEVEN

COMMUNITY-LEVEL AND OTHER LEVEL FACTORS ASSOCIATED WITH CAESAREAN SECTION DELIVERIES IN GHANA

7.1 Bivariate Relationship between Levels of Influence and C-section Delivery

This section highlights the results of the bivariate analyses of the relationship between levels of influence and C-section delivery. The bivariate analyses which were based on Chi Square test are presented under the five levels of influence.

7.1.1 Individual-Level Factors and C-section Delivery

A consideration of the association between maternal age at birth and C-section delivery indicates a strong positive association between maternal age at birth and C-section delivery. C-section delivery significantly increases with increase in maternal age at birth ($p<0.001$). Also, the analysis in Table 7.1 indicates that women who are 35-49 years have higher (19.4 percent) C-section rate than those aged 18-19 years (7.5 percent).

A correlation between employment status and C-section delivery found no significant association ($P=0.696$). Almost equal proportion of women who were working and not working had C-section deliveries. A strong association was found between marital status and C-section delivery (Table 7.1). This association was clearly significant ($p<0.001$) and indicates that formally married women have higher rate of C-section delivery than those who were currently married or never married.

Table 7.1 further showed that proportion of C-section deliveries tends to be significantly ($p<0.001$) higher for women in the rich wealth quintile than those who are averagely rich and poor. It indicates that the richer a woman is, the higher her risk of having C-section delivery. The results

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of the analysis indicate that women who are rich have higher (18.6 percent) C-section rate than poor women (9.2 percent). The relationship between parity and C-section delivery indicates that a strong negative relationship exists between parity and C-section delivery. This relationship is significant (P<0.001) and shows that as parity increases, risk of C-section delivery decreases. The results of the analysis also show a strong positive association between maternal educational level and C-section delivery. This association was significant (p<0.001) and indicates that women with higher educational level have higher C-section rate than those with no education.

Table 7. 1 Bivariate Relationship between Individual Factors and C-section Delivery

C-section Delivery				
Characteristics	**C-section delivery (%)**	**Total**	**χ^2**	**p-value**
Age at Delivery				
18-19 years	7.5	25		
20-34 years	14.1	538	33.765	<0.001
35-49 years	19.4	208		
Employment Status				
Not Working	14.4	131	0.152	0.696
Working	14.9	640		
Marital Status				
Never Married	12.5	43		
Currently Married	14.8	668	25.768	<0.001
Formally Married	16.8	60		
Wealth Index				
Poor	9.2	132		
Middle	12.5	130	72.282	<0.001
Rich	18.6	509		
Parity				
Primiparous	19.1	259		
Multiparous	14.2	318	31.529	<0.001
Grand multiparous	11.9	194		
Educational Level				
No education	8.9	94		
Primary	12.1	121	55.083	<0.001
Secondary/Higher	17.6	556		
Total number		771		

Source: Generated from GDHS 2003, 2008 and 2014 data

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7.1.2 Interpersonal-Level Factors and C-section Delivery

Table 7.2 indicates that the presence of the partner at ANC visits is a strong predictor of C-section delivery. The results of the analysis show that women whose partners were present at ANC visits have higher (19.5 percent) C-section rate than those whose partners were not present for ANC visit (9.9 percent). This association was found to be statistically significant ($p<0.001$).

Table 7. 2 Bivariate Relationship between Interpersonal Factors and C-section Delivery

C-section Delivery				
Characteristics	**C-section delivery (%)**	**Total**	**χ^2**	**p-value**
Partner present at ANC				
Not present	9.9	68	21.700	<0.001
Present	19.5	91		
Total Number		159		

Information on partners' presence at ANC visits is missing for most women because partners claim they did not father a child in the last five years, so they were not ask this question.
Source: Generated from GDHS 2003, 2008 and 2014 data

7.1.3 Institution-Level Factors and C-section Delivery

Table 7.3 indicates that the relationship between number of ANC visits and C-section delivery is statistically significant and positive ($p<0.001$) and suggests that women who had more than three ANC visits had higher (15.5 percent) C-section deliveries than those who had 1-3 visits (7.0 percent). Table 7.3 further indicates that access to healthcare is a significant ($p<0.05$) predictor of C-section delivery. Women who have high access to healthcare have higher C-section rate than those who have low access to healthcare. Again, the results of chi-square test in Table 7.3 indicates that there is no statistically significant relationship between place of delivery and mode of child birth. The results of the analysis indicate that there is no difference ($p=0.863$) in mode of delivery between those who deliver at private hospitals than those who did so at public hospitals in terms of C-section delivery.

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Table 7. 3 Bivariate Relationship between Institutional Factors and C-section Delivery

C-section Delivery				
Characteristics	**C-section Delivery (%)**	**Total**	χ^2	**p-value**
Number of ANC Visits				
1-3 Visits	7.0	26	18.944	<0.001
4 or more Visits	15.4	745		
Access to healthcare				
Low access	13.3	225	4.529	<0.05
High access	15.5	546		
Place of child delivery				
Public hospital	14.8	658	0.030	0.863
Private hospital	14.6	113		
Total Number	771			

Source: Generated from GDHS 2003, 2008 and 2014 data

7.1.4 Community-Level Factors and C-section Delivery

At the community level, the bivariate relationship between region of residence and C-section delivery, revealed a significant ($p<0.001$) association between the two variables (Table 7.4). The results of the analysis indicate that of the ten regions, women in Greater Accra Region (20.5 percent) and Central Region (18.5 percent) have higher C-section rates. Women in Upper East (5.9 percent) and Upper West (5.9 percent) regions have the lowest rate of C-section delivery. In furtherance to this, the analysis found a significant ($p<0.001$) association between place of residence and C-section delivery.

Urban dwellers have higher C-section rate than women in the rural areas (see Table 7.4). Also, the Pearson correlation between community-level poverty and C-section delivery indicates a significant ($p<0.001$) relationship between the community-level poverty and C-section delivery. The results of the analysis suggest that women residing in high-poverty-level communities (16.6

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percent) have higher C-section rates than the women in low-poverty-level communities (11.8 percent).

Table 7. 4 Bivariate Association between Community Factors and C-section Delivery

	C-section Delivery			
Characteristics	**C-section Delivery (%)**	**Total**	**χ^2**	**p-value**
Region of residence				
Greater Accra	20.5	212		
Central	18.5	86		
Western	14.7	71		
Volta	11.0	42		
Eastern	13.3	63	83.252	<0.001
Ashanti	16.8	194		
Brong Ahafo	8.6	27		
Northern	9.9	55		
Upper East	5.9	13		
Upper West	5.9	8		
Place of residence				
Urban	17.2	511	31.241	<0.001
Rural	11.6	261		
Community poverty				
Low poverty	11.8	235	22.532	<0.001
High poverty	16.6	536		
Community education				
Low education				
High education	13.7	342	4.762	<0.05
	15.8	430		
Total Number		771		

Source: Generated from GDHS 2003, 2008 and 2014 data

7.1.5 Medical Factors and C-section Delivery

Considering medical factors, history of pregnancy complications showed statistical significance for C-section delivery ($p<0.05$). For example, there were higher C-section births among women who have had a history of pregnancy complications than the women who have had no

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complications (Table 7.5). In the same vein, previous C-section deliveries have statistically significant (p<0.001) relationship with C-section delivery. Women who have had previous C-section deliveries have thrice higher C-section rate than their counterparts who have had no previous C-section delivery. In furtherance to this, the bivariate analysis indicates that there is an inverse (p<0.001) relationship between birth order and C-section delivery. The analysis in Table 7.5 shows that C-section delivery decreases with increasing birth order. The association between size of child at birth and C-section delivery was clearly significant (P< 0.001) and indicates that women who had large babies have higher (19.0 percent) rate of C-section than those who had small babies (15.7 percent).

Table 7. 5 Bivariate Relationship between Medical Factors and C-section Delivery

C-section Delivery				
Characteristics	**C-section Delivery (%)**	**Total**	**χ^2**	**p-value**
History of complications				
No	11.7	122	9.579	<0.05
Yes	15.5	649		
Previous C-section				
No	13.2	670	309.793	<0.001
Yes	63.5	101		
Birth order				
1	18.8	239	27.126	<0.001
2-3	14.7	313		
4-5	12.5	147		
6 or more	11.4	72		
Size of child at birth				
Large	15.7	418	25.248	<0.001
Average	11.7	212		
Small	19.0	141		
Total Number		771		

Source: Generated from GDHS 2003, 2008 and 2014 data

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7.2 Logistics Regression Model showing the Effect of Community-Level Factors on C-section Delivery

This section reports on the results of the binary logistic regression analysis of the relationship between levels of influence and C-section delivery.

Model 1 in Table 7.6 is on the effect of community-level factors alone on C-section delivery. The overall model show that some of the variables in the model are significantly associated with the outcome variable as shown by the Model p-value of 0.001. The Nagelkerke R^2 values show that the predictive value of the model increases as additional variables are controlled for. In addition, the results show that age of mother at last birth, region of residence, place of residence, education, parity and previous C-section experience are significantly associated with C-section delivery. Furthermore the size of the child at birth, wealth and attendance at ANC significantly predicted C-section delivery.

Evidence from the model suggests a statistically significant association between region of residence as well as place of residence and C-section delivery. Women residing in all the regions have lesser chance of C-section delivery than those in Greater Accra Region. The results indicate that women in Volta and Upper West regions respectively were 42 percent and 66 percent less likely to have C-section delivery ($p< 0.05$). Also, women residing in Brong Ahafo, Northern and Upper East regions have lower odds of C-section delivery by 48 percent, 57 percent and 70 percent respectively ($p<0.001$). Further, women in the Eastern Region were 30 percent less likely to have C-section delivery. Relative to women residing in the Greater Accra Region, the odds of women having a C-section in the other regions are lower.

The findings suggest that generally, the likelihood of C-section delivery is much lower among women in the northern part compared to those in the southern parts of the country. Few studies

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conducted in Italy, Iran and Mozambique suggest that the likelihood of C-section delivery is lower among women in northern Italy, Iran and Mozambique than among women in southern Italy, Iran and Mozambique (Long et al., 2015; Mancuso et al., 2008; Shabila, 2017). There could be many plausible explanations to the regional disparities in C-section delivery. One reason is that there could be differences in the availability and accessibility of facilities that have the capacity to perform C-section across the regions. According to Ghana Ministry of Health (2011) report, there is higher accessibility of health facilities that perform C-section in southern Ghana than in the northern parts. According to the report, Greater Accra and Western respectively have 41 percent and 20 percent of their health facilities having the capacity to do C-section. However, only 11 percent, 5 percent and 7 percent of health facilities in the Northern, Upper East and Upper West respectively have the capacity to perform C-section delivery.

The effect of place of residence suggests that the likelihood of C-section birth is 24 percent lower for women residing in rural areas compared with women in the urban areas ($p<0.01$). This result buttresses the finding in studies conducted in Iraq and Mozambique which suggests that urban dwellers have higher odds of C-section delivery than their rural counterparts (Long et al., 2015; Shabila, 2017). As indicated in the previous chapter, the reasons for the rural to urban differences in C-section delivery could be many. First, there are socio-economic differences between rural and urban areas and so are in the affordability of C-section delivery. Second, there could also be disparities in the availability and accessibility of facilities that have capacity to perform C-section across rural and urban areas in Ghana.

The model further indicates that although women residing in high poverty communities were 0.08 times more likely to have C-section delivery compared to those residing in low poverty communities, their likelihood of C-section delivery was not statistically significant. This outcome

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is unexpected because even though studies on the effect of community-level poverty on C-section are limited, one would expect that the results will be comparable to the effect of wealth index on C-section at the individual level. At the individual level, being poor reduces women's likelihood of undergoing C-section. However, this study showed that the relationship is not significant at the community-level. This finding may mirror a situation where the poorer a community is, the more likely the people living in the community are to have poor health-seeking behaviour and to make less-informed health choices (Adamba, 2013). As such, this behaviour could lead women into having obstetric complications that require birth intervention such as C-section.

Similarly, the results of the analysis revealed that residents of high education communities are 0.08 times more likely to deliver by C-section compared to residents of low education communities. However, the relationship was not statistically significant. This development is unexpected because although studies on the effect of community-level education on C-section are limited, it was expected that the findings will be similar to the effect of education on C-section at the individual level. At the individual level, higher education predisposes women to higher C-section risks than women with primary and no education (Azami-aghdash et al., 2014; Long et al., 2015). The plausible reasons are that; i) higher educated women delay marriage and age at first delivery as well as age at subsequent births which could predispose them to C-section delivery. ii) Educated women have small family size and for that matter lower birth order which are associated with higher C-section delivery. iii) Highly educated women come from high socio-economic background which provides them the ability to afford C-section delivery.

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Table 7. 6 Estimated Odds Ratios (OR) and 95% Confidence Intervals (CI) from Logistic Regression of Caesarean Section Deliveries, GDHS 2003-2014

Characteristics	Model 1		Model 2		Model 3		Model 4		Model 5	
	Exp(β)	[95% CI]	Exp(β	[95% CI]	Exp(β)	[95% CI]	Exp(β)	[95% CI]	Exp(β)	[95% CI]
Region of residence										
Greater Accra(RC)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Central	0.99	[0.74, 1.33]	0.92	[0.68, 1.26]	0.93	[0.68, 1.28]	0.78	[0.35, 1.73]	0.61	[0.26, 1.40]
Western	0.74	[0.55, 1.01]	0.74	[0.54, 1.02]	0.77	[0.56, 1.07]	0.85	[0.41, 1.78]	0.78	[0.36, 1.71]
Volta	0.58	[0.40, 0.84]**	0.58	[0.40, 0.85] **	0.65	[0.44, 0.96]*	0.82	[0.37, 1.83]	1.16	[0.50, 2.70]
Eastern	0.70	[0.51, 0.96]*	0.76	[0.55, 1.05]	0.82	[0.59, 1.15]	0.91	[0.43, 1.97]	0.98	[0.44, 2.19]
Ashanti	0.90	[0.72, 1.13]	0.89	[0.70, 1.13]	0.92	[0.72, 1.18]	1.47	[0.86, 2.51]	1.54	[0.87, 2.73]
Brong Ahafo	0.52	[0.37, 0.72]***	0.55	[0.39, 0.77] ***	0.64	[0.45, 0.90]*	0.97	[0.46, 2.03]	1.23	[0.56, 2.68]
Northern	0.43	[0.27, 0.66]***	0.45	[0.28, 0.70] ***	0.60	[0.38, 0.97]*	0.53	[0.21, 1.30]	0.78	[0.30, 2.06]
Upper East	0.30	[0.16, 0.53]***	0.29	[0.16, 0.53] ***	0.39	[0.21, 0.72]**	0.48	[0.15, 1.56]	0.89	[0.26, 3.12]
Upper West	0.33	[0.16, 0.69]**	0.35	[0.17, 0.73] **	0.45	[0.21, 0.95]*	0.30	[0.04, 2.36]	0.48	[0.06, 3.92]
Place of residence										
Urban(RC)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Rural	0.76	[0.64, 0.91]**	0.82	[0.68, 0.99]*	0.98	[0.79, 1.22]	0.63	[0.41,0.96]*	1.27	[0.77, 2.11]
Community poverty										
Low poverty(RC)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
High poverty	1.08	[0.90, 1.30]	1.01	[0.84, 1.22]	0.90	[0.74, 1.09]	1.13	[0.74, 1.72]	0.93	[0.60, 1.45]
Community education										
Low education (RC)										
High education	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	1.08	[0.92, 1.27]	1.10	[0.93, 1.29]	1.09	[0.92, 1.29]	0.80	[0.551,1.15]	0.85	[0.58, 1.24]
Any pregnancy complication										
No(RC)			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes			1.04	1.04	1.02	[0.82, 1.28]	1.10	[0.65, 1.86]	0.93	[0.54, 1.62]
Partners presence at ANC										[1.17,2.54]**
Not present(RC)						1.00	1.00	1.00	1.00	
Present						1.72		[1.19, 2.49] **	1.72	

*p <0.05; **p<0.01; *** p<0.001; RC - Reference category

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Table 7.6 —continued

Characteristics	Model 1	Model 2		Model 3		Model 4		Model 5	
		Exp(β)	[95% CI]	Exp(β)	[95% CI]	Exp(β)	[95% CI]	Exp(β)	[95% CI]
Birth order									
1(RC)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2-3		0.58	[0.48, 0.70] ***	0.98	[0.61, 1.55]	0.38	[0.24, 0.60] ***	2.20	[0.65, 7.41]
4-5		0.54	[0.43, 0.69] ***	0.72	[0.40, 1.29]	0.37	[0.22, 0.62] ***	0.81	[0.13, 5.02]
6+		0.5	[0.43, 0.79] ***	0.60	[0.31, 1.18]	0.49	[0.25, 0.95]	0.8	[0.12, 6.43]
Previous C-section									
No(RC)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes		11.02	[7.75, 15.66] ***	12.09	[8.42, 17.34] ***	6.80	[3.52, 13.14] ***	9.29	[4.54,18.99]***
Size of child at birth									
Large(RC)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Average		0.70	[0.58, 0.84] **	0.71	[0.58, 0.85] ***	0.52	[0.33, 0.81] **	0.47	[0.30, 0.75]**
Small		1.23	[0.99, 1.54]	1.21	[0.96, 1.52]	1.00	[0.59, 1.71]	0.81	[0.45,1.43]
Age at last birth									
18-19 years(RC)				1.00	1.00			1.00	1.00
20-34 years				2.23	[1.43,3.46] ***			2.47	[0.78, 7.82]
35-49 years				5.26	[3.19,8.65] ***			7.70	[2.15, 27.56]**
Employment status									
Unemployed (RC)				1.00	1.00			1.00	1.00
Employed				1.17	[0.93,1.46]			1.6	[0.96, 2.94]
Marital status									
Never married(RC)				1.00	1.00				
Currently married				1.53	[1.06, 2.20]*				
Formerly married				1.74	[1.10, 2.73]*				
Wealth index									
Poor(RC)				1.00	1.00			1.00	1.00
Average				1.21	[0.90, 1.61]			3.01	[1.39, 6.52]**
Rich				1.41	[1.04, 1.91]*			4.81	[2.19, 10.55]***
Parity									
Primiparous(RC)				1.00	1.00			1.00	1.00
Multiparous				0.43	[0.27, 0.68] ***			0.14	[0.04, 0.47]**
Grand multiparous				0.46	[0.26, 0.83] **			0.30	[0.05, 1.88]

*p <0.05; **p<0.01; *** p<0.001; RC - Reference category

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Table 7.6—continued

Characteristics	Model 1		Model 2		Model 3		Model 4		Model 5	
			Exp(β)	[95% CI]	Exp(β)	[95% CI]	Exp(β)	[95% CI]	Exp(β)	[95% CI]
Educational level										
No education (RC)					1.00	1.00			1.00	1.00
Primary					1.13	[0.83,1.54]			0.41	[0.19, 0.86]*
Secondary/Higher					1.36	[1.04, 1.79]*			0.73	[0.41, 1.28]
Access to healthcare										
Low access(RC)			1.00	1.00					1.00	1.00
High access			1.07	[0.90, 1.28]					0.88	[0.57, 1.36]
Number of ANC visits										
1-3 visits(RC)			1.00	1.00					1.00	1.00
4 or more visits			1.88	[1.24, 2.85] **					1.52	[0.53, 4.32]
Place of delivery										
Public hospital(RC)			1.00	1.00					1.00	1.00
Private hospital			0.93	[0.74, 1.17]					0.95	[0.55, 1.63]
Year of Survey (2003)	1.00		1.00		1.00		1.00		1.00	
2008	1.211[.928,1.578]		1.094[.829,1.443]		1.06[.804,1.389]		1.00		1.00	
2014	2.046[1.645,2.543]***		1.848 [1.467,2.328]***		1.77 [1.411,2.217]***		1.64[1.115,2.420]**		1.81[1.201,2.720]**	
Model fit		159.96		405.14		505.93		113.37		170.95
-2LL		4212.96		3967.37		3866.57		812.07		754.492
Model p value		<0.001		<0.001		<0.001		<0.001		<0.001
Nagelkerke R^2		05.3%		13.2%		16.3%		17.0%		25.0%
Over all percentage		85.2		86.1		86.4		86.9		87.3

*p<0.05; **p<0.01;***p<0.05; RC- Reference category

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Model 2 of Table 7.6 adjusted for the mediating effects of institutional-level and medical (proximate) factors and indicates a marked improvement over Model 1 in all the statistical parameters. The likelihood square reduced from 4212.96 in Model 1 to 3967.37 in Model 2 ($p<0.001$) and the model explains 13.2 percent of the variance in the mode of child delivery which correctly classified 86.1 percent of the case with an increase in the model fit value from 159.96 in Model 1 to 405.14 in Model 2. The statistical parameters indicate that Model 2 is better than Model 1. The results of the influence of region of residence and place of residence on C-section delivery remained significant. The effect of community-level poverty and community-level education also remained not significant as shown in Model 1. However, the odds of having C-section delivery were not significant for women in Eastern Region. The results may suggest that the combined effect of institutional-level and medical factors does not mediate the effect of the community-level factors on C-section delivery.

The effect of institutional-level factors such as access to healthcare and place of delivery seems not to be significantly related to C-section delivery. However, number of ANC visits is significantly related to C-section delivery. The model indicates that although the odds of C-section delivery is higher for women who had high access to healthcare than those who had low access, the relationship is not statistically significant (OR= 1.08, 95% CI: 0.90-1.28) (Ghosh, 2010; Kottwitz, 2014; Lauer et al., 2010). This development is unexpected because research indicates that the increased availability of emergency obstetric care facilities in Ghana could increase access to healthcare and more importantly access to C-section delivery (Ghana Ministry of Health, 2011), but the study proved otherwise. The possible explanation could be in the measuring of access to healthcare, which may not be reliable. Several scholars conceptualised access to healthcare as visits to healthcare facility in the last 12 months preceding the survey (Ejembi, Dahiru, & Aliyu,

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2015; Wang, 2016). Therefore, the current study used visits to healthcare facility in the last 12 months as proxy for access to healthcare.

Additionally, private hospital clients have seven percent lower likelihood of C-section delivery than public hospital clients, though not statistically significant. The results of the analysis established that the number of ANC visits is an important covariate, influencing C-section delivery. The findings suggest that women who have had four or more ANC visits are 1.88 times as likely to have C-section delivery compared to women who had less than 4 ANC visits ($p< 0.05$). A possible explanation for this is that higher ANC visits means availability and accessibility to healthcare facilities, where such interventions are provided. Also, this association is expected since most pregnancy complications that might indicate C-section delivery can be easily diagnosed through routine antenatal care.

Medical factors such as previous C-section delivery, birth order and baby's size at birth have significant effect on C-section delivery (Table 7.6). Compared to women who have no prior C-section, women who have had previous C-section deliveries are 10.02 times more likely to have C-section birth ($p<0.001$). As expected, the finding is congruent to many studies conducted in low-, middle-and high-income countries (Busaidi et al., 2012; Habib et al., 2011; Suzuki & Nakata, 2013; unNisa et al., 2016). The reasons for these findings could be that women with previous C-section are exposed to many obstetric health complications in subsequent pregnancies and therefore physicians would not like to take risks with such patients but provide C-section services with the slightest indication. As a way of solving this problem, the Ministry of Health can adopt and modify the US Healthy People 2000 protocol which helped USA maintain an optimal C-section rate of 15 percent in some parts of the country (Yassin et al., 2012), to reduce non medically indicated C-section delivery among Ghanaian women who are having their first child.

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Similarly, the likelihood of C-section occurring was 30 percent lower for women who had average-sized babies than those with larger babies ($p<0.01$). This goes to confirm the assertion made in similar studies conducted in India that women having smaller babies and large babies are at higher likelihood of C-section delivery than women with average-sized babies (Ghosh, 2010). This was expected, because there are many health complications associated with having smaller and bigger babies that would require C-section intervention. Having smaller babies may imply having premature babies, which means that either the baby, the mother or both have health issues. Additionally, having very large babies requires C-section because normally there are health challenges associated with delivering such babies vaginally.

Additionally, women who a have had history of pregnancy complication have 1.04 times likelihood of C-section birth than those without a history of complication. This relationship is however not significant. Similarly, the odds of C-section births was 42 percent ($p<0.001$), 46 percent ($p<0.001$) and 42 percent ($p<0.001$) lower for order 2-3 women, order 2-5 women and order 6+ women respectively. This finding is consistent with studies carried out in other developing countries which indicate that women with first birth order have higher likelihood of C-section delivery than women with 2-3 birth order, 2-5 birth order and 6+ birth order (Nazir, 2015; Rahman et al., 2015; Yassin et al., 2012). The plausible explanation to the current finding is that, women who have had three C-sections are advised by doctors to stop childbearing. This could suggest that any woman who goes beyond three deliveries has no labour complications which may require surgery.

In Table 7.6, the results of the analysis further assess how individual-level factors and medical factors mediate the effect of community-level factors on C-section delivery in Model 3. This model further marked an improvement over Model 2 where the likelihood square further reduced from

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3967.37 in Model 2 to 3866.57 in Model 3 (p<.001). This model explains 16. 3 percent of the variance in the mode of child delivery and correctly predict, 86.4 percent of the case with an increase in the model fit value from 405.14 in Model 2 to 505.93 in Model 3. This suggest that Model 3 is a better model than the Models 1 and 2. Model 3 indicates that the significant effect of place of residence and women residing in Eastern Region on C-section delivery disappeared. Further, community-level poverty and community-level maternal education remain not significant as indicated in the two previous models. However, the likelihood of C-section delivery across the regions with the lower odds of C-section in Models 1 and 2 decreased. The model suggests that the likelihood of C-section births is 35 percent (p<0.05) lower in Volta, 36 percent (p<0.05) lower in Brong Ahafo and 40 percent (p<0.05) lower in Northern regions. The results of the analysis further suggest that women in Upper East and Upper West were 61 percent (p<0.001) and 55 percent (p<0.001) less likely to have C-section delivery respectively. The assertion that individual-level and medical factors play a key role in the rise of C-section delivery was evident in Model 3 of Table 7.6, where most of the individual-level factors and medical factors significantly predicted C-section delivery.

The results of the analysis from Model 3 (Table 7.6) suggest that wealthy women were 1.41 times more likely to have C-section delivery when compared to the poor category (p<0.001). This finding supports the assertion that the relationship between community-level factors and C-section is mitigated by wealth quintile of the woman. This outcome confirms previous studies conducted in developed and developing countries (Arsenault et al., 2013; Faremi et al., 2014; Ghosh, 2010; Khan et al., 2017; R. Khan et al., 2012; Long et al., 2015). A number of reasons may have accounted for these differences. First, women from higher socio-economic status generally choose

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private hospitals where C-section is more common. Second, wealthy households can afford the surgery and the additional costs associated with it.

The status of being currently married and formerly married is associated with 0.53 times and 0.74 times likelihood of C-section delivery respectively than the never married women ($p<0.05$). The finding corroborates a study conducted in Cameroon by Tebeu et al. (2011) which indicates that the majority of C-section patients were married. This could be explained by the effect of cost sharing. This may suggest that married women and their partners could pool their resources together to pay for the cost of C-section delivery hence the higher rate of the procedure among this group.

With regard to parity, multiparous and grand multiparous women were 57 percent ($p<0.001$) and 54 percent ($p<0.01$) less likely respectively to have C-section. The outcome buttresses what many studies have found which suggest that primiparous women are more likely to have C-section delivery (Farghali, Rashed, Fathi, Moustafa, & Rahman, 2014; Yassin, Saida, & Yassin, 2012). The reasons for this increased C-section delivery among primiparous women are not entirely clear. However, an earlier study indicates that this could be a case of misuse of C-section by the primiparous women (Long, 2015).

Again, the interactions between educational level and C-section delivery suggest that women with secondary or higher education were 0.36 times more likely to deliver by C-section when compared to those with no education. This outcome is expected because many studies have documented similar findings (Azami-aghdash et al., 2014; Ghodrati et al., 2016; Yilmaz et al., 2013). According to these studies, education can influence a range of other factors that may lead to such a conclusion. One key reason is that higher education is a strong predictor of women's decision-making autonomy. Moreover, educated women may prefer C-section because they can afford it and they

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may believe it to be safer. However, in this study, the results of the analysis is expected as three possible explanations could be provided for the findings. i) Higher education can delay marriage and age at first delivery as well as age at subsequent births which could predispose women to C-section delivery. ii) Educated women have small family size and for that matter lower birth order which are associated with higher C-section delivery. iii) Highly educated women come from high socio-economic background which provides them the ability to afford C-section delivery.

Model 3 also indicates that women aged 20-34 years and 35years or more were 1.23 ($p<0.001$) times and 4.26 ($p<0.001$) times respectively more likely to have C-section delivery when compared with those aged 18-19 years. This finding is consistent with many earlier studies conducted in developed and developing countries which indicate that increasing age is associated with increasing C-section delivery (Sinnott et al., 2016; Suzuki & Nakata, 2013; Tebeu et al., 2011; E. Wang, 2016; Yoshioka-maeda, Ota, Ganchimeg, Kuroda, & Mori, 2016). The plausible explanation to this finding is that women in advanced maternal ages are more likely to suffer from many health complications which may be aggravated during pregnancy and therefore predispose them to C-section and that may save their lives. This finding is expected, as women in advanced maternal ages are more likely to suffer from obstetric and maternal complications that may subsequently contribute to the increasing rate of C-section deliveries. It is therefore important for health workers to educate women on the need to have early pregnancies to avoid C-section delivery associated with complications during advanced ages.

Medical factors such as previous C-section delivery and baby's size at birth continue to show a significant effect on C-section delivery as indicated in Models 1, 2 and 3 (Table 7.6). Compared to women who have no prior C-section, women who have had prior C-section delivery were 11.09 ($p<0.001$) times more likely to deliver by C-section (OR= 12.09, 95% CI: 8.42-17.34).

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Furthermore, the likelihood of C-section delivery was 39 percent lower for women who had average-sized babies than those with larger-sized babies ($p<0.001$).

Model 4 controls for the interactive effect of interpersonal-level factors and medical factors; and it indicates that the significant effect of region of residence on C-section delivery disappeared. In this model, the results of the analysis indicate a progressive improvement of the statistical parameters over the previous models. The model was statistically significant where the likelihood square reduced from 3866.57 in Model 1 to 812.07 in Model 4 ($p<.001$) and the model fit value decreased from 505.93 in Model 3 to 812.07 Model 4. Further, there was a slight increase in the percentage correct rate from 86.4 percent in Model 3 to 86.9 percent in Model 4. The model explains 17.0 percent of the variance in the mode of child delivery. This indicates a progressive improvement from the Models 1, 2 and 3.

Additionally, the results of the analysis from Model 4 and the previous three models indicate that the odds of C-section delivery are lower for rural women. The model's findings on place of residence was consistent with the findings from Models1, 2 and 3 where rural dwellers were 36 percent less likely to have of C-section delivery compared to urban dwellers ($p<0.05$). Furthermore, the model suggests the effect of women residing in community education and community poverty remains not statistically significant as shown in Models 1, 2 and 3.

The changes in Model 4 suggest that the combined effect of interpersonal-level factors and medical factors substantially mediate the relationship between community-level factors and C-section delivery. Evidence from the results of the analysis suggests that women whose partners were normally present at ANC have higher likelihood of C-section births (OR= 1.72, 95% CI: 1.17-2.54). These findings indicate that spousal support seems to increase the odds of C-section delivery. This contradicts the finding of studies done in Nepal which suggests that husband's

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presence at ANC visits and during labour reduces birth intervention such as C-section (Sapkota et al., 2012). The reasons for this finding could be multifaceted. One could be that the women whose partners were present at ANC visit may be carrying health threatening pregnancies that require spousal support. Another reason is that these partners may want to receive information on the health status of both mother and unborn child. Further, this may suggest that these partners could be educated and therefore value the need to support their spouses to attend ANC regularly by their presence. Now, these educated men are likely to have educated spouses hence the high C-section rate among this group. As earlier demonstrated in this study, C-section rates are high among educated women. In this regard, it is imperative for health workers in Ghana to use the spousal presence at ANC to educate the partners on how to provide support to help the women deliver vaginally if possible as shown by Nepalese men in the study by Sapkota et al., (2012).

The effect of women with average-sized babies is clearly significant ($p< 0.05$) and consistent with findings in previous models, as these categories of women have 48 percent lower odds of C-section delivery compared to those with large-sized babies. The effect of birth order remains consistent with findings in Model 2. Additionally, births order 2-3 mothers and 4-5 mothers are 62 percent and 61 percent less likely to have C-section delivery respectively compared to first birth order women ($p< 0.001$). The influence of previous C-section delivery clearly remains consistent with all the three previous models which present a strong predictive effect on subsequent C-section delivery. Women with history of prior C-section birth have higher odds of having C-section delivery than women with no prior C-section delivery (OR= 6.80, 95% CI: 4.54-18.99).

Model 5 in Table 7.6 controls for the combined effect of all the factors in the model. The model indicates a progressive improvement on the statistical parameters over all the four previous models. The model was statistically significant where the likelihood square reduced further from

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812.07 in Model 4 to 754.49 in Model 5 ($p<0.001$) and the model fit value increased from 113.37 in Model 4 to 170.95 in Model 5. Further, there was a progressive increase in the percentage correct rate from 86.9 percent in Model 4 to 87.3 percent in Model 5. This model explains 25.0 percent of the variance in the mode of child delivery. These parameters suggest that Model 5 is better than all the previous four models. The results of the analysis indicate that the effect of community-level factors and institutional-level factors on C-section delivery disappeared. This may suggest that the effect of community factors appears to be spurious, confirming that the relationship between community-level factors and C-section delivery is mediated by the combination of individual, interpersonal and medical factors.

At the individual level, women aged 35-49 years, wealthy, primary school leavers and the averagely "rich" continue to affect C-section delivery. Women aged 35-49 years continue to show a positive effect on C-section as demonstrated in previous model (OR= 7.70, 95% CI: 2.15-27.56). However, the magnitude of this positive effect increased in Model 5 with decreased level of significance. Multiparous women continue to record a negative effect on C-section delivery. This negative effect remains constant as shown in previous model (OR= 0.14, 95% CI: 0.04 -0.47). However, the extent of the negative effect decreased substantially and the level of significance reduced marginally. Wealthy women continue to positively affect C-section delivery as exhibited in previous model (OR= 4.81, 95% CI: 2.19-10.55). The magnitude of this positive effect increased considerably over Model 3. The effect of averagely wealthy women on C-section delivery which did not show as significant relationship with C-section in Model 3, suggests a positive effect on C-section delivery in Model 5 (OR= 3.01, 95% CI: 1.39-6.52). Again, primary school leavers who did not show a significant relationship in Model 3, exhibited a negative effect on C-section delivery (OR= 0.41, 95% CI: 0.19-0.86). The effect of educated women on C-section delivery which

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showed a significant relationship with C-section in Model 3, did not show a significant effect on C-section delivery in Model 5.

The model indicates that the effect of interpersonal-level factors on C-section delivery remains consistent with Model 4. Women whose partners accompanied them to most ANC visits were 1.72 times as likely to deliver by C-section, compared to those whose partners did not accompanied them (OR= 1.72, 95% CI: 1.17-2.54).

Considering medical factors, women who had average-sized babies were 53 percent less likely to have C-section ($p<0.01$). Model 5 of Table 7.6 suggests that women with average-sized babies continue to show reduced likelihood of C-section delivery as indicated in the previous model. The level of this negative effect increases slightly over Model 3. Also, higher likelihood of C-section delivery was recorded among respondents who have had a history of prior C-section births (OR= 9.29, 95% CI: 4.54-18.99). The results of the analysis indicate that, previous C-section delivery continues to exhibit a positive pattern, whereby women with prior C-section deliveries have higher odds of C-section delivery.

Finally, results of the analysis in Model 5 suggest that higher education, advanced age, wealth, presence of partner at ANC visits and history of previous C-section were associated with increased likelihood of C-section delivery. This may suggest that higher education has multiplying effect on C-section delivery. In this regard, educated and wealthy women are more likely to delay marriage and give birth at advanced ages. These may predispose them to pregnancy complications that may lead to C-section delivery. Further, C-section delivery is significantly lower for women who have had primary education, gave birth to average-sized babies and multiparous. This may imply that primary school graduates are likely to marry and have their first delivery before the age of 35 years. These predisposing them to less pregnancy complications leading to vaginal delivery. This

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study reinforced the importance of individual and medical factors in C-section delivery research. Further, the current study has augmented the few existing studies conducted to examine the influence of interpersonal factors on C-section delivery.

7.3 Summary

Furthermore, the findings of the quantitative study indicate that community-level factors did not predict C-section delivery in Ghana. C-section delivery is rather explained by individual (higher education, wealth and advanced ages), interpersonal (presence of partners at ANC visits) and medical (previous C-section and average-sized baby) factors. The findings of the study may suggest that higher education has multiplying effect on C-section delivery. In this regard, educated and wealthy women are more likely than poor uneducated women to delay marriage and give birth at advanced ages. These predispose them to complications that lead to C-section delivery. However, the results of the qualitative study suggest that community beliefs predict C-section delivery, were community beliefs were seen to be negatively significant to C-section delivery.

Additionally, there is a significant relationship between women whose partners accompanied them to most ANC visits.

Finally, C-section delivery is significantly lesser for women who have had primary education, gave birth to average-sized babies and were multiparous. This may imply that primary school graduates are likely to be married and have their first delivery before the age of 35 years, predisposing them to less pregnancy complications that may lead to less C-section deliveries.

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CHAPTER EIGHT

SUMMARY, CONCLUSION AND RECOMMENDATIONS

8.1 Summary

High and low C-section rates as well as wide C-section disparities is a significant contributing factor to infant and maternal morbidity and mortality. This however is not being prioritized for control in many countries globally partly because of lack of extensive data on the factors influencing the current levels and trends of C-section delivery. Such data are needed in order to develop effective community based prevention strategies to ensure that C-section is provided and accepted when needed. Although several studies had been done on the determinants of high and low C-section rates as well as C-section disparities, what is clearly missing in the literature is whether community factors and the beliefs values of the people have influenced the global levels and trends in C-section delivery. Research has however shown that this information is important because the behaviour of the people toward C-section delivery could be shaped by the factors in the community as well as the belief systems of the people.

This study contributes theoretically to literature by providing systematic framework which could guide future studies on mode of child delivery. What this study has shown is the impact of community beliefs on researches underpinned by the Health Belief Model. The study has re-conceptualised the HBM to include community beliefs which was not originally part of the model. In addition, this study has re-conceptualised the Social Ecological Model of health by McLeroy et al. (1988) to include medical factors. The impact of medical factors in health research such as C-section delivery research cannot be under estimated, as extensive research has been done on the influence of medical factors on mode of child delivery. This addition to the model is a major

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contribution to literature and provides the latitude to merge both medical and social variables in a single framework which can guide future social science studies underpinned by the SEM.

In addition, this study helps to advance C-section delivery's research in sub Saharan African setting by showing that the current C-section deliveries trends can be fully understood by interrogating the beliefs of the childbearing women and factors in the community that could affect child delivery. Hence, in order to fully understand any maternal health problem, the methodology should consider the beliefs of the people and the prevailing factors in the communities. This will help in developing appropriate community based interventions to help address the problem.

In order to fill this gap, this study sought to investigate the trends, disparities and the influencing factors of C-section deliveries in Ghana with a view to developing community based preventive intervention to ensure that C-section is provided and accepted when needed. Specifically, this study described the levels and trends of C-section deliveries in Ghana from 2003 to 2014, explore the beliefs of childbearing women on mode of child delivery and to examine the community level factors influencing mode of child delivery.

In this chapter, a mixed method design was adopted using both quantitative and qualitative approaches to answer the research questions. The quantitative aspect focused on two areas: (i) the spatial levels and trends of C-section deliveries in Ghana. The source of data was the individual datasets of 2003, 2008 and 2014 GDHS. Also, (ii) community-level factors and other factors associated with C-section deliveries in Ghana. This was based on pooled data of 2003, 2008 and 2014 GDHS dataset to increase the power of the study. The sample size was 5222 respondents with the inclusion criteria being women aged 18-49 who delivered at private or public health facility. Data analysis was done at univariate, bivariate and logistic regression levels.

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On the other hand, the qualitative method was used to explore beliefs of child bearing women on mode of child delivery. Data was obtained from primary data of in-depth and key informants interviews. Greater Accra and Northern regions being the region with highest and lowest C-section rate in Ghana respectively were selected for the study. Two hospitals, one private and the other public were selected from each region using simple random sampling. The sampling frame for the selection of the hospital which was obtained from Ghana Health Service Research Division and was made up of top five hospital that performed the most C-section delivery in Ghana in 2016. In Greater Accra Region, Ridge and Mediferm hospitals were selected while Tamale Teaching Hospital and Kings Medical Centre were selected from Northern Region. Participants were purposively recruited from the four hospitals out of which 48 mothers and 11 health workers comprised four gynaecologist, four midwives and four traditional birth attendants were interviewed. This study drew on the concepts of SEM and HBM to explain the concepts and findings. The summary of finding, policy recommendations and recommendations for future research are presented in this chapter.

8.2 Summary of Major Findings

8.2.1 Spatial level and trends of C-section delivery in Ghana from 2003 to 2014

This study showed that C-section rates in Ghana almost doubled increasing from 9.8% in 2003 to 18.2% in 2014 with wide regional disparities and it is above the recommended WHO threshold of 15 percent. The Greater Accra and Northern regions recorded the highest rate of 23.1% and lowest rates of 8.2% respectively. Drawing on the re-conceptualised Socio-Ecological Model, the study suggests that the rise and disparities in C-section rate in Ghana could be attributed to a myriad of factors The indicate that these factors included individual factors (being wealthy, primiparous,

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employed, advanced in age and having secondary or higher education), interpersonal factors (partners presence at ANC visits), institutional factors (having 4 or more ANC visits), community factors (living in urban areas and Greater Accra Region) and medical factors. The findings were consistent with what the reviewed studies on mode of child delivery in Chapter 2 showed. Many of the studies in low- and middle- income countries showed that the two major contributors of low and high C-section rates as well as C-section in any region are individual and medical factors. This finding was also validated in Chapter seven. In Chapter seven, the results showed that the factors influencing C-section deliveries were multifaceted and interrelated and this confirmed what previous studies have shown (Gebremedhin, 2014; Long et al., 2015; Mohtasham & Afshari, 2013). However, the reasons for the regional and rural-urban differences in C-Section delivery rates could be that, there is difference in the availability and accessibility of C-Section facilities and health professionals capable of performing the surgery across the regions and the rural-urban areas. The results on the number of ANC visits showed that women with four or more ANC visits are likely to have C-section delivery and this confirmed what previous studies have shown (Nazir, 2015; Yassin et al., 2012). A possible explanation for this is that women who have higher ANC visits means availability and accessibility to healthcare facilities where such interventions are provided. Also, this association is expected since most pregnancy complications that might indicate C-section delivery can be easily diagnosed through routine antenatal care.

8.2.2 Belief of childbearing women on mode of child delivery

In this chapter, the qualitative study explore the beliefs of child bearing women on mode of child delivery. The study found that women in Northern Region are similar to those in the Greater Accra Region on the constructs of perceived susceptibility to labour pains, perceived severity of C-

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section, community beliefs on C-section delivery and cues to action from the advice from doctors. In addition, the results further suggest that women in the Greater Accra Region differ on the score of perceived barriers and perceived benefits from those in the Northern Region. The study suggest that cultural beliefs and community beliefs are the main barriers to C-section delivery in the Northern region while women in the Greater Accra quoted financial difficulties as the main barrier to C-section delivery. The findings in this study could be the reasons behind the low levels of C-section delivery observed in the Northern Region of Ghana as indicated in the quantitative study and confirms the findings of a study that suggest that religious beliefs exist as barrier to C-section delivery (Ugwu & de Kok, 2015). Also, the study demonstrated that doctors are the major decision makers when it comes to C-section delivery. The interviewees further indicated that doctors perform C-section because they are lazy and for financial gains and confirms the findings of earlier study (Naeimi & Momeni, 2015).

8.2.3 Community and other factors associated with caesarean section deliveries in Ghana

Findings of the quantitative study indicate that community-level factors did not predict C-section delivery in Ghana. C-section delivery is rather explained by individual (having higher education, being wealth and advanced in age), interpersonal (presence of partners at ANC visits) and medical (having previous C-section delivery and average-sized baby) factors.

However, the integration of the two theories was useful in identifying the predictors of C-section delivery at individual, interpersonal, community and medical levels. For example, the re conceptualised Health Belief Model synchronises very well with the re-conceptualised Socio-Ecological Model (SEM) to identify community beliefs as a predictor of C-section delivery. Community beliefs fit directly in the community-level factors in the SEM since these beliefs are

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likely to be shaped by the communities in which the women reside. Therefore, the study suggest that individual (having higher education, being wealth and advanced in age), interpersonal (presence of partners at ANC visits), community (community beliefs), medical (having previous C-section delivery and average-sized baby) factors and beliefs as the main predictors of C-section deliveries in Ghana. The findings on individual and medical factors confirm the findings of similar studies conducted in mostly low- and middle-income countries as shown in the literature review (Gebremedhin, 2014; Long et al., 2015; Nazir, 2015; Yassin et al., 2012). In addition, the study indicate that women whose partners were present at most of their ANC visits were likely to have C-section delivery. The reasons for this finding could be multifaceted. One could be that the women whose partners were present at ANC visit may be carrying health threatening pregnancies that require spousal support. Another reason is that these partners may want to receive information on the health status of both mother and unborn child. Further, this may suggest that these partners could be educated and therefore value the need to support their spouses to attend ANC regularly by their presence. Now, these educated men are likely to have educated spouses hence the high C-section rate among this group. In addition, there has been reports that currently Ghana Health Service is encouraging male involvement in anti-natal (ANC) and post-natal care (PNC) to extent that, women who report to ANC and PNC clinics with their partners are seen first. However, researches show that the decision on whether to have C-section delivery or not, does not rest on the partners and so the partners presence cannot be associated with the findings in this regard.

In a nutshell, this study has contributed to the body of research on the determinants of C-section delivery by identifying community beliefs as a major determinate of low C-section rates and the need to consider belief values of a group of people in drawing maternal health intervention.

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8.3 Recommendations

The findings of the study, especially that relating to the relationship between community-level factors and C-section delivery, suggest that a number of factors could influence C-section delivery. Of particular importance is the influence of women who are wealthy, educated and advanced in age. These women are more likely to have the financial resources to afford the surgery and predispose them to C-section delivery. In tackling the growing C-section rise and disparities, it is imperative for health policy makers to educate these women through the ANC clinics on the need to avoid getting pregnant in advanced ages (35-49 years) in order to prevent complications that may lead to C-section delivery. The growing female educational attainment in Ghana could delay marriages and age at first delivery, which could expose women to C-section delivery. This has implications for maternal and infant health as multiple C-section delivery for example could lead to challenges such as morbidity to both mother and child as well as mortality to mother and baby.

Further, of specific significance is the influence of women who had low levels of education and those residing in communities with beliefs as barriers to C-section delivery. These women are less likely to have C-section delivery when they need it and could die from birth complications. This would have implication for infant and maternal mortality in Ghana. Research indicates that 15 percent of all pregnancies in Ghana will develop complications that may require interventions such as C-section (Ghana Statistical Service et al., 2015). Therefore, low C-section rate among these groups of women is a cause for concern since it has implications for maternal mortality in Ghana. The Ghana Health Service as well as key stakeholders in the health sectors should therefore include in maternal health intervention programmes, identified predictors to ensure that C-section is provided on medical indication to all Ghanaian women who need it.

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Also, it is important to note that the major contribution of this study to literature is the identification of community belief as a significant predictor to low C-section rates. Therefore there is the need for stakeholders to consider the beliefs of the people in the communities in drawing up maternal health intervention for the women in each community.

8.4 Further Studies

The world of academia should be encouraged to conduct research that will inform policy on the predictors of C-section delivery rise and disparities in Ghana as well as the need to rationalise C-section use to ensure that medically indicated C-sections are provided.

The study shows that interpersonal factors (partner's presence at ANC visits) predict C-section delivery. This finding is contrary to what has been documented in the literature where interpersonal factors have been found to rather predict vaginal delivery (Sapkota et al., 2012). It is therefore imperative to investigate why women whose partners attended most ANC visits have higher likelihood of C-section delivery.

Additionally, there are beliefs as barriers to C-section delivery in Ghana as the findings from the qualitative component of the study indicate. This may suggest that the focus on medical issues for improving health outcomes in Ghana is probably responsible for this situation. There is, therefore, the need for researchers to investigate the beliefs which serves barriers to C-section delivery in other parts of Ghana and how to sensitise women on the benefits of C-section delivery. This can be done using the qualitative methodology in the other regions of Ghana.

Finally, the results of the study did not show a significant association between all the community-level factors and C-section delivery. Future research should consider exploring the use of other community-level factors such as infrastructure and hospital delivery on C-section delivery.

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8.5 Conclusion

Ghana's population-based C-section rate is higher than the WHO recommended threshold of 15 percent. However, there are wide C-section rate disparities among women in Ghana. Both high and low C-section rates mirror a situation where the procedure is overused or underused in Ghana. This could have serious implications for any gains made to achieve the target set for reducing maternal mortality as enshrined in the SDG 3.

This study showed that there are extremely high C-section rates in some parts of Ghana and very low C-section rates in other parts of the country. Although this study showed that the factors influencing C-section disparities are multifaceted (community factors, beliefs, individual and medical factors). It is clear that, this study has advanced mode of child delivery literature by establishing that community factors and beliefs are also associated with C-section rise and disparity. It is therefore important for health policy makers to include in maternal health interventions, community factors and beliefs to ensure that C-section is provided and accepted when needed.

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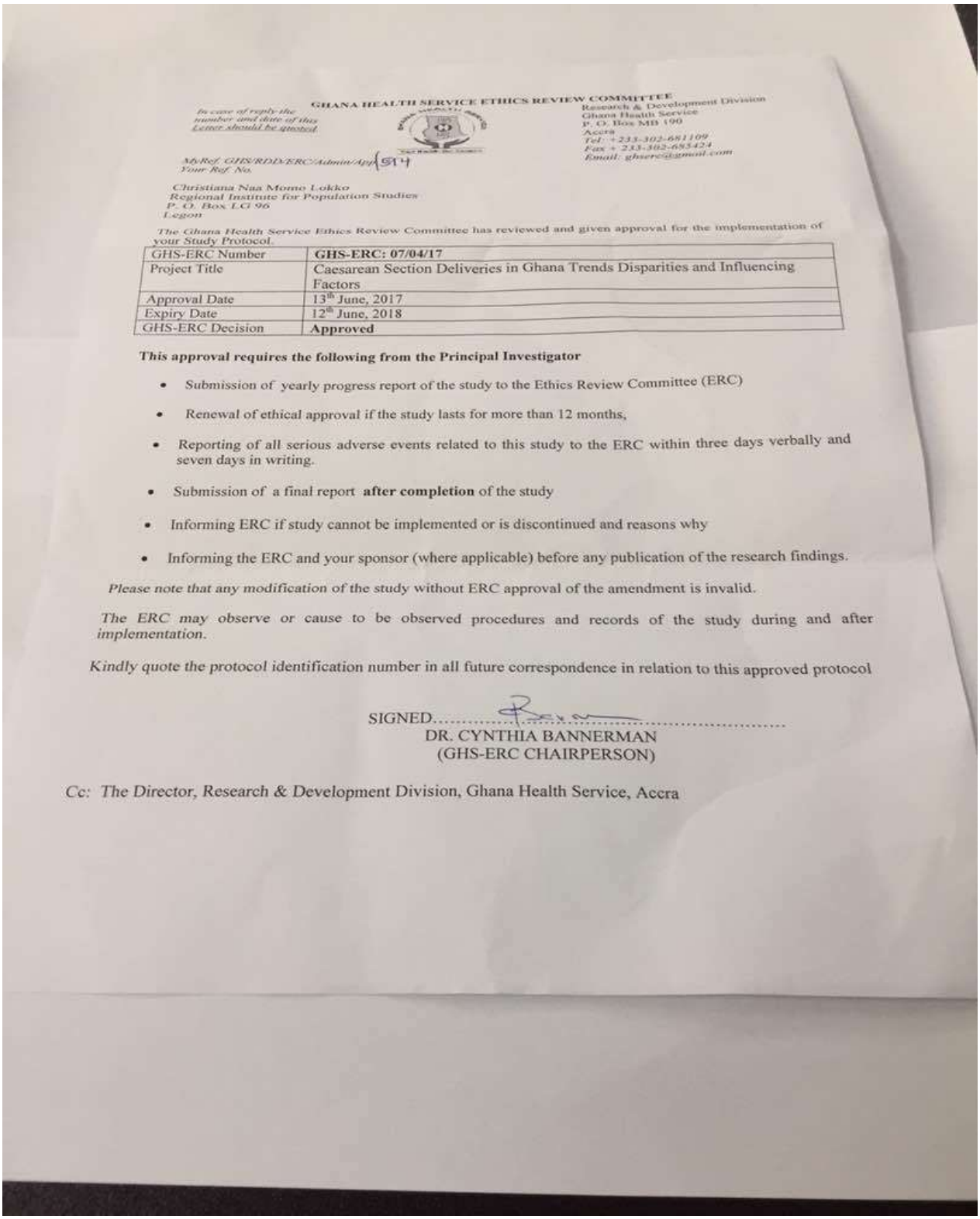
Appendix 1: Ethical Approval from Ghana Health Service



GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

In case of reply the number and date of this Letter should be quoted

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax: +233-302-685424
Email: ghserc@gmail.com

My Ref: GHS/RDD/ERC/Admin/Apr/[917]
Your Ref No.

Christiana Naa Momo Lokko
Regional Institute for Population Studies
P. O. Box LG 96
Legon

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol.

GHS-ERC Number	**GHS-ERC: 07/04/17**
Project Title	Caesarean Section Deliveries in Ghana Trends Disparities and Influencing Factors
Approval Date	13th June, 2017
Expiry Date	12th June, 2018
GHS-ERC Decision	**Approved**

This approval requires the following from the Principal Investigator

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report **after completion** of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.

Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....
DR. CYNTHIA BANNERMAN
(GHS-ERC CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra

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Appendix 2: Ethical Approval from University of Ghana

UNIVERSITY OF GHANA
ETHICS COMMITTEE FOR THE HUMANITIES (ECH)
P. O. Box LG 74, Legon, Accra, Ghana

My Ref. No.....

17th March, 2017

Ms. Christiana Naa Mmo Lokko
Regional Institute for Population Studies
University of Ghana
Legon

Dear Ms. Lokko,

ECH 090/16-17: CAESAREAN SECTION IN GHANA: TRENDS, DISPARITIES AND INFLUENCING FACTORS

This is to advise you that the above reference study has been presented to the Ethics Committee for the Humanities for a full board review and the following actions taken subject to the conditions and explanation provided below:

Expiry Date:	14/03/18
On Agenda for:	Initial Submission
Date of Submission:	13/02/17
ECH Action:	Approved
Reporting:	Bi-Annually

UG/ISSER/ECH VALID UNTIL 14 MAR 2018 APPROVED DOCUMENT

Please accept my congratulations.

Yours Sincerely,

Rev. Prof. J. O. Y. Mante
ECH Chair

CC: Prof. Samuel Codjoe, Regional Institute for Population Studies

Tel. +233-302933866

Email: ech@ug.edu.gh | ech@

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Appendix 3: Poster for Voluntary Participation in Research

Voluntary Participation in Research

A female researcher from the University of Ghana, Legon, invites all women from the ages of 18-49 years, who gave birth at this facility by both caesarean section and vaginal birth to voluntary participate in this research. The research involves face-to-face private interviews which will be held inside or outside the facility or any appropriate location. Interviews conducted will be used confidentially and anonymously. Potential participants will be contacted by phone.

The main purpose of the research is to fulfil academic requirement and policy formulation.

Title of study: Caesarean Section (C-section) Deliveries in Ghana: Trends, Disparities and Influencing Factors

Duration of interview: 45-60 minutes

NB: Incentives in a form of GH 10 air time will be provided after completion of interviews. Kindly fill in your details in the form attached to this poster.

For participation and further enquiries, you can call 020 8080812.

Thank you.

	CAESAREAN SECTION BIRTH		**VAGINAL BIRTH**	
18-19 AGE GROUP				
Serial	First Name	Contact Number	First Name	Contact Number
1				
2				
3				
4				
20-34 AGE GROUP				
1				
2				
3				
4				
5				
6				
35-49 AGE GROUP				
1				
2				
3				
4				
5				
6				

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Appendix 4: Flyer for Prospective Participants

INFORMATION FOR PROSPECTIVE PARTICIPANTS

UNIVERSITY OF GHANA
REGIONAL INSTITUTE FOR POPULATION STUDIES

CAESAREAN SECTION DELIVERIES IN GHANA: TRENDS, DISPARITIES AND INFLUENCING FACTORS

Research Team Contact: Regional Institute For Population Studies-University Of Ghana

Principal Research : Christiana N.M Lokko PhD Candidate
Phone : 020808081
Email : cnmlokko@st.ug.edu.gh

Lead Supervisor : Dr. Ayaga Bawah
Phone : 0207265075
Email : aabawah@ug.edu.gh

The purpose of the research?

The purpose for this study is to understand the beliefs of women who have given birth on the mode of child birth from high C-section rate setting and low C-section rates setting so as to target interventions at specific women to ensure that C-section are performed for women who needs the intervention.

Are there any benefits?

Participants will not benefit directly from the study but through participating in the interviews, they will assist to contribute to knowledge, and assist health providers to improve comprehensive delivery care service for other women who will be delivering in the future.

Are there any risk?

There are no potential risk in taking part in this study except the time lost for answering interview questions

Any compensation for time spent?

Participants will be given 10 Cedis worth of air time as compensate for your time spent

Who are we looking for?

The research team is looking for women from ages 18-49 years old who gave birth at this facility by caesarean section or vaginal birth.

What will I be required to do?

Your participation will involve one session of face-to-face in-depth interview which will last about 45 mins. You will be ask questions on your beliefs and experience on the method through which you gave birth. The interview will be audio-taped and transcribed. Any information you provide will be treated with confidentiality.

If interested, who should I contact?

If you are interested in this study, please contact Christiana Naa Momo Lokko on phone: 0208080812 or email:christiananaalokko@gmail.com/ cnmlokko@st.ug.edu.gh

Further information will be provided to ensure that you are adequately informed before consenting to talk part in the study. Participants are free to withdraw, leave, or stop the interviews at any time without explanation or coercion

Ethical Approval for Research

Ghana Health Service Ethics Approval Number : GHS-ERC: 07/04/17
University Of Ghana Ethics Approval Number : ECH 090/16-17

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Appendix 5: Interview Guide for the Women

Interview Guide for the Women

Title of study: Caesarean Section (C-section) Deliveries in Ghana: Trends, Disparities and Influencing Factors

Introduction

I am a final year doctoral candidate at the Regional Institute for Population Studies, University of Ghana. I am conducting a study in fulfilment of University of Ghana's academic requirements on: ***Caesarean Section (C-section) deliveries in Ghana: Trends, Disparities and Influencing Factors***. This study will help understand the drivers of C-section disparities observed in Ghana and to identify policies that will ensure access to necessary C-section for all Ghanaian women. This is critical for achieving the SDG 10 of reducing all forms of disparities and goal 3 of reducing infant and maternal mortality.

Women who have delivered in the past 5 years will be required to will take part in in-depth interviews which will last 30 minutes. **Interviews will be held privately and questions to be asked will be limited to your past child delivery experiences**. Your participation is voluntary and have the liberty to end the interview, leave or decline to answer some questions without any explanation or coercion. You can also ask for further explanation of questions if a question is not clear for you. With your permission, interviews will be audio recorded. Audio recordings will be kept as records but only the researcher will have access to them. Shall we now begin the interview by signing this consent form?

SECTION A: DEMOGRAPHIC DETAILS

1. Age
2. Marital Status
3. Educational Status

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4. Occupation
5. Region of residence
6. Place of residence
7. Mode of delivery
8 Place of delivery
9. Do you have valid health insurance? Probe for type and usage
10. Did your partner go with you for any of the ANC visits? Almost all or some of the visits?
11. Was he present during delivery?

SECTION B: CONSTRUCTS OF THE HEALTH BELIEVE MODEL

PERCEIVED SUSCEPTIBILITY

12. Some women feel that every woman is susceptible to labour pain and labour fear so they opt for a particular mode of delivery. Would you share your experiences with us on this issue?
13. What are your beliefs on C-section delivery?
14. What do you think are the general beliefs of the community members on the various mode of delivery? Probe for beliefs on all the modes and others.

PERCEIVED BENEFITS

15. What do you think are the benefits of the method you delivery by. Probe for the following
    - VB is a normal/natural process
    - Allows early contact with new-born after delivery
    - Allows early breastfeeding
    - Shorter hospital stay
    - Faster recovery after delivery
    - No unnecessary surgical wound pain
    - The fate of my baby is determined by nature
    - Less costly
    - Repetitive vaginal examinations
    - Pre-determine date for delivery
    - Plan the delivery time
16. Given another opportunity which mode of delivery will you choose and why?

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PERCEIVED SEVERITY

17. Some people believe there are health concerns on all the modes of child delivery, what is your view on this? Probe for the following
    - Risk to mother health
    - Risk to baby's health
18. Which modes of child delivery do you think carry more health concerns?

PERCEIVED BARRIERS

19. What was your preferred mode of child delivery?
20. Were there factor(s) that prevented you or any of your peers form delivering by their preferred mode of delivery? Mention the barriers. Probe for the following.
    - Financial (health insurance)
    - Beliefs as barriers
    - Health barriers

CUES TO ACTION

21. Which persons influenced your choice of mode of delivery? Probe for the following
    - Healthcare professionals. Specify
    - Relatives. Specify
    - Friends/ Peers
22. What are the reasons they gave for their advice
23. Are there any stories on child delivery which enforced your choice of mode of delivery that can be shared?
24. Are there any previous experiences on child delivery which enforced your choice of mode of delivery that can be shared?

SECTION C: DEBRIEFING

25. Do you have any question to ask or any issues you want to discuss? Probe

Thank you.

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Appendix 6: Interview guide for Health Workers and TBAs

Interview guide for Health Workers and TBAs

Title of study: Caesarean Section (C-section) Deliveries in Ghana: Trends, Disparities and Influencing Factors

Introduction

I am a final year doctoral candidate at the Regional Institute for Population Studies, University of Ghana. I am conducting a study in fulfilment of my academic requirement on: ***Caesarean Section (C-section) deliveries in Ghana: Trends, Disparities and Influencing Factors***. This study will help understand the drivers of C-section disparities observed in Ghana and to identify policies that will ensure access to necessary C-section for all Ghanaian women. This is critical for achieving the SDG 10 of reducing all forms of disparities and goal 3 of reducing infant and maternal mortality.

You will be required to take part in in-depth interviews which will last 30 minutes**. Interviews will be held privately and questions to be asked will be limited to your working experiences as a gynaecologist, midwife or TBA on the beliefs and perceptions of the various mode of child delivery**. Your participation is voluntary and have the liberty to end the interview, leave or decline to answer some questions without any explanation or coercion. You can also ask for further explanation of questions if a question is not clear for you. With your permission, interviews will be audio recorded. Audio recordings will be kept as records but only the researcher will have access to them. Shall we now begin the interview by signing this consent form?

SECTION A: DEMOGRAPHIC DETAILS

1. Age
2. Marital Status
3. Educational Status
4. Profession (Doctor, Midwife or TBA)
5. Region of residence
6. Place of residence
7. Location of work.

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SECTION B: BELIEFS ON MODE OF CHILD DELIVERY

8. In your carrier as a have come across any societal/tribal/religious beliefs on any of the modes of child delivery.
9. What are your beliefs and perceptions on C-section delivery?
10. What do you think are the general beliefs and perceptions of your clients on the various mode of delivery?
11. What do you think are the general beliefs and perceptions of the community members on the various mode of delivery?
12. Do some of your client prefer one mode of delivery over the other?
13. What do you think are their reasons?
14. Do some doctors/other health professionals recommend C-section delivery in the absence of medical complications? If yes, what do you think are their reasons?
15. What /who motivates clients to choose a particular mode of delivery? Probe for cultural/religious beliefs.
16. According to the Ghana Demographic and Health Survey C-section delivery is on the increase? What do you think might have account for this?
17. The same Ghana Demographic and Health Survey indicate that there are wide disparities in C-section delivery among the regions in Ghana. For example greater Accra has the highest rates while Upper West has the lowest. What do you think are the factors influencing these trends?
18. What can be done to a least help provided the needed C-section to women who needs it irrespective of their background.
19. Are there barriers to access C-section delivery in Ghana currently?
20. Can you tell us some of the barriers?
21. Are there any social issues about child delivery among the clients which you would want to share? Probe why they choose this place for delivery

SECTION C: DEBRIEFING

22. Do you have any question to ask or any issues you want to discuss?

Thank you