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FACTORS INFLUENCING CAESAREAN DELIVERIES AT THE 37 MILITARY HOSPITAL, ACCRA: A CROSS-SECTIONAL STUDY

BY

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THIS DISSERTATION IS SUBMITTED TO

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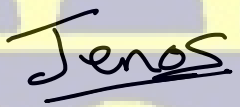
DECLARATION

I declare that apart from references made to other people's works and which have been duly acknowledged, this work was done by me under supervision. I further declare that this work has not been submitted for the award of any degree neither in this university nor elsewhere.

MATILDA AMA SORKPOR **……** **……30/01/2023…..**

(STUDENT) **SIGNATURE** **DATE**



PROF. JULIANA YARTEY ENOS…….. **30/01/2023**

(SUPERVISOR) **SIGNATURE** **DATE**

DEDICATION

This research work is dedicated to the Almighty God. I also dedicate this work with love and sincere gratitude to my entire family and well-wishers for their support, encouragement, love and care.

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The successful completion of this research would not have been achieved without the assistance of several people, whose time and effort I highly appreciate. I am thankful to the Almighty God for giving me the strength, courage, hope, perseverance, understanding and everything I needed for the completion of my study. I appreciate Professor Juliana Yartey Enos immensely for the direction, guidance and commitment in the supervision of my thesis. I equally want to express my gratitude to my family and friends for their encouragement and support. Finally, I want to praise myself for persevering and never giving up in the face of difficulties. Never will I give up.

ABSTRACT

Background: Caesarean section remains a life-saving obstetric intervention that can effectively be prioritized to prevent maternal and neonatal mortality. The WHO recommends a caesarean section threshold of between 10% to 15%. This study sought to determine the maternal factors that influenced the preference for caesarean deliveries among antenatal mothers at the 37 Military Hospital in the Greater Accra region of Ghana.

Methods: A cross-sectional study design was conducted. The study purposively sampled antenatal mothers within their third trimester of pregnancy. Health workers were also purposively included to determine their perspectives of caesarean section. Semi-structured questionnaires were used to collect data from the antenatal mothers as well as the health workers. The study also reviewed the delivery registers at the facility from 2017 to 2021 to determine the prevalence and trend of caesarean section at the hospital. Logistic regression analyses were used to determine the factors that influenced caesarean deliveries at the hospital (significant at α=0.05).

Results: A total of 409 antenatal mothers and 29 health workers participated in the study. The mean age of the mothers was 31 years. The study revealed an average caesarean prevalence rate of 50.3% from 2017 to 2021. From the study, 27.1% and 72.9% of the antenatal mothers preferred caesarean section and vaginal delivery respectively. Maternal reasons for preferring caesarean section were safe and less painful (48.6%), previous CS (41.4%) and health reasons (10%). In addition, 67.2% of women had adequate knowledge and 75.1% and 57.2% had positive attitudes and good perceptions about caesarean section respectively. Also, majority of health workers had good perceptions on caesarean section.

The study showed that the history of emergency (AOR: 12.29, p<0.0001) and elective (AOR:48.35, p<0.0001) caesarean section among antenatal mothers significantly influenced their preference for caesarean section at the hospital. In addition, ANC mothers with gravida two (AOR= 0.21, p=0.037) were more likely to prefer a CS delivery to those with their first pregnancy.

Conclusion: Although, the level of caesarean section election and preference among pregnant women is considerably high, the main influencing factors were having a history of caesarean delivery and the number of pregnancies of ANC mothers. Women should be adequately counselled for opting for vaginal delivery when it is possible. The hospital should adopt pragmatic steps to sustain the decline of CS election among pregnant women.

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ABBREVIATIONS

CS	-	Caesarean Section
GDHS	-	Ghana Demographic and Health Survey
GHS	-	Ghana Health Service
GSS	-	Ghana Statistical Service
HIV	-	Human Immunodeficiency Virus
NICE	-	National Institute for Health and Clinical Excellence
SDG	-	Sustainable Development Goals
SSA	-	Sub-Saharan Africa
WHO	-	World Health Organization

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Caesarean section (CS) is an obstetric intervention that can effectively prevent maternal and neonatal mortality (WHO, 2018). It involves a surgical procedure used to deliver a foetus by making an incision into the uterus (Ezeome et al., 2018; WHO, 2018). It is one of the most common surgical procedures used as an obstetric intervention globally (Hesselman, 2017; Prah et al., 2017). CS has been recommended for saving maternal and infant lives only when they are required for medically indicated reasons including foetal distress, prolonged labour, post-maturity and previous CS experience (Begum et al., 2017). The WHO, however, recommends that CS should be avoided when there are no medical indications for the procedure (WHO, 2015, 2018).

According to the WHO (2015), the global community considered an ideal caesarean section rate of between 10% to 15%, although CS levels among healthcare facilities may widely vary depending on the facility's characteristics and capacity to provide the service. This notwithstanding, there have been records of increasing rates of CS in both developed and developing countries (WHO, 2015). Delivery by caesarean section has gone through a lot of stages to become one of the safest surgical procedures receiving attention, and this guarantee may be contributing to the increasing rates although, other demographic factors may be contributing to the trend (Hesselman, 2017).

Due to the observed CS rising trends, the WHO provided in 2015, that, every effort should be made to provide CS to women in need and not necessarily strive to achieve a specific rate (WHO, 2015). The global rate of CS is estimated around 20% with variation in various sub-regions and countries (Hesselman, 2017). Betran et al., (2021), for instance report from their study on the trends and projections of CS rates, that, 21.1% of births in the world were by CS and this is expected to reach 28.5% by 2030. The greatest increases in percentage points of CS were among eastern Asia (44.9%), western Asia (34.7%) and 31.5% for northern Africa. The highest CS rates of 42.8% is recorded in Latin America and the Caribbean with Sub-Saharan Africa (SSA) estimated to have the lowest percentage point increases of 3.6% in CS (Betran et al., 2021; Dankwah et al., 2019).

In their projections, Betran et al., (2021) indicate that, SSA will reach 7.1% by 2030 with prevailing unmet needs in the region contrary to the overuse of the intervention in other regions such as Asia and northern Africa. It is evident that, similar variations exist among SSA countries including Ghana. Available data shows a higher CS rate for Ghana. According to the 2014 Ghana Demographic and Health Survey (GDHS) and the 2015 Ghana Health Service Family Health Division report CS rates estimates were 13% and 14.6% respectively (Ghana Health Service, 2016; Ghana Statistical Service (GSS) et al., 2015).

The critical requirement remains that, women needing CS as an intervention to prevent maternal and infant complications and deaths should receive the service as Ghana envisages achieving its set targets for the sustainable development goals (SDG). The targets for SDG 3 on achieving healthy lives and promoting well-being for all include reducing maternal

mortality to less than 70 per 100000 live births and neonatal mortality to at least as low as 12 per 1000 live births (Apanga & Awoonor-Williams, 2018a)..

These are ambitious targets that need strategic, pragmatic and effective utilization and application of all available interventions including CS to achieve them. It is argued therefore, that increasing CS rates in Ghana should translate into contributing to the reduction of poor maternal and child health outcomes to heighten the country's chances of achieving set targets. Anything short of this will mean that, CS intervention is not meeting the intended need and the high rates include predominantly those who may not really need the service.

1.2 Problem Statement

The considerable global increase in caesarean section rate over the years has however, not been accompanied by the expected positive maternal and neonatal birth outcomes according to the WHO, (2018). In 2015, the Ghana Health Service reported an institutional maternal mortality ratio 142 per 100,000 live births (Ghana Health Service, 2016). By 2016, the institutional maternal mortality rate had increased to about 164 per 100,000 live births and neonatal mortality from 3.6 per 1000 live births in 2015 to 3.8 per 1000 live births in 2016. One observable problem was that, within the period, CS rates had increased from 14.6% in 2015 to 16% in 2016, and this did not have the expected effect on the maternal and neonatal indicators (Ghana Health Service, 2017).

Furthermore, according to the WHO, Ghana's 2017 maternal mortality ratio stood at 308 deaths per 100,000 live births. Even though this is a 1.9% decline from the 2016 figure, it will be

difficult for Ghana to achieve the maternal and neonatal mortality rates by 2030 if pragmatic steps and investments are not made to hasten the declines. Therefore, with the aim of achieving the targets by 2030, every maternal, neonatal and obstetric intervention is of critical importance and this includes the role of CS, which impact on the trends of maternal and neonatal mortality has not been realised yet, requiring investigation, considering the high levels in Ghana (WHO, 2018).

It is crucial to have a comprehensive view on why CS is not contributing to the decline of these critical indicators. It can be deduced that, gaps exist in the application of interventions such as caesarean section as an effective medical intervention to prevent poor maternal as well as neonatal birth outcomes (WHO, 2021b). These may include knowledge and attitudinal gaps stemmed from the perceptions of pregnant women and their families on making choices during delivery of their babies (Bam et al., 2020).

At the 37 Military Hospital, where this study was conducted, 50.6% of deliveries in 2021 were through CS. The 2021 CS delivery rate is very high compared with the SSA performance of about 5% and the expected 10-15% set by the international community and the World Health Organization. Of the CS records from the 37 Military hospital in 2021, more than half of them was through election. These suggest abuse or overuse of caesarean birth interventions among pregnant women. A critical challenge could be whether those who really need caesarean births are receiving it to contribute to positive birth outcomes or not. If left unaddressed, they contribute to programmatic challenges and bottlenecks which can deprive the facility and country the opportunities of achieving programme indicators and set targets.

The assessment of the trend and factors influencing the CS at the 37 Military Hospital is therefore, necessitated to identify gaps and suggest suitable evidence-based recommendations in the delivery of this critical intervention to reduce maternal and neonatal mortality as well as other poor birth outcomes. Earlier studies have demonstrated challenges with knowledge level of women on caesarean section which influences the attitudes and preparedness towards electing for caesarean section. However, no such study has been identified to be conducted at the 37 Military Hospital to systematically assess the knowledge, attitudes, perceptions and factors influencing CS election by mothers. Identifying such contextual factors will inform the utilization of CS effectively to contribute to positive birth outcomes for mothers and their babies, which this study seeks to achieve.

1.3 Research Questions

1. What is the prevalence rate and trend of caesarean section deliveries at the 37 Military hospital?
2. What are the knowledge, attitude and perception of CS among antenatal mothers at the 37 Military Hospital?
3. What are the perceptions of health care providers on CS at the 37 Military Hospital?
4. What maternal factors influence the preference for CS by antenatal mothers at the 37 Military Hospital?

1.4 Objectives of the study

1.4.1 Main Objective

To determine the prevalence rates, trends and factors that influence caesarean section deliveries at the 37 Military Hospital in the Greater Accra Region of Ghana.

1.4.2 Specific Objectives

1. To determine the prevalence and 5-year trend of CS deliveries at the 37 Military Hospital.
2. To assess the knowledge, attitude and perceptions of antenatal mothers on caesarean section at the 37 military hospital.
3. To assess the perceptions of caesarean section among health care workers.
4. To determine the maternal factors influencing the preference for CS deliveries among antenatal mothers at the 37 military hospital.

1.5 Conceptual Framework

The framework presents a relationship between the factors that influence the caesarean deliveries among antenatal mothers. From the framework, the outcome of interest is caesarean deliveries. The independent factors include the sociodemographic factors and obstetric history of antenatal mothers as well as their knowledge on caesarean section and attitude and

perceptions towards caesarean section. Sociodemographic factors may influence a woman's choice of caesarean section (Mireku-Gyimah, 2021). For instance, according to Gandau et al., (2019), having formal education influenced positive perceptions on caesarean section among pregnant women. The influence of formal education on caesarean section has also been identified by Prah et al., (2017). However, Apanga & Awoonor-Williams, (2018), found that, higher education among women reduced the odds of accepting caesarean section. The relationship between formal education and positive perception could be explained by the enhanced understanding and knowledge of women on caesarean section.

In addition, age of women as well as economic situations such as employment and income levels also influence caesarean deliveries among mothers (Ansah, 2018; Gandau et al., 2019). Ansah, (2018) further identified the influence of ethnicity, religious affiliation and income levels on deliveries through caesarean section. In addition to the direct relationship between sociodemographic factors and caesarean deliveries, the influence of sociodemographic factors on knowledge, attitudes and perceptions towards caesarean section has also been established (Konlan et al., 2019; Prah et al., 2017).

The framework further shows a relationship between knowledge of pregnant women on their preference for caesarean section during delivery. A study by Ansah, (2018) found from a study in the Cape Coast metropolis that, higher knowledge was associated with caesarean section deliveries. This finding is supported by Bam et al., (2020) in the Ashanti region of Ghana where knowledge on caesarean section influence decision-making to accept elective caesarean section.

The framework shows that, maternal obstetric history can influence women's preference for caesarean section. The findings of Ansah, (2018) indicates that, parity influenced the acceptance of caesarean section. This finding supports earlier findings (Prah et al., 2017). Additionally, women with history of previous caesarean section may be more likely to accept subsequent procedures (Bam et al., 2020; Prah et al., 2017).

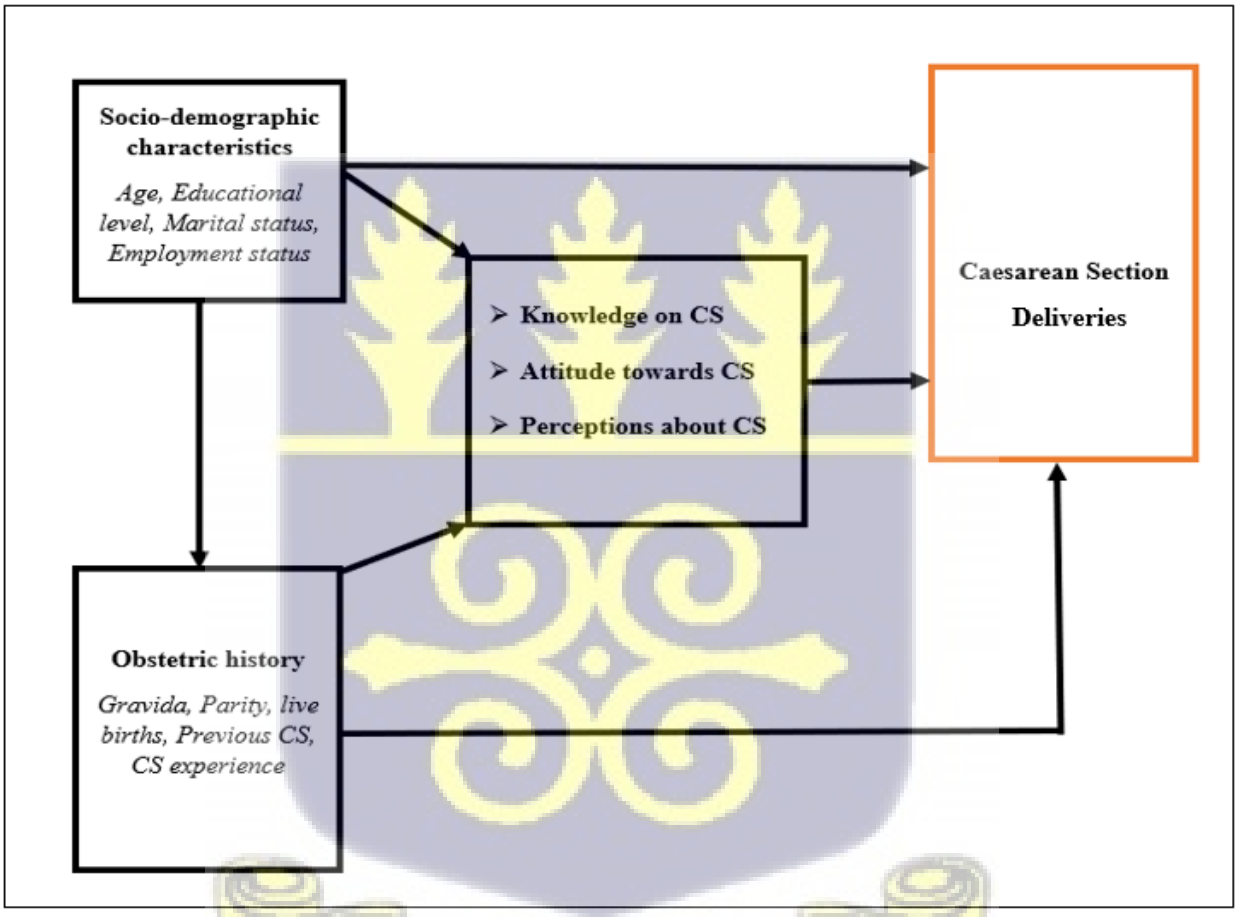


Figure 1.1 Conceptual framework on the knowledge, attitudes and perceptions of antenatal mothers towards caesarean section

Source: Authors' construct.

1.6 Significance of the Study

Caesarean section is an important public health intervention which can contribute effectively to the reduction of maternal and neonatal death. There has been significant increase in CS rates in Ghana, with the Greater Accra Region as one of the regions with the highest rates. Several factors may interact to influence the decision of pregnant women to accept a particular delivery method including CS. The contextual identification of these factors is critical to guide the implementation of the CS intervention and streamline the development of protocols to maximize the expected impact of the intervention on maternal health and programme indicators.

The study will facilitate the identification of these factors and contribute to the steps to improve maternal and neonatal care. Furthermore, the study will suggest recommendations based on the findings to improve the election and recommendation of CS by mothers and health care providers. These recommendations may be applied to similar settings to contribute to the overall improvement of maternal and neonatal health in Ghana, and contribute to achievement of the sustainable development goals. Finally, the study will add to the growing knowledge of literature on knowledge, attitudes, perceptions and factors that influence caesarean deliveries in the country and beyond.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

The chapter presents a review of literature on the background to caesarean section and its use as an obstetric intervention. The review will include knowledge as well as the attitudes and perceptions of antenatal mothers on caesarean section. The factors that influence the choice of caesarean section among antenatal mothers contributing to the increasing trend of CS will also be included in the review. A summary of the discussion on the reviewed literature will be provided at the end of the chapter.

2.2 History of Caesarean Section

Caesarean section dates back to ancient times and may be considered one of the oldest surgical operations in the world (Dhakal-Rai et al., 2021). The expression has been associated with Roman laws where it was forbidden to bury a pregnant woman with the foetus in the uterus around 715-673 BC (Dongen, 2009). The woman was therefore, cut open to remove the foetus. Earlier use of CS was therefore, used when the pregnant woman was dead or dying (Becher & Stokke, 2013). Around the 1500s, CS was advocated as a post-mortem practice to save the child (Low, 2009).

According to Low, (2009), attempts to carry out CS on a living woman was not until around the 17th century, which faced a lot of opposition at the time. The opposition was justified by

the associated high maternal mortality due to haemorrhage and puerperal infections at the time (Dhakal-Rai et al., 2021; Low, 2009). Records indicate that, the uterine incision was not closed as it was considered a dangerous practice because of uterine retraction and this contributed to almost 100% in maternal and perinatal deaths (Dongen, 2009).

Earlier documented successful CS with proven survival of mother and babies include The Netherlands in 1792, South Africa in 1826, the United Kingdom in 1834, United States of America in 1835 and 1841 in Germany (Dongen, 2009). During the mid-19th century onwards, when developments and improvements in surgical techniques and aseptic environments were observed, CS became an accepted surgical method in maternal care (Dhakal-Rai et al., 2021). Dhakal-Rai et al., (2021) asserts that, at current rates in the 21st century, CS has moved from being a rescuing attempt of a baby from a dead or dying mother to a maternal and reproductive health choice.

2.3 Indications for Caesarean Section

The indications for CS vary greatly and have been shaped by several factors including religion, culture, economics, profession and technology (Becher & Stokke, 2013). CS is usually performed when a vaginal delivery puts the health or life of the baby or mother at risk (Aftab et al., 2019; Becher & Stokke, 2013). Therefore, CS is required to protect the woman and the baby's health (Betran et al., 2021). According to the WHO, (2018), CS as a surgical procedure effectively prevents maternal and neonatal mortality only when used for medically indicated reasons. Thus, it is recommended that, the procedure is carried out on women who are in need,

as higher rates have not been automatically associated with the reductions in maternal and neonatal deaths (WHO, 2015).

There can be several indications for CS although no standard classifications of the indicators had been readily available (Mariam et al., 2021). The WHO therefore, proposed the adoption of the Robson classification as a standard for assessing, monitoring and comparing CS rates among facilities (WHO, 2015). The system classifies all women into one of ten categories which includes the following; 1. Nulliparous women with single cephalic pregnancy of more than 37-week gestation in spontaneous labour; 2. nulliparous women with single cephalic pregnancy of more than 37-week gestation who either had labour induced or were delivered by caesarean section; 3. Multiparous women without a previous uterine scar, with single cephalic pregnancy more than 37 weeks gestation in spontaneous labour; 4. Multiparous women without a previous uterine scar, with single cephalic pregnancy more than 37 weeks gestation who either had labour induced or were delivered by caesarean section; and 5. All multiparous women with at least one previous uterine scar, with single cephalic pregnancy more than 37-week gestation.

The others include; 6. All multiparous women with a single breech pregnancy; 7. All multiparous women with a single breech pregnancy, including women with previous uterine scar; 8. All women with multiple pregnancies including women with previous uterine scars; 9. All women with a single pregnancy with a transverse or oblique lie, including women with previous uterine scar; and 10. All women with a single cephalic pregnancy less than 37 weeks gestation including women with previous scars.

Summarily, CS may generally have maternal and foetal indications. The maternal indications include prolonged or obstructed labour, previous caesarean section, pelvic anatomy, preeclampsia, infection, and placenta praevia (Becher & Stokke, 2013). Becher & Stokke, (2013) identify among the foetal indications to include foetal distress, presentation of the baby, large babies, multiple babies and preterm babies. The findings of Aftab et al., (2019) from their work on the indications of primary caesarean section showed that prolonged labour contributed to most of the mother undergoing CS, followed by foetal distress, preeclampsia and antepartum haemorrhage. Among the most common indications are briefly described:

Prolonged or obstructed labour: This is the situation when labour duration exceeds 24 hours due to prolonged latent phase or lacking cervical dilation during the active labour phase. In such situations, foetal distress may occur necessitating regular foetal monitoring. This may indicate the need for a CS as one of the options to save the baby and the mother.

Previous caesarean section: There is an increased risk of complications among women with a history of CS, although this does not mandate subsequent deliveries through CS. Previous CS also increases the risk of placenta praevia and uterine rapture.

Pelvic anatomy: The pelvis forms the birth canal and its anatomy regarding the inner diameters and how it provides a safe passage of the foetus is important to determine the mode of delivery. Where the pelvis may not support vaginal delivery, a CS may be indicated.

Preeclampsia: During pregnancy, some women have elevated blood pressure. Hypertension after 20 weeks of pregnancy is referred to as preeclampsia. The onset of high blood pressure

with proteinuria, oedema and activation of the coagulation system puts maternal and foetal life at risk which may require a caesarean section when the pregnancy comes to full term.

Infection: CS has been proven to be an effective intervention that protects and limits the baby's risk of contracting certain infections from the mother. Typical is the prevention of mother-to-child transmission of HIV.

Placenta praevia: This condition can lead to severe haemorrhage during normal vaginal delivery. It is the situation where the placenta is situated partly over the exit of the foetus. The condition thus, necessitates CS to save the life of the mother and her foetus and further preventing severe bleeding after delivery.

Foetal distress: This occurs when there is a depletion of oxygen to support life of the foetus in the uterus. The deficient levels of oxygen and high carbon dioxide levels leads to hypoxia and acidosis (Pashte & Choudhari, 2016).

Presentation of the baby: This refers to the baby's position in the uterus at term. Babies may be in breech, transverse or compound presentation. Although many babies may be in breech position, most of them would have turned into normal positive before birth.

Large babies: Large babies may predispose the mother to the risk of vaginal tear, perianal damage and haemorrhage. There may also be long lasting birth and other injuries to the babies. When an assessment proves that the baby is too large to be delivered through normal vaginal birth, a CS may be indicated.

Multiple babies: Where there are more than one babies and have associated risk for the mother and either or all of the babies, a CS to reduce the risks and complications may be recommended.

Preterm babies: A child born before 37 gestational weeks is a preterm. The actual age of the pregnancy may influence the choice of CS or otherwise.

In addition to these medical indications for CS, there have been documented cases of pregnant women undergoing CS without any medical indication and this has been identified to contribute significantly to the increasing rates of CS both globally and locally (Betran et al., 2021; Konlan et al., 2019; Souza et al., 2010). Most of these cases without medical indications are due to maternal request for CS (Chien, 2021; Konlan et al., 2019; Seidu et al., 2020). This further means that, there is an overuse of caesarean section, where cases have little or no risk to require for a CS procedure (Kingdon et al., 2018b).

The indications for CS may lead to the categorization of CS being elective or emergency. The elective forms of CS are planned and performed at a decision by the mother and service providers (Stjernholm et al., 2010). Planned or elective CS may involve situations where doctors consider possible danger to the mother and baby and indicate the risk of vaginal delivery outweighs that of CS (Mariam et al., 2021). These are usually performed before the onset of labour (Hesselman, 2017). The National Institute for Health and Care Excellence (NICE) suggest that, CS should be discussed and planned with women with breech presentation, multiple pregnancies, preterm babies, morbidly adherent placenta and infections such as HIV among others (NICE, 2021).

Stjernholm et al., (2010) add that, the emergency CS are performed under urgent indications after onset of labour and usually due to failed progress in delivery. In such emergency cases, safe vaginal delivery may be observed to be dangerous and life-threatening to the life of the mother or baby (Mariam et al., 2021). Turner et al., (2020) in their study on caesarean section

rates in Ireland summarily provided that, all CS that were unplanned could largely be emergency ones, with the planned CS largely elective. The unplanned ones are usually indicated after the onset of labour (Hesselman, 2017).

2.4 Risks and Complications of Caesarean Section

CS, like most medical and surgical procedures, is associated with short- and long-term risks or complications (Ansah, 2018; WHO, 2018). Globally, the incidence of infections and complications following caesarean section is about 2.5% to 21% (WHO, 2021b). The greatest burden of the risk and complications accompanying CS may be among low-resourced settings (Ansah, 2018). According to the WHO, (2018), the associated risks and complications may go beyond the current pregnancy to affect the woman, baby or future pregnancies. Undergoing a CS may increase one's risk of requiring blood transfusion, anaesthetic complications, organ injury, infection and neonatal respiratory problems in the short-term (WHO, 2018).

Generally, the overall complication rate can be up to one-third of patients (Hesselman, 2017). Hesselman, (2017) reports that, the risk of severage haemorrhage was twice or thrice that of vagina delivery for those who underwent elective or emergency CS respectively in a population register study. Furthermore, a prospective study showed an increase maternal mortality and hysterectomy were observed among CS patients compared with vaginal delivery (Hesselman, 2017).

Among the long-term risk of CS, women may have increased risk of asthma and obesity in children (WHO, 2018). There may be other complications including uterine rupture, placenta

accreta and praevia, infertility, ectopic pregnancies, intra abdominal adhesions (Ansah, 2018). Sometimes, CS may cause lasting complications including disability or death (WHO, 2015). In Ghana, Gandau et al., (2019) reports that about one-third of mothers receiving the service in the Upper West Regional and St. Joseph's Hospitals in the Upper West Region of Ghana indicated a post-CS complication including bleeding, wound infection and sick babies. Current developments and improvements in surgical practice have contributed in reducing the occurrence of complications, unless in areas where these advancements are lacking (WHO, 2015, 2021b).

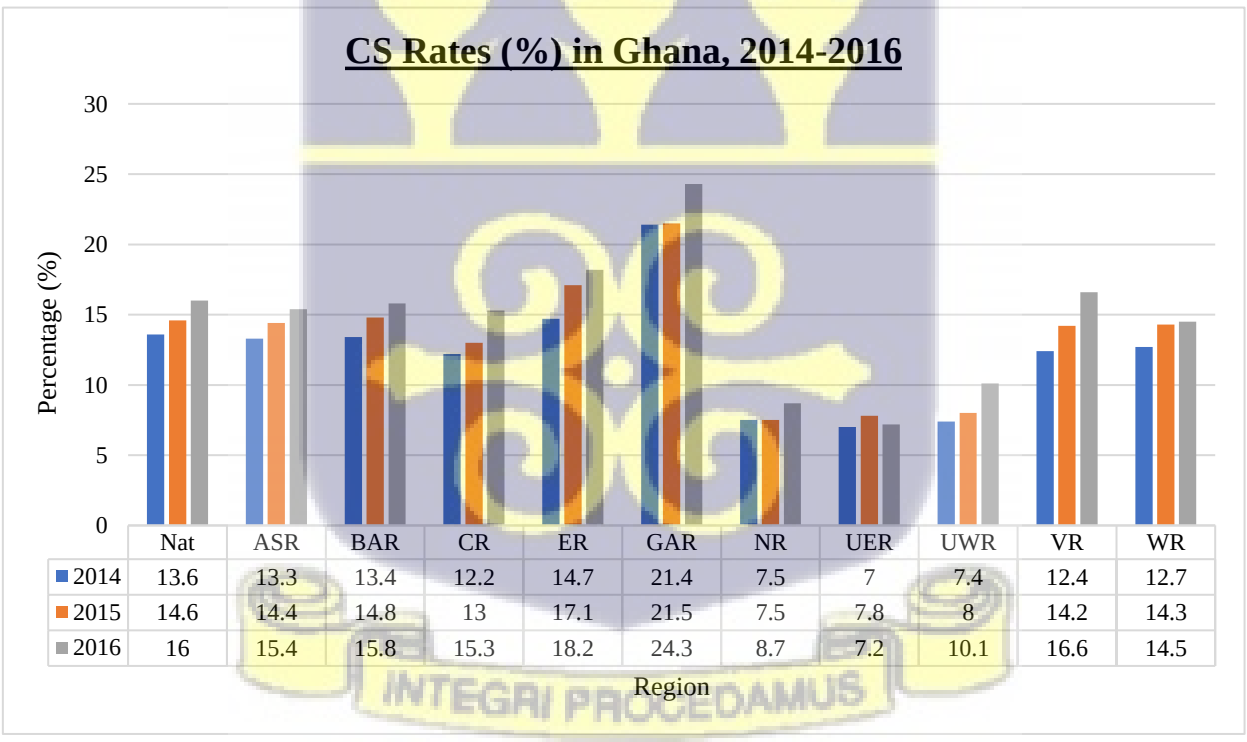
2.5 Prevalence of Caesarean Section

The WHO recommended in 1985, that, CS rates were not to exceed 15% (WHO, 2015). After over three decades, the WHO, (2015) indicates, that efforts were to ensure the provision of CS for women who were in need of the service, and that countries and facilities were not to strive to achieve any performance rates. This is because, the differences in demographic and contextual factors across the globe may however, push optimal CS rates to about 20% or further below the 15% for another geographic area (Robson & Costa, 2017). The goal here, therefore, is to reduce the levels of unnecessary CS which have not been associated with improvements in maternal and neonatal indicators while focusing on using the intervention of effectively preserve the lives of mothers and their foetuses (Dhakal-Rai et al., 2021).

According to Betran et al., (2021) who used data from 154 countries representing 94.5% of the world's live births, the global CS rate was estimated at 21.1%, which was a 19 percentage point

increase from 1990 to 2018. Regional CS rates provided by Betran et al., (2021) included Americas, 39.3%, Europe, 25.7%, Asia, 23.1%, Oceania, 21.4% and 9.2% for Africa. Among the sub-regions, the highest CS rates of 42.8% were among Latin America and Carribean. Sub-Saharan Africa has the lowest CS rates in the world. The report by Betran et al., (2021) showed a CS rate of 5% for SSA.

In Ghana, the CS rate also increased significantly from 4% in 1998 to 12.8% in 2014 (Ghana Statistical Service (GSS) et al., 2015). This further increased to about 16% in 2016 from 14.6% in 2015 (Ghana Health Service (GHS), 2017). There are regional variations in CS rates in Ghana. According to the 2016 GHS report, Greater Accra region has consistently the highest CS rates of recording 24.3% in 2016 (Figure 2.1).



	Nat	ASR	BAR	CR	ER	GAR	NR	UER	UWR	VR	WR
2014	13.6	13.3	13.4	12.2	14.7	21.4	7.5	7	7.4	12.4	12.7
2015	14.6	14.4	14.8	13	17.1	21.5	7.5	7.8	8	14.2	14.3
2016	16	15.4	15.8	15.3	18.2	24.3	8.7	7.2	10.1	16.6	14.5

Figure 2.1 CS Rates (%) in Ghana from 2014 to 2016

Source: Ghana Health Service, (2017).

This is compared with 18.2% in the Eastern region, 16.6% in Volta 15.8% in Brong Ahafo, 15.4% in Ashanti, 14.5% in Western, 10.1% in Upper West, 8.7% in Northern and 7.2% in Upper East (Figure 2.1). The higher rates in the Greater Accra region can be explained by the existence of the largest Teaching Hospital among other equally well-resourced facilities as compared to those in other regions. In their assesment, Okyere et al., (2022) also found similar trends of CS rates with Greater Accra having the highest rate of 22.9% in Ghana. The findings of Dankwah et al., (2019) further agrees with the variations in CS rates in Ghana with lower rates among poor communities.

2.6 Factors Influencing Preference of Caesarean Section

Several studies have suggested various independent and interrelated factors that influence CS among antenatal mothers. Among these factors explored in this study include knowledge of CS among antenatal mothers as well as their attitudes and perceptions towards caesarean section. These factors are discussed below.

2.6.1 Maternal Knowledge of Caesarean Section

The knowledge of clients on healthcare services and procedures largely influence how they patronize the service (Ansah, 2018). This makes it important for adequate information to be provided for clients on particular services, including the associated risks and benefits as it influence their decisions (Prah et al., 2017). The decision making process of women regarding

delivery involves multiple factors and usually may centre on how much knowledge they have on the available options including CS (Bam et al., 2020). On CS for instance, ensuring enhance knowledge among pregnant women is necessary for making healthy delivery choices in order not to make an emergency intervention a lucrative practice (Kizito, 2021).

Earlier studies have identified varied knowledge levels among women on CS. For instance, In the Upper West region of Ghana, Gandau et al., (2019) reported that, antenatal mothers generally had inadequate knowledge on CS although most of them were aware of the procedure. Another study in Northern Ghana also found only 32% of pregnant women to have adequate knowledge on CS (Afaya et al., 2018). Their findings were similar to Prah et al., (2017) who reported that only 39.6% of antenatal mothers had adequate knowledge on CS in Cape Coast in Ghana.

A similar study in Cape Coast by Ansah, (2018) later found about 78% of antenatal mothers with high knowledge levels which was higher than the earlier findings of Prah et al., (2017). Also, a study conducted in the Korle-Bu Teaching hospital reported 82.2% of pregnant women having considerable knowledge on CS (Dorkenoo & Abor, 2021).

In Nigeria, the study by Panti et al., (2018) on the perception and uptake of pregnant women towards caesarean section showed about 85.5% had good knowledge on CS. In the United Arab Emirates, knowledge among pregnant women was low with about 22% having adequate knowledge on CS (Al-Rifai et al., 2021).

2.6.2 Maternal Perceptions of Caesarean Section

Perception usually stems from the representation of perceiving or conceiving something. Unlike knowledge, which may be primarilty influenced by the extent of having adequate factual information on the subject, perceptions may be preconceived ideas and unfounded by facts. How mothers feel and perceive CS may also influence their attitudes and preference for the procedure (Ansah, 2018). Thus, a study by Seidu et al., (2020) in Ghana suggested the exploration of socio-cultural factors, beliefs and perceptions of women that may be contributing to the increasing CS deliveries.

Several factors can affect the perceptions of pregnant women on CS. These include the demographic and psychosocial variables of the women (Ansah, 2018). The formed perceptions of women and their environments could influence their health choices including the preference of their birth delivery modes (Walana et al., 2017). Adageba et al., (2008) identified in their study in Ghana, that about 52% of pregnant women perceived CS to be dangerous deterring some of them to undergo the procedure even when indicated. This is similar to the findings of Gandau et al., (2019) in Ghana where poor perception deterred about 8.6% of the women from undergoing the procedure even if CS was indicated necessary.

In Cape Coast, Ghana, Prah et al., (2017) also reported from their study that, 40% of the antenatal mothers perceived that women who underwent CS died and therefore, a dangerous procedure to undergo during child birth. Perceptions, including sick babies following CS procedures, and inability to have safe vaginal delivery after CS continue to influence many women in Ghana (Gandau et al., 2019). In their study, they identified socio-demographic

factors including maternal age, education, occupation and previous CS experience to influence maternal perception and acceptance of CS.

Poor perceptions towards CS have also been identified in studies outside Ghana. For instance, in Nigeria, Ezeome et al., (2018) observed that, although all women from their study agreed that CS was intended to save the mother and the baby, 13% rejected the procedure regardless of the indication. Among the reasons for some rejecting CS include perceptions such as the procedure being a curse, marriage breaker, a misfortune and a sign of incompetent health workforce (Waniala et al., 2020). In South East Nigeria, Lawani et al., (2019) found from their study that, CS was perceived as a sign of reproductive failure and a high cost delivery process. There were also reported religious beliefs that hindered the acceptance of CS (Lawani et al., 2019).

The findings of Amiegheme et al., (2016) further indicates poor perception of CS among pregnant women in Nigeria with views such as fear of death and family preference for vaginal delivery. In Thailand however, mothers had preference for CS delivery due to fear of child birth, safety concern related to health risk perceptions, negative previous birth experiences and belief in having their children on specified dates (Suwanrath et al., 2021). The perception of birth safety, fear of pain, socio-cultural influences and knowledge levels shape the views of mothers toward CS (Coates et al., 2020). In order to ensure adequate use of scarce resources in achieving the SDGs goal 3, the views and perceptions of pregnant women leading to the unmet needs or overuse of CS should be explored and addressed adequately. This will largely influence the strides being made to further reduce maternal and neonatal deaths.

2.6.3 Maternal Attitudes towards Caesarean Section

Attitude towards a service contributes to its utilization and remains an important determinant for modifying behaviours for program and intervention implementation (Siabani et al., 2019). Several studies have indicated the aversion to caesarean section (Jeremiah et al., 2011). The attitudes of some pregnant women and their relatives have contributed to the decision making processes of accepting CS in developing countries like Ghana (Dorkenoo & Abor, 2021). These attitudes may be influenced by knowledge, perceptions or the experiences of women during previous CS (Afaya et al., 2018).

The findings of Gandau et al., (2019) in the Upper West region indicates that, majority of women has positive attitudes and would accept CS when it became necessary. Dorkenoo & Abor, (2021) also found good attitudes towards CS among pregnant women receiving ANC in the Korle-Bu Teaching Hospital in Ghana. In the Cape Coast Metropolis, 89% demonstrated positive attitudes towards CS and were likely to undergo the process to promote health (Ansah, 2018). Generally, with the majority of women having positive attitudes towards CS, there will be increase in CS deliveries as have been shown in Ghana.

The increase rate in CS also reflects the altered attitude of pregnant women towards the modes of delivery through the increase sharing of information and education (Panda, Daly, et al., 2018; Stjernholm et al., 2010). According to Panti et al., (2018) the negative attitudes of CS can be associated to the hesitance of among pregnant women to undergo the procedure when it is sometimes indicated. Thus, Suwanrath et al., (2021) observed that, positive attitudes of pregnant women towards CS in Thailand contributed to its preference and acceptance.

2.7 Health Worker Perceptions of Caesarean Section among Antenatal Mothers

One of the key actors in influencing caesarean section decision is the health system and its care providers (Kingdon et al., 2018b). The contribution of health workers to pregnant women through their prenatal, delivery and postnatal stages cannot be underestimated and are further involved in decision making processes during these critical moments (Walana et al., 2017). The health worker's role in education and continuous support for antenatal mothers is therefore, of critical importance (Maharaj & Mohammadnezhad, 2022; WHO, 2018). The preferred mode of delivery by pregnant women have sometimes been found to be influenced by healthcare providers (Walana et al., 2017).

The perceptions and viewpoints of health workers are therefore, important consideration for determining maternal preferences for a particular mode of delivery. According to Juma et al., (2016), the perceptions of a group of Kenyan health workers on caesarean section were positive and were guided by clinical indications necessitating caesarean section. Bakker et al., (2021) asserts the importance of the health worker's involvement in ensuring informed consent of expecting mothers and their family before caesarean section procedures. The right perspectives are expected to shape how health workers support antenatal mother to arrive at decisions on their preferred mode of delivery. For instance, Shah et al., (2018) reports of how health workers are ready to use caesarean section as a necessary alternative intervention to vaginal delivery. The right perspectives of health workers are therefore, needed to support the needs of antenatal mothers in making the critical decision of choosing a particular mode of delivery.

2.8 Outstanding Knowledge Gaps

The chapter has presented a review of literature on the factors that influence antenatal mothers' preferred mode of delivery. The review also included an overview of caesarean section, the indications for cesarean section as well as the prevalence and mothers' perceptions of caesarean section. From the review, although the WHO recommends a caesarean section level of about 10% to 15%, levels in Ghana are a little over 20% which is higher compared with the sub-Saharan African regional estimate of about 5%. Additionally, although some earlier studies have attempted to assess maternal knowledge and attitudes towards caesarean section, establishing the relationship between knowledge and attitudes with preferred modes of delivery have been lacking in Ghana. Furthermore, there is little or no evidence of such studies conducted at the 37 Military Hospital where this study was conducted.

CHAPTER THREE

METHODS

3.0 Introduction

The chapter presents the methodological approach used to address the research questions. It includes the study design and population, data collection techniques and analysis and ethical considerations to the study.

3.1 Study Area

The study was conducted at the 37 Military Hospital in the Greater Accra Region of Ghana. The 37 Military Hospital is a specialist and largest military hospital in Ghana located in Accra between the Kotoka International Airport and the Jubilee House, the official residence of the sitting president of the Republic of Ghana. The hospital was originally established on the 4th July, 1941 by Gen. George Giffard, a British military officer, to provide treatment for troops injured in World War II. The hospital was later opened to the general public and it is staffed by both military and civilian personnel. The name was derived from the facility being the 37th military hospital to be built among the British Colonies of West Africa.

The hospital runs a 24-hour service with a total of about 400 beds capacity and also serves as a teaching hospital for some post graduate medical students. The hospital has several divisions at the hospital including the trauma and surgical emergency unit, medical, pathology, paediatrics, pharmacy, public health and obstetrics and gynaecology divisions, among others.

The Obstetrics and Gynaecology Department is one of the key divisions of the 37 Military Hospital which provides care for women. Thus, it is the division responsible for all obstetric and gynaecological cases.

The department consists of three (3) sub-divisions and two (2) wards. These include Female Out Patients Department (FOPD), Maternity and Gynecology Emergency while the wards are Yaa Asantewaa and Gandhi wards. The department takes care of the antenatal and postnatal clinics of the 37 Military Hospital. These departments are primarily staffed by specialists and resident obstetricians and gynaecologists, midwives and nurses among other health professionals who are trained on maternal and child health of which most are uniformed Personnel and Civilians.

3.2 Study Design

The study used a cross-sectional study design. A semi-structured questionnaire and retrospective review of hospital records were employed to address the research questions. In addition, health workers were included in the study and data collected with a semi-structured questionnaire. The 37 Military Hospital runs an antenatal clinic. The study focused on determining the maternal factors that influenced the preference for caesarean deliveries among pregnant women attending the antenatal clinic.

3.3 Study population

All pregnant women accessing antenatal care at the 37 Military Hospital were considered for participation in the study. Health care providers at the facility were also included to assess their perceptions of CS among mothers attending the hospital. The engagement of both pregnant women and care givers enhanced the identification of the factors that influence the preference for CS deliveries at the hospital.

3.3.1 Inclusion Criteria

All the mothers in their third trimester registered and attending antenatal care at the 37 Military Hospital were eligible for inclusion in the study. In addition, healthcare providers involved in the provision of antenatal, obstetric and gynaecological care were eligible for participation, unless affected by the exclusion criteria.

3.3.2 Exclusion Criteria

The study excluded mothers who are within their first and second trimesters of pregnancies. This was based on the assumption that, mothers within their first and second trimester may not have adequately decided on their mode of delivery for the current pregnancy, which this study measured as its outcome variable. Also, mothers who may be too ill to respond to the questions were excluded.

3.4 Sample Size and Sampling Technique

3.4.1 Sample Size Determination

The sample size was determined using the Cochrane formula given as n= $\frac{Z^2pq}{d^2}$

where;

n = Sample size determined, z= 95% confidence interval (CI) given as 1.96 and q = 1-p. With 95% CI, d = 0.05. The sample size estimation was based on the following assumptions;

- ✓ Estimated total deliveries of 3025 in the year 2021.
- ✓ The frequency of 50.6%, being the estimated rate of CS at the 37 Military Hospital.
- ✓ A 10% adjustment for non-responses was factored

Therefore $n = \frac{(1.96^2)(0.5)(1-0.5)}{0.05^2}$

$n = \frac{0.9604}{0.0025} = 384.2$

n = 384+ (0.1*384) = **422**

In addition to the antenatal mothers, 29 health workers available at the time of the study were included.

3.4.2 Sampling Technique

The study used the purposive sampling technique to select the mothers within their third trimesters of pregnancy. The technique was employed at the health facility where antenatal care sessions were being held for the pregnant women. The purposive sampling technique allowed all pregnant women in their third trimester and have decided on their preferred mode of delivery for their current pregnancy to be shortlisted to respond to the questionnaires. This was done to obtain rich information to adequately answer the research questions. Additionally, all available healthcare providers at the time of the study involved in maternal and neonatal care including medical officers (obstetrician gynaecologists), midwives and anaesthetics were purposively sampled.

3.5 Data Collection Tools and Techniques

A simple spreadsheet was designed to review the hospital's delivery register over the past five years to determine the prevalence rates and trends of deliveries and caesarean section. The spreadsheet summarized the data for the periods and included the reason or indication for the caesarean section. The use of the records reviews enabled the researcher to answer the first research question.

Additional data were obtained using a semi-structured questionnaire to assess the knowledge, attitudes and perceptions of CS among antenatal mothers. The questionnaire had both closed- and open-ended questions. These questions were rated with scores 1, 2 and 3, where a wrong response was scored 1, an unsure response, 2 and a correct response scored 3. There were

opportunities for women to explain their responses through the open-ended questions in order to clearly ascertain the extent of their responses to enable the determination of the appropriate score. The data collected from the antenatal mothers enabled the researcher to answer the research questions 2 and 4.

The questionnaire also included information on socio-demographic variables as well as obstetric history of the pregnant women and the preferred choice of delivery by pregnant women to measure the study outcome. Additionally, a separate semi-structured questionnaire was used to collect data from health workers on their perceptions about caesarean section at the 37 Military hospital. The health worker dataset enabled the researcher answer the research question 3.

3.6 Study Variables

The variables studied were categorized as dependent and independent variables.

3.6.1 Dependent Variables

The study measured the antenatal mother's preferred delivery method for the current pregnancy for which they were attending ANC in the third trimester. The variable was a dichotomous variable and coded as '0' for opting for Vaginal delivery and '1' for opting for caesarean section delivery.

3.6.2 Independent Variables

The independent variables considered for this study included the socio-demographic factors, maternal obstetric history, knowledge and attitude variables and perceptions on CS. These independent variables are further described in the Table 3.1.

Table 3.1 Independent Variables

Variable name	Variable definition	Variable measurement	Measurement scale
Socio-demographic variables			
Age of client	Age of pregnant woman in completed years	Raw ages of patient	Discrete (Categorized for analysis)
Locality/Residence	Community or suburb where client lives	List	Nominal
Marital status	Client's marital status	0 = Never married, 1 = Married	Categorical
Education	Highest level of education completed	0 = None, 1 = Primary 2 = Secondary 3 = Tertiary or higher	Categorical
Employment status	Indication of whether client was employed or not	0 = Not employed 1 = employed	Categorical
Obstetric history			
Number of pregnancies	Total number of times woman has been pregnant	Raw numbers	Discrete (categorized for analysis)
Number of deliveries	Total number of times woman has been delivered of a baby	Raw numbers	Discrete (categorized for analysis)
Number of live births (Parity)	Total number of living children of woman	Raw numbers	Discrete (categorized for analysis)
Number of still births	Total number of times woman has had a still birth	Raw numbers	Discrete (categorized for analysis)

Ever had a caesarean section	If woman had ever had a birth through caesarean section	0 = No, 1 = Yes	Categorical
Experience from previous CS	Open-ended to explore maternal experiences of previous CS	Raw responses	Nominal (Categorized in positive and negative experiences)
Knowledge assessment	A set of questions including with 3-point score to determine knowledge score	Raw scores	Continuous. Categorized as adequate (≥70%) or inadequate (<70%)
Attitude assessment	A set of questions including with 3-point score to determine attitude score	Raw scores	Continuous. Categorized as adequate (≥70%) or inadequate (<70%)
Mother's perception about CS	Open-ended questions to determine assessment	Maternal responses	Nominal Categorized as positive and negative perceptions based on connotations of the perceptions
Preferred mode of delivery for current pregnancy	*This refers to the mother's preferred mode of delivery for the current pregnancy*	*0 = Vaginal delivery* *1 = Caesarean section*	*Categorical*
Reasons for the preferred delivery mode	Maternal reasons for the preference. Open-ended to explore mothers' reasons	Raw responses	Nominal

3.7 Pretesting of Questionnaires

The data collection tools were pretested at the Ridge hospital in the Greater Accra region. This aided in identifying and addressing all possible gaps in the data collection tool and process. A total of 10 pregnant women attending ANC were used to test the questionnaire. The pretested

questionnaires were adequately reviewed and potential revisions made to the tool before administering it for the study.

3.8 Data Quality Control

The use of the purposive non-probability sampling afforded all the eligible clients an opportunity of being selected for the study. The pretesting of the tool further allowed deficiencies to be identified and corrected optimally. Data collection was done by two research assistants with a minimum of an HND qualification in public health, social science or related fields. The research assistants were trained by the researcher on the data collection tool and techniques for effective administration of the questionnaires. The training further enabled the generation of adequate responses and reduced wrong responses. The completed questionnaires were reviewed by the researcher daily before data entry.

3.9 Data analysis

Data were entered, cleaned and analysed using Stata v16 (Stata Corp, USA). Quantitative data were summarised using descriptive statistics reporting their frequencies, percentages, means and their standard deviations (SD).

In using a set of questions to determine the knowledge, attitude and perceptions of pregnant women, a cumulative score was determined and expressed as a percentage. Scores below the

70% were categorized as inadequate for knowledge and negative or poor attitudes and perceptions. Those who attained a score above 70% were categorized as adequate for knowledge and positive attitudes and perceptions.

Logistic regression analysis was used to examine the maternal factors that influenced preference for caesarean section. The unadjusted model was used to determine the relationship between the independent variables and the outcome variable reporting their unadjusted odds ratio (UOR), 95% confidence intervals (CI) and their p-values determined at a significance level of 5% (where $\alpha = 0.05$). The adjusted model was fitted to include all the variables reporting the adjusted odds ratio (AOR), 95% confidence intervals (CI) and their p-values also at a significance level of 5% (where $\alpha = 0.05$).

The retrospective data were analysed to determine the prevalence rates and the trend of CS deliveries in the hospital using Microsoft Excel. The prevalence of Caesarean section was estimated as the total CS deliveries divided by the total number of deliveries at the hospital for the year and multiplied by 100 given as $p = \frac{Total\ CS}{Total\ Deliveries} x100$. The estimated rates were used to present the 5-year trend of CS deliveries of the hospital. The analysis also included the reasons indicated for the CS delivery, reporting their frequencies and percentages for the period.

3.10 Ethical Consideration

Ethical clearance for the study was sought from the 37 Military Hospital Institutional Review Board (IRB). An official request was made to the 37 Military Hospital and permission sought to collect data from the antenatal mothers to answer the research questions. Informed consent was also sought from the eligible participants of the study before administering the data collection tool. The informed consent form had the names and telephone numbers of the researcher and the administrator of the 37 Military Hospital Institutional Review Board.

Before the administration of the questionnaire, an informed consent form was administered to the participant and requested to sign the consent form when they agreed to participate in the study. The potential participants were then informed of the rationale of the study, the average time for completing the questionnaire as well as the benefits and risks of the study. All such information were explained in a language that the participants adequately understood. A copy of the signed consent form was given to the participant and the other one kept by the researcher for future reference.

There was an assurance of privacy and confidentiality of participants. The questionnaires were administered at sites where the privacy of participants was ultimately observed. The study further used unique identifiers to ensure anonymity of participants. Participants were reliably informed that, the data would be used for answering only the research questions and the filled questionnaires were to be kept under lock and key with all soft copy versions of data secured with pass codes. Participants were also informed of their voluntary participation in the study

and that they could withdraw or not participate in the study without any effect on the services they received at the hospital.

CHAPTER FOUR

RESULTS

4.0 Introduction

The chapter presents the findings of the study conducted to determine the factors that influence caesarean section deliveries at the 37 Military Hospital in the Greater Accra region of Ghana. The chapter begins with the background characteristics of the respondents and follows with the findings for each of the research questions. The study used both antenatal mothers and health workers. The study findings from the antenatal mothers are based on a response rate of 96.9% as 409 out of the expected 422 distributed forms were retrieved and analysed.

The data from the antenatal mothers were used to answer the research questions two and four which focused on the knowledge, attitude and perceptions of women on caesarean section as well as the factors that influenced the choice of caesarean deliveries. Additionally, the findings from the 29 health workers were used to answer the research question three which focused on the perceptions of health workers on caesarean section.

4.1 Characteristics of Respondents

4.1.1 Background Characteristics on ANC Mothers

The mean age of the ANC women was 31 years. About 1% of respondents were 18-19 years old and 8.3% were 40+ years. Most of the respondents were between 20 and 39 years of age. Majority of the respondents (83.9%) were married and the remaining 16.1% were not married

at the time of the study. The study revealed that 55.7% of the women and 66.7% of their partners had attained tertiary education.

Table 4.1 Background Characteristics of ANC Mothers

Characteristic	Frequency (n=409)	Percent
Age group		
18-19 years	4	1.0
20-29 years	144	35.2
30-39 years	227	55.5
40+ years	34	8.3
Mean age (SD): 31.3 (5.1)		
Locality		
Accra	319	78.0
Outside Accra	90	22.0
Marital Status		
Not married	66	16.1
Married	343	83.9
Educational level of respondent		
No formal education	7	1.7
Basic	41	10.0
Secondary	133	32.5
Tertiary	228	55.7
Employment status		
Not employed	105	25.7
Employed	304	74.3
Religious affiliation		
Christianity	348	85.1
Islam	61	14.9
Partner's education		
No formal education	3	0.7
Basic	27	6.6
Secondary	106	25.9
Tertiary	273	66.7
Access to internet		
No	43	10.5
Yes	366	89.5
Average monthly family income		
<GHC500	21	5.1
GHC500-1000	78	19.1
GHC1001-1999	115	28.1
GHC2000+	195	47.7

It was also revealed that, 74.3% of the women were employed. Majority (85.1%) of the respondents were Christians and the remaining 14.9% were of the Islamic faith. Most of the ANC mothers (89.5%) had access to the internet. On average, 47.7% of the respondents had a family income of more than GHC2000 a month. The background characteristics of the women are shown in Table 4.1.

4.1.2 Women's Obstetric Characteristics

The study revealed that, 27.4% had been pregnant once and 22.2%, 23.2%, 16.4% and 10.8% had had two, three, four and five+ pregnancies, respectively (Table 4.2).

Of the total respondents, 32.5% had never had a childbirth. Those who had experience miscarriages and still births were 30.1% and 5.9% respectively. A third (30.3%) of the women had ever had a caesarean section. Of those having had a caesarean section, 61.3% were emergency and 38.7% were elective cases (Table 4.2).

The first three reasons for the previous caesarean section were maternal request (23.4%), abnormal presentation of foetus (18.5%) and based on physician advice (16.1%). Other reasons provided by respondents for caesarean deliveries in the past and other obstetric characteristics are shown in Table 4.2.

Table 4.2 Obstetric Characteristics of ANC Mothers

Characteristics	Frequency	Percent
Number of pregnancies (n=409)		
1	112	27.4
2	91	22.2

3	95	23.2
4	67	16.4
5+	44	10.8
Number of deliveries (n=409)		
None	133	32.5
1	106	25.9
2	102	24.9
3	46	11.2
4	18	4.4
5+	4	1.0
Number of living children (n=409)		
None	140	34.2
One	104	25.4
Two	107	26.2
Three	41	10.0
Four	13	3.2
Five+	4	1.0
Ever had miscarriage (n=409)		
No	286	69.9
Yes	123	30.1
Ever had still births (n=409)		
No	385	94.1
Yes	24	5.9
Ever had a caesarean section (n=409)		
No	285	69.7
Yes	124	30.3
Type of CS (n=124)		
Emergency	76	61.3
Elective	48	38.7
Reason for CS (n=124)		
Maternal request	29	23.4
Abnormal presentation	23	18.5
Physician advice	20	16.1
Maternal health condition	17	13.7
Non-reassuring FHR	16	12.9
Other unidentified complications	12	9.7
Placental complication	5	4.0
Bleeding	2	1.6
Satisfaction with CS (n=124)		
Satisfied	93	75.0
Dissatisfied	31	25.0
Describe experience (n=124)		
Negative	23	18.5
Positive	101	81.5

CS-Caesarean section

4.1.3 Characteristics of Health Workers

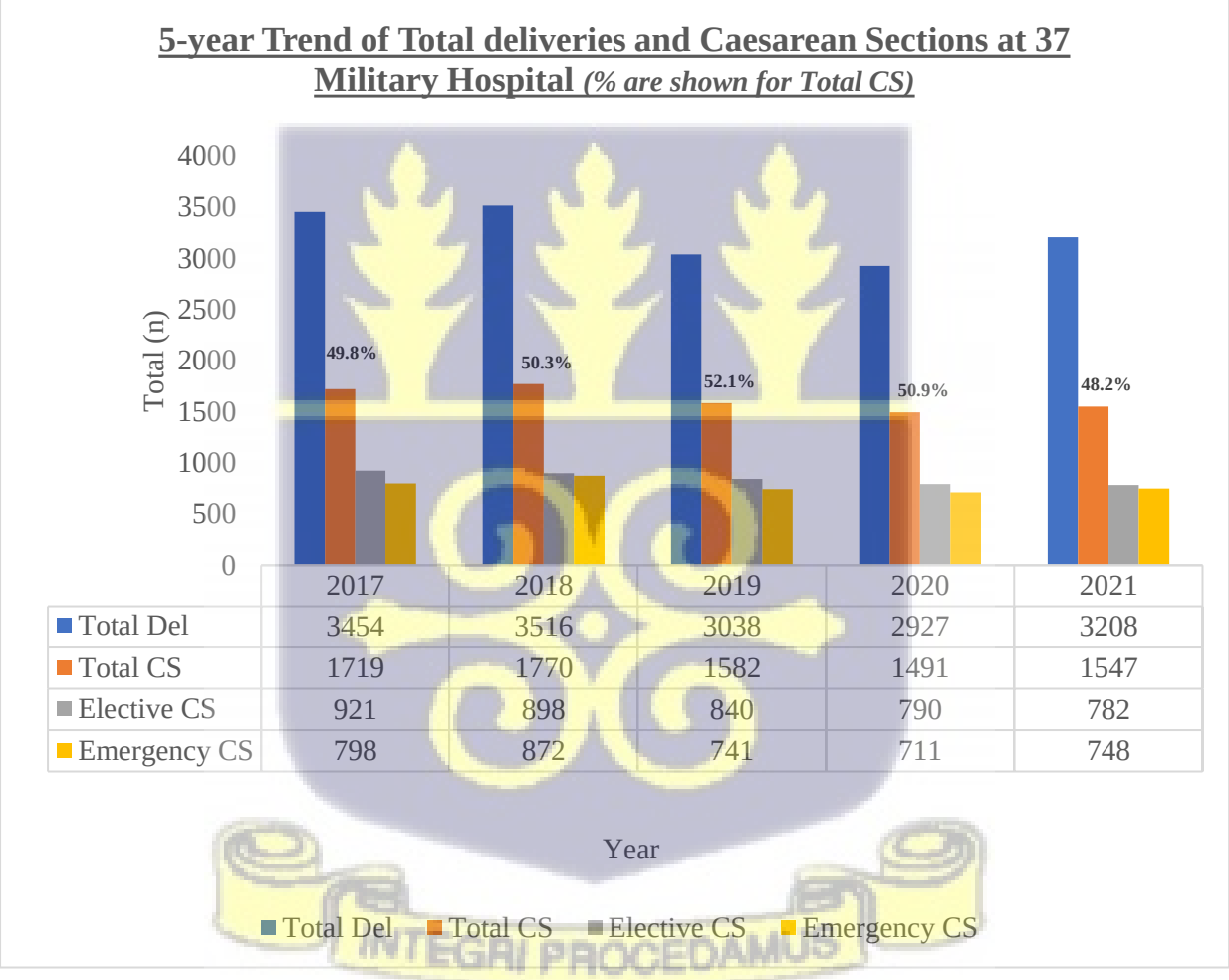
The health workers used in the study included 62.1% females and 37.9% males. Most 41.4% of the health workers were aged 30-39 years old and were mostly Christians (89.7%). Most of the health workers participating in this study were married (65.5%) and the remaining 34.5% were not married at the time of the study. Based on their professions, 48.3% were midwives and 31% and 20.7% medical officers and anaesthetics respectively. Most of them (55.2%) had worked at the 37 Military hospital for less than 10 years whereas 20.7% and 24.1% had worked at the hospital for 10-19 years and 20+ years respectively (Table 4.3).

Table 4.3 Characteristics of Health Workers

Characteristics	Frequency (n=29)	Percent
Age of respondent		
20-29	8	27.6
30-39	12	41.4
40-49	7	24.1
50+	2	6.9
Sex of respondent		
Male	11	37.9
Female	18	62.1
Religious affiliation		
Non-affiliated	1	3.4
Christianity	26	89.7
Islam	2	6.9
Marital status		
Not Married	10	34.5
Married	19	65.5
Cadre of provider		
Medical Officer	9	31.0
Midwife	14	48.3
Anaesthetics	6	20.7
Working years		
<10	12	41.4
10-19	10	34.5
20+	7	24.1
Length of work at 37 (years)		
<10	16	55.2
10-19	6	20.7
20+	7	24.1

4.2 Prevalence Rates and Trend of Caesarean Section Deliveries at the 37 Military Hospital

The analysis from the secondary data revealed that, total caesarean sections prevalence rates at the hospital for the five-year period (2017 – 2021) were as follows: 1719 (49.8%) for 2017 and 1770 (50.3%), 1582 (52.1%), 1491 (50.9%) and 1547 (48.2%) for 2018, 2019, 2020 and 2021. On average, caesarean section prevalence rate for the five-year period was 50.3%.



	2017	2018	2019	2020	2021
Total Del	3454	3516	3038	2927	3208
Total CS	1719	1770	1582	1491	1547
Elective CS	921	898	840	790	782
Emergency CS	798	872	741	711	748

Figure 4.1 Trend of Caesarean Section Deliveries at 37 Military Hospital

The analysis further showed that elective caesarean section (52.2%) outpaced emergency caesarean section procedures at 47.8% for the five years on average. The trend for elective caesarean sections were 53.6%, 50.7%, 53.1%, 53% and 50.5% respectively for 2017, 2018, 2019, 2020 and 2021 (Figure 4.2). Figure 4.2 also shows the trend for emergency CS for the periods.

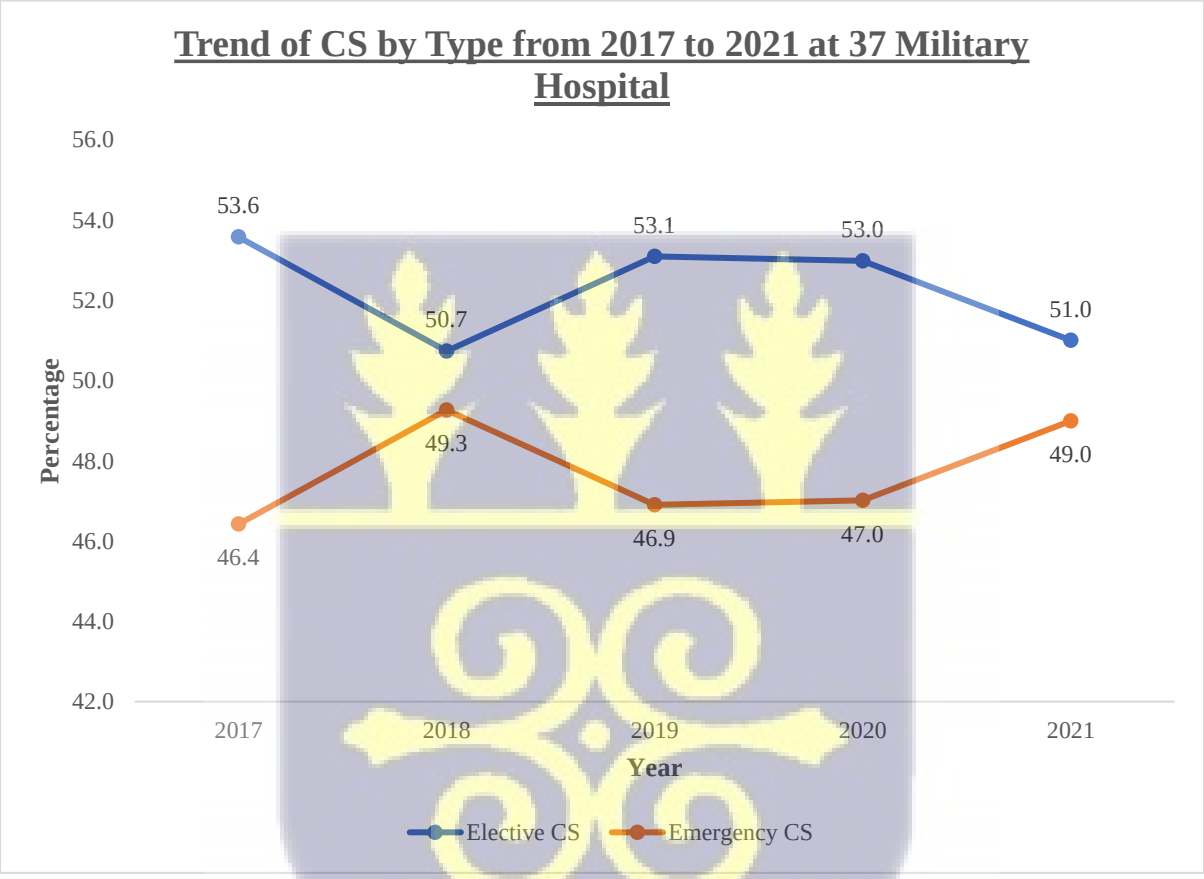


Figure 4.2 Trend of CS Deliveries by Type at the 37 Military Hospital

Further analysis of CS trend revealed a decline for total CS (β= -0.315, p=0.641) and elective CS (β= -0.410, p=0.570) with no statistically significant changes over the five years. There was, however, an increasing trend of emergency CS although the increase was not statistically significant (β= 0.410, p=0.570) as shown in Figure 4.3.

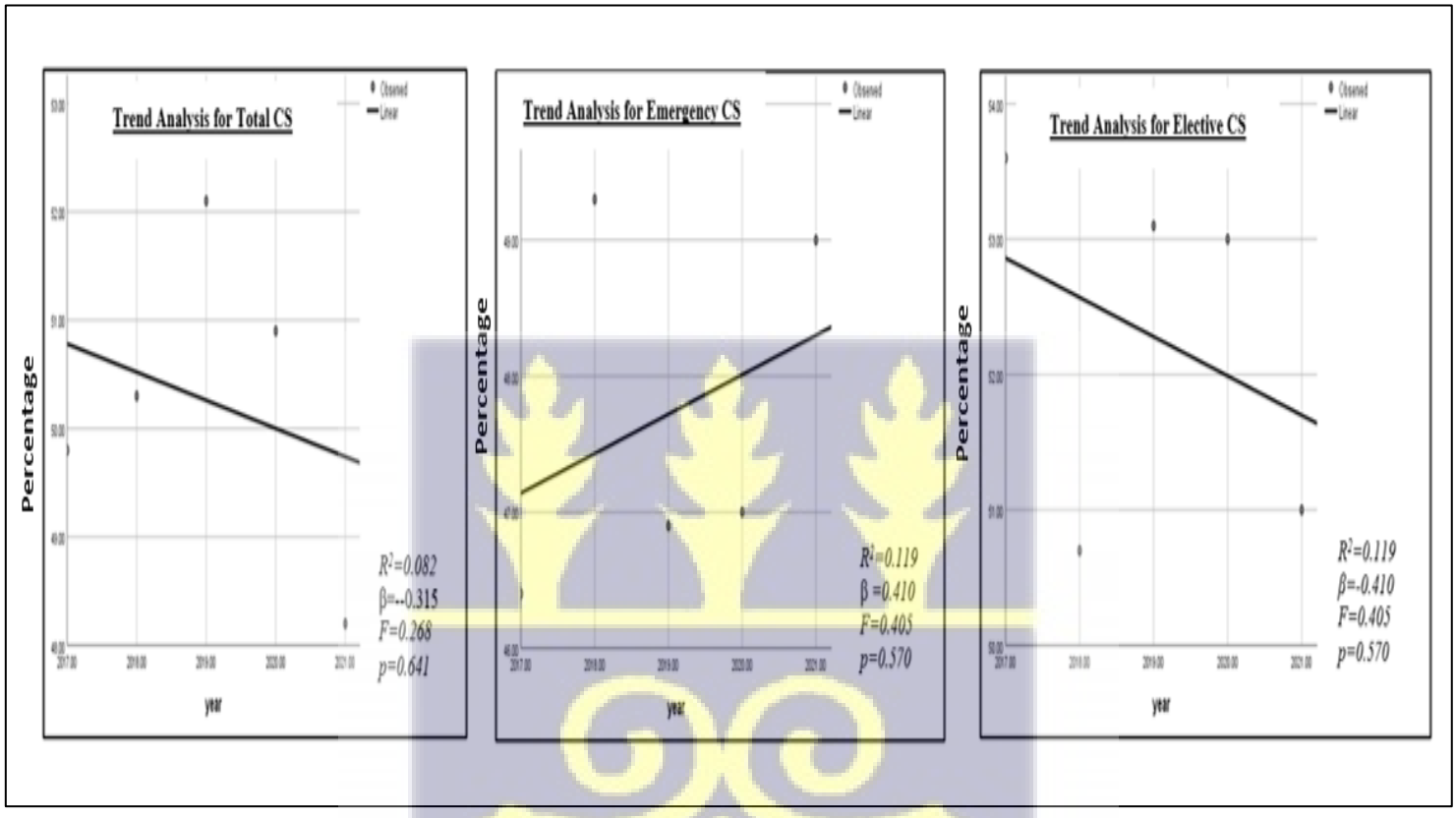


Figure 4.3 Trend Analysis for Total, Emergency and Elective CS

Preferred Mode of Delivery by Antenatal Mothers

The study showed that 72.9% of the respondents preferred vaginal delivery for their current pregnancy and 27.1% preferred caesarean section as shown in Figure 4.4.

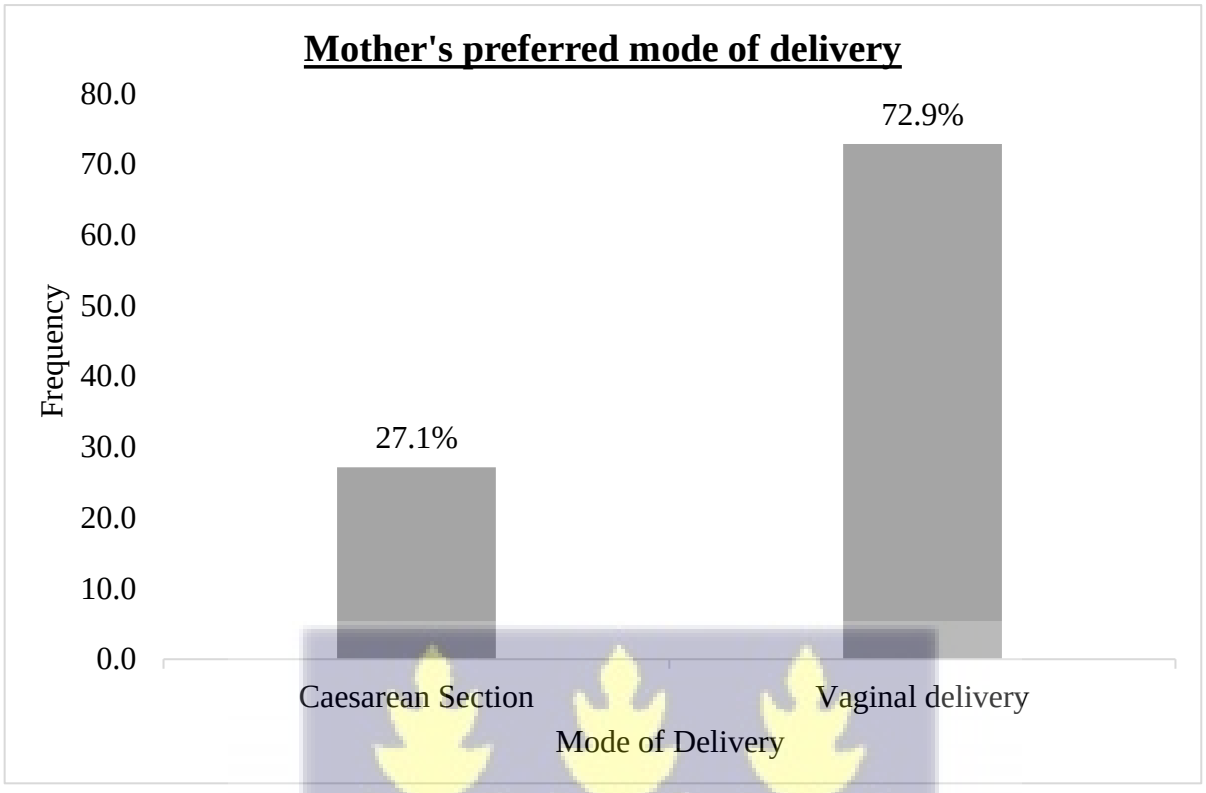


Figure 4.4 Preferred Mode of Delivery for Current Pregnancy by ANC Women

On the reasons for preference of a particular mode of delivery, 40.6% preferred vaginal delivery because it was simple and less painful for them whereas 32.9% and 26.5% indicated the choice of vaginal delivery because it was safe and natural, respectively. For those who preferred caesarean section, 48.6% were because, CS was safe. Also, 41.4% indicated their preference for CS was because of previous caesarean section. The remaining 10% gave health reasons for the choice of CS. (Figure 4.5).

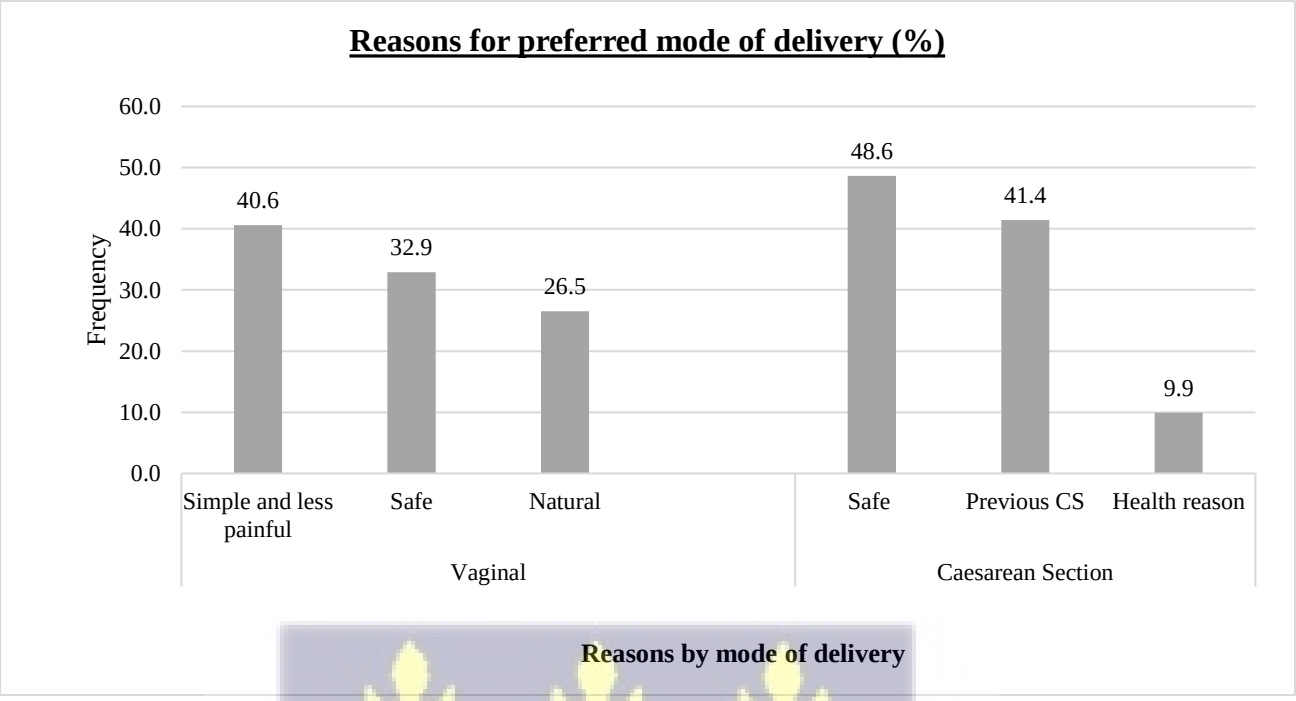


Figure 4.5 Reasons for Preferred Mode of Delivery

4.3. Maternal Knowledge, Attitudes and Perceptions on Caesarean Section

4.3.1 Maternal Knowledge on Caesarean Section

The study found that 53.8% of the women had adequate knowledge on caesarean sections based on a set of eight knowledge parameters used in assessing their knowledge (Table 4.4). The study showed that, 74.1% of women knew about the possibility of vaginal delivery following a caesarean section delivery. Also, 50.4% disagreed with the need for blood transfusion at every caesarean section and 51.8% disagreed with the statement that, infections and complications usually followed a caesarean section.

The study revealed that, 33.7% indicated less bleeding in CS than in vagina delivery. On pain associated with CS, only 16.6% of ANC mothers indicated that, CS was less painful. The study

showed that 42.5% of respondents were able to identify a reason for which mothers would have a CS. More than half (55.7%) of the respondents indicated that, CS was very safe for the baby. The responses on maternal knowledge on CS is shown in Table 4.4.

Table 4.4 Maternal Knowledge on Caesarean Section

Knowledge variable	Frequency (n=409)	Percent
Vaginal delivery is possible after caesarean section.		
Yes	303	74.1
No	61	14.9
Unsure	45	11
Caesarean section always requires blood transfusion		
Yes	147	35.9
No	206	50.4
Unsure	56	13.7
Infections and complications usually occur after caesarean section		
Yes	123	30.1
No	212	51.8
Unsure	74	18.1
There is less bleeding in caesarean section than vaginal delivery		
Yes	138	33.7
No	129	31.5
Unsure	142	34.7
Caesarean section is less painful		
Yes	68	16.6
No	88	21.5
Unsure	253	61.9
Identify one reason mothers will have CS		
Yes	174	42.5
No	17	4.2
Unsure	218	53.3
Caesarean section is very safe for the baby		
Yes	228	55.7
No	33	8.1
Unsure	148	36.2
Identify one common indication for CS		
Yes	181	44.3
No	48	11.7
Unsure	180	44
Knowledge level		
Inadequate knowledge	134	32.8
Adequate knowledge	275	67.2

4.3.2 Maternal Attitudes towards Caesarean Section

From the assessment, 75.1% of the women had positive attitudes towards caesarean section (Table 4.5). The study revealed that, 39.6% regarded CS as an unnatural and unacceptable method of delivery. Majority (82.6%) of the women would opt for a caesarean section when vaginal delivery was risky. Also, 76.3% believed women should have the right to request for caesarean section and 67% did not have any problem undergoing a caesarean section when it was necessary. Almost half (49.1%) of the respondents indicated that, CS prevented deformation of the female genital area. From the study, 32.5% did not like CS because of abdominal scars. The assessment of maternal attitudes towards caesarean section is shown in Table 4.5.

Table 4.5 Maternal Attitudes towards Caesarean Section

Attitude variable	Frequency (n=409)	Percent
Caesarean section is unnatural and an unacceptable method		
Yes	162	39.6
No	154	37.7
Unsure	93	22.7
Caesarean section should be done when vaginal delivery is risky		
Yes	338	82.6
No	24	5.9
Unsure	47	11.5
With or without complications, I would never request caesarean section		
Yes	188	46
No	150	36.7
Unsure	71	17.4
I believe mothers should have the right to request for caesarean section		
Yes	312	76.3
No	46	11.2
Unsure	51	12.5
Caesarean section prevents deformation of the female genital area		
Yes	201	49.1
No	64	15.6
Unsure	144	35.2
I do not have any problem undergoing caesarean section when necessary		
Yes	274	67

No	70	17.1
Unsure	65	15.9
I don't like caesarean section because of the abdominal scars		
Yes	133	32.5
No	182	44.5
Unsure	94	23
How do you generally feel about caesarean section		
Good	230	56.2
Bad	94	23
Unsure	85	20.8
Attitude of Mothers		
Negative attitude	102	24.9
Positive attitudes	307	75.1

4.3.3 Maternal Perceptions on Caesarean Section

Table 4.6 shows that 57% of the women had positive perceptions on caesarean section. The study also revealed that, 29.6% perceived that, CS did not conform to culturally inspired motherhood and childbirth. Most (43.3%) of the mothers however, were of the view that, CS conformed to culturally inspired motherhood and child birth. It was found that, 55% of the women perceived caesarean section could be used to get a desired day or date of birth and 23.5% were of the view that caesarean section had bad consequences. The factors used in assessing maternal perceptions on caesarean section can be found in Table 4.6.

Table 4.6 Maternal Perceptions on Caesarean Section

Perception	Frequency (n=409)	Percent
Having caesarean birth does not conform to culturally inspired motherhood and child birth		
Yes	121	29.6
No	177	43.3
Unsure	111	27.1
I can use caesarean section to get a desired day or date of birth		
Yes	225	55
No	102	24.9
Unsure	82	20
Caesarean section has bad consequences		
Yes	96	23.5
No	164	40.1
Unsure	149	36.4
Infants born by caesarean section are more intelligent than vaginal delivery		
Yes	32	7.8
No	187	45.7
Unsure	190	46.5
Perception of Mothers		
Negative	175	42.8
Positive	234	57.2

4.4 Health workers' perception on caesarean section

On the perception of health workers on caesarean section, the study found 51.7% to be positive and 48.3% to be negative. The study showed that, 48.3% of health workers agreed that CS births should only be indicated for medical or clinical reasons. Almost all health workers (96.6%) of the health workers further agreed that, counselling mothers before granting CS on request was important. It was revealed that, 72.4% of health workers did not prefer CS to vaginal delivery for pregnant women. None of the health workers agreed that, children born through CS were more intelligent than those born vaginally. Among the health workers, 20.7% agreed that, having CS births did not conform to culturally inspired motherhood and childbirth.

The factors used in assessing health worker perceptions on caesarean sections are shown in Table 4.7.

Table 4.7 Health Workers' Perception of Caesarean Section

Perception of Health workers	Frequency (n=29)	Percent
Caesarean section births should only be indicated for medical or clinical reasons		
Agree	14	48.3
Disagree	11	37.9
Unsure	4	13.8
It is important to counsel mothers before granting them CS on request		
Agree	28	96.6
Disagree	1	3.4
Unsure	0	0
I prefer caesarean section to vaginal delivery for pregnant women		
Agree	1	3.4
Disagree	21	72.4
Unsure	7	24.1
Infants born by caesarean section are intelligent than those born by vaginal delivery		
Agree	0	0
Disagree	24	82.8
Unsure	5	17.2
Having caesarean birth does not conform to culturally inspired motherhood and child birth		
Agree	6	20.7
Disagree	20	69.0
Unsure	3	10.3
Caesarean section can be used to get a desired day or date of birth for the child		
Agree	22	75.9
Disagree	4	13.8
Unsure	3	10.3
Perception of Caesarean Section		
Poor perception	14	48.3
Good perception	15	51.7

4.5 Factors influencing election for CS deliveries among antenatal mothers

Table 4.8 shows the logistic regression model used to assess the factors that influenced CS deliveries among antenatal mothers. From the unadjusted model in Table 4.8, maternal age 20-29 years (UOR: 0.36, p=0.012) was significantly associated with preference for CS deliveries. Also, maternal education at SHS/Vocational /Technical (UOR: 0.57, p=0.033) was significantly associated with preference for caesarean deliveries. The study also showed that, the relationship between the number of pregnancies, i.e., mothers having three (UOR: 2.23, p= 0.015) four (UOR: 2.25, p=0.024) and five (UOR: 2.38, p=0.031) pregnancies and preference for CS deliveries was significant. The unadjusted model also showed that having one (UOR: 2.38, p=0.005), two (UOR: 2.41, p=0.005) and three deliveries (UOR: 2.44, p=0.023) was significantly associated with preference for CS deliveries. The findings also revealed that, there was a significant relationship between having a history of caesarean section and preference for a caesarean delivery. In addition, adequate maternal knowledge on caesarean section (UOR: 1.97, p=0.003) also had a significant association with preference for CS delivery. The study also revealed a significant relationship between positive maternal perceptions (UOR:1.85, p=0.009) and preference for caesarean deliveries (Table 4.8).

The findings further revealed in the adjusted model that, women with a history of emergency caesarean deliveries were more than 13 times likely to prefer caesarean birth for their current pregnancy when they were compared with those without a history of caesarean section (AOR: 13.88, p<0.0001). Those with a previous elective caesarean section were more than 54 times

likely to prefer caesarean births compared with those without caesarean section experience. The study further found that, women with two pregnancies (AOR: 0.17, p=0.020) were less likely to opt for a caesarean birth compared with those having their first pregnancy in the adjusted model (Table 4.8).

Table 4.8 Factors Influencing Election for Caesarean Deliveries among Antenatal Mothers

Dependent Variable = Mode of delivery	UOR	95% CI		P value	AOR	95% CI		P value
		Lower	Upper			Lower	Upper	
Age groups								
Below 20 years	Ref				Ref			
30-39 years	1.75	1.08	2.88	**0.026**	1.76	0.86	3.60	0.122
40+ years	2.87	1.3	6.36	**0.009**	2.39	0.74	7.72	0.147
Location								
Accra	Ref				Ref			
Outside Accra	1.11	0.67	1.88	0.673	1.17	0.61	2.26	0.642
Maternal Education								
Basic	Ref				Ref			
Secondary	0.44	0.21	0.92	**0.029**	0.61	0.22	1.72	0.354
Tertiary	0.775	0.4	1.49	0.446	1.20	0.41	3.53	0.744
Employment Status								
Not employed	Ref				Ref			
Employed	1.03	0.63	1.7	0.899	0.67	0.33	1.34	0.257
Religion								
Christian	Ref				Ref			
Islam	0.69	0.36	1.33	0.269	0.96	0.42	2.21	0.920
Partner's education								
Basic	Ref				Ref			
Secondary	0.68	0.28	1.64	0.395	1.26	0.37	4.22	0.713
Tertiary	0.74	0.33	1.66	0.471	0.90	0.27	2.99	0.867
Access to internet								
No	Ref				Ref			
Yes	0.59	0.31	1.15	0.120	0.53	0.20	1.36	0.187
Average monthly family income								
<GHC500	Ref				Ref			
GHC500-1000	0.98	0.34	2.86	0.974	1.31	0.31	5.49	0.708

GHC1001-1999	0.73	0.26	2.07	0.555	0.61	0.15	2.59	0.507
GHC2000+	1.03	0.38	2.8	0.950	0.89	0.22	3.65	0.871
Number of pregnancies								
One	Ref				Ref			
Two	1.56	0.79	3.06	0.200	0.21	0.05	0.91	**0.037**
Three	2.23	1.17	4.25	**0.015**	0.28	0.05	1.61	0.155
Four	2.25	1.11	4.54	**0.024**	0.18	0.02	1.52	0.117
Five+	2.38	1.08	5.24	**0.031**	0.22	0.02	2.67	0.236
Number of deliveries								
None	Ref				Ref			
1	2.38	1.29	4.4	**0.005**	1.38	0.34	5.52	0.650
2	2.41	1.3	4.47	**0.005**	0.94	0.17	5.24	0.944
3	2.44	1.13	5.26	**0.023**	1.06	0.14	7.77	0.955
4	2.52	0.86	7.44	0.094	2.30	0.17	30.58	0.527
5	1.68	1.17	16.92	0.659	0.44	0.01	19.63	0.672
Ever had miscarriage								
No	Ref				Ref			
Yes	1.3	0.82	2.08	0.263	1.77	0.73	4.25	0.203
Ever had a still birth								
No	Ref				Ref			
Yes	1.66	0.7	3.92	0.244	0.75	0.21	2.64	0.654
History of Caesarean section								
None	Ref				Ref			
Emergency	7.14	4.03	12.66	**0.000**	12.29	5.56	27.18	**0.000**
Elective	27.14	12.42	59.29	**0.000**	48.35	18.15	128.82	**0.000**
Maternal knowledge								
Inadequate	Ref				Ref			
Adequate knowledge	1.97	1.25	3.1	**0.003**	1.26	0.69	2.31	0.451
Maternal attitude								
Negative	Ref				Ref			
Positive attitudes	1.35	0.87	2.09	0.182	0.83	0.45	1.54	0.562
Maternal perception								
Negative	Ref				Ref			
Positive	1.85	1.17	2.92	**0.009**	1.70	0.92	3.13	0.088

UOR-Unadjusted Odds Ratio; CI – Confidence Interval; AOR - Adjusted Odds Ratio; P-value – Probability value significant at 5% (α=0.05); Ref – Reference category

CHAPTER FIVE

DISCUSSION OF RESULTS

5.1 Introduction

The study was conducted to determine the prevalence rates and trends as well as the factors that influence preference for caesarean deliveries among antenatal mothers receiving care at the 37 Military hospital. This chapter provides the discussion to the study findings and cover the research objectives including prevalence rates and trends of caesarean section, knowledge, attitudes and perceptions of mothers and health workers and the factors that influence caesarean deliveries at the hospital.

5.2 Prevalence Rates and Trends of Caesarean Deliveries

5.2.1 Prevalence Rates of Caesarean Section from Secondary Data

The study showed that, about half of the total deliveries over the past five years (2017 – 2021) at the 37 Military Hospital were through caesarean section. Additionally, more than half of these caesarean section procedures were by election. Caesarean section rates have increased in Ghana, estimated at 12.8% in 2014 by the GSS et al., (2015) and up to 16% in 2016 by the GHS (2017). There is also evidence from earlier studies of higher caesarean section rates in the Greater Accra region such as the 22.9% as indicated by Okyere et al., (2022). The prevalence rate from this current study is much higher when compared with the earlier studies and reports in Ghana.

The level of caesarean section of more than 50% from this study is higher than the recommended 15% set by the World Health Organization (WHO, 2015). The observed prevalence rates from this study are also higher when compared with the global estimate of 21.1% by Betran et al., (2021). It is also higher than the 42.8% level observed among the Latin America and Caribbean regions, who according to Betran et al., (2021), have the highest rates in the world. One comparable high prevalence of caesarean section is reported from a study conducted in Bangladesh by Ahmed et al., (2022) where the caesarean section prevalence rate was 67.4%, higher than the levels observed from this study. Also, a study in Vietnam showed an overall caesarean section prevalence rate of 49.6% among hospitals with higher levels up to 57.8% among private facilities which to a large extent aligns with the high prevalence of caesarean section reported from this study (Thi et al., 2022).

The high level of elective caesarean sections accounts for the overall high cases at the hospitals. A similar scenario is reported by Ji et al., (2015) in China as close to 35% of women electing for caesarean section did not have any underlying indication listed in the clinical guideline nor based on maternal request. The need for comprehensive investigations into the fundamental reasons for these caesarean section cases beyond this study is crucial to further prioritize the utilization of the procedure as an effective maternal health intervention. The inclusion of care providers and relevant family members in arriving at justified conclusions where a caesarean section procedure is not clinically indicated needs to be considered in order to regularise the procedure (Bam et al., 2021; Ji et al., 2015).

5.2.2 Trends of Caesarean Section from Secondary Data

The study showed a declining trend of the total CS at the 37 Military Hospital from 52.1% in 2019 to 50.9% in 2020 and 48.2% in 2021 after an increase from 49.8% in 2017 to 50.3% in 2018. The findings differs from that of Okyere et al., (2022) whose findings showed an increasing trend of CS in Ghana. The declining rates observed from this study are also not congruent with the findings of Betran et al., (2021) who reported global CS rates to be steadily increasing. Betran et al., (2021) further reported increases in CS rates among all sub-regions including the sub-Saharan African sub-region.

In other sub-regions such as the Carribean, Latin America, Asia and Europe, trends of CS deliveries have been observed to be increasing (Betran et al., 2021). The findings of Amjad et al., (2020) showed an upward trend of CS deliveries in Pakistan which is incongruent to the trend observed from this current study. The trend of CS deliveries in China from 2008 to 2018 was also reported to be increasing (Li et al., 2020). The observed decline in CS rates in this facility is probably because the observed rates are too high compared to what exists in other facilities and the country overall.

The declining trend of CS rate from this study needs to be sustained and improved as the current rates recorded at the hospital are high. It is important to employ actions that can ensure the continuous decline by prioritizing indicated CS interventions and reducing electives and cases that may not be necessary. These actions could include educational interventions as well as use of evidence-based clinical guidelines, regular CS audits and requirement of second medical opinion for CS decisions in settings where possible (WHO, 2021a).

5.2.3 Proportion of Antenatal Mothers Preferring Caesarean Deliveries

This study found that, 27.1% of the antenatal mothers preferred caesarean deliveries to vaginal delivery which is higher than the 15% threshold by the World Health Organization.. The findings of Banchani & Tenkorang, (2022) from the 2017 Ghana Maternal Health Survey reported that, about 13% of mothers had preference for caesarean section and was similar to the findings of Alhassan, (2021) which were all lower than the findings from the 37 Military Hospital. Manyeh et al., (2017) also reported a lower level of delivery through caesarean section of 6.6% compared with this study in Southern Ghana.

A study conducted by Islam et al., (2022) using 36 demographic and health surveys in sub-Saharan Africa estimated a caesarean section rate of 15% which is lower than the findings of this study. In a study by Chelangat et al., (2021) in Kenya, 18.7% of antenatal mothers preferred caesarean section which is also below the observed level from this current study. A slightly higher level preference of 28.9% for caesarean section was however, reported by Welay et al., (2021) among pregnant women in Ethiopia. The findings of Shi et al., (2016) also reported that, 21.3% of pregnant women in China preferred CS to vagina delivery. Another study in China by Loke et al., (2015) found 22.9% of women preferring caesarean section. In Bangalore, India, Saxena et al., (2019) also found more than 35% of women preferring caesarean section to vaginal delivery, which is also higher than what was found from this current study.

5.3 Knowledge, Attitudes and Perceptions of Antenatal Mothers on Caesarean Section

5.3.1 Maternal Knowledge on Caesarean Section

The assessment from the 37 Military Hospital among antenatal mothers found that, 67.2% of the women had adequate knowledge on caesarean section. The findings indicates that, majority of the women receiving antenatal care were aware and knowledgeable on caesarean section as a procedure of childbirth. The findings therefore, shows a higher knowledge level among antenatal mothers on caesarean section when compared with that of Gandau et al., (2019) in the Upper West region of Ghana where women generally had inadequate knowledge on caesarean section.

Also, Afaya et al., (2018) reported from their study in Northern Ghana that, 32% of pregnant women had adequate knowledge on caesarean section which is lower than the findings from this current study. The findings from this current study also shows higher knowledge when compared with other earlier studies including Prah et al., (2017) among antenatal mothers in Cape Coast in the Cental region of Ghana. These observation might point to the influence of maternal educational attainment on delivery preferences as documented in several studies (Dankwah et al., 2019; Okyere et al., 2022; Prah et al., 2017)

The findings of Ansah, (2018) from Cape Coast, Ghana reported a knowledge level of 78% among antenatal mothers which is higher than the knowledge level among the mothers from this current study. Dorkenoo & Abor, (2021) also reported from the Korle Bu Teaching hospital that, 82.2% of antenatal mothers had adequate knowledge on caesarean section which is also higher than the findings from this study. Although the findings from the current study is higher

than some earlier studies, the knowledge level from the findings of Ansah, (2018) and Dorkenoo & Abor, (2021) suggests that, knowledge level of CS could be further improved among antenatal mothers.

In Nigeria, Panti et al., (2018) reported from their study that, 85.5% of pregnant women had adequate knowledge on CS. According to the findings of Al-Rifai et al., (2021) in the United Arab Emirates, about 20% had adequate knowledge on caesarean section which is lower than the findings from this current study. In Thailand, the proportion of pregnant women with knowledge on caesarean section was about 30% by Matemanosak & Suwanrath, (2021). The above discussion shows variations in knowledge level among pregnant women on caesarean section deliveries among different regions and countries.

Even within Ghana, different studies have showed variations in maternal knowledge on caesarean section. The variations could be explained from the various backgrounds of study participants including educational level and access to obstetric and health information and thus, shows the continuous need for health education at all levels of health care. When the findings from this study are juxtaposed with the high educational level of the women involved in this study as well as their increased access to internet and information, a higher knowledge level than the observed levels from the study would have been expected.

This therefore, requires intentional efforts to provide adequate accurate information on birth options to antenatal mothers during health education and counselling sessions. Approaches to improving knowledge through education may include culturally tailored health education interventions as they have been associated with increase in knowledge among pregnant women (Fernandes et al., 2020). The use of various media including mass and social media firms to

desseminate health information can also contribute to improving access to information and maternal knowledge (Majlesi et al., 2020).

5.3.2 Maternal Attitudes to Caesarean Section

The findings of the study revealed that, 75.1% of antenatal mothers had positive attitudes towards caesarean deliveries at the 37 Military Hospital. The finding thus corroborates that of Dorkenoo & Abor, (2021) among women from the Korle-Bu Teaching hospital in Accra where attitudes of antenatal mothers towards CS were positive. Similarly, the findings of Gandau et al., (2019) in the Upper West region and Ansah, (2018) in the Central region of Ghana showed women's positive attitudes towards caesarean deliveries which agrees with the findings of this study.

Panti et al., (2018) found that, most of the respondents in a Nigerian study were ready to accept caesarean section when it became necessary and had positive attitudes towards caesarean section. The attitudes of a group of Egyptian women were also reported to be positive by Wali et al., (2020) and Alkalash et al., (2021) in separate studies. Similarly, the findings from this current study agrees with Suwanrath et al., (2021) in Thailand, where the attitudes of women towards caesarean section were positive. The findings of Varghese et al., (2019) also showed that, majority of pregnant women had favourable attitudes towards caesarean deliveries in Mangaluru, India. In Manipur also in India, the assessment of Oinam et al., (2016) found maternal attitudes to be neutral towards caesarean sections and this was similar to that of

Poongodi & Renuka, (2020) among women in Puducherry, India. A study conducted in Nepal found that, majority of women did not have positive attitudes towards CS (Joshi et al., 2018).

The attitudes of pregnant women can be observed to be varied within socio-cultural or geographic contexts. The findings of this current study indicates largely, positive attitudes of antenatal mothers to CS which is important in contributing to the utilization of maternal health interventions such as caesarean section to address poor pregnancy and birth outcomes such as maternal and neonatal deaths in Ghana. Health care providers could therefore, explore the positive attitudes of mothers to make right maternal health choices since attitudes have been noted to be influenced by maternal knowledge and perceptions (Afaya et al., 2018). In this regard, the attitudes of pregnant women should be used to guide counselling and procedures for making informed decisions regarding their preferred mode of delivery to reduce risks and complications and promote maternal and neonatal health.

5.3.2 Maternal Perceptions of Caesarean Section

The assessment at the 37 Military Hospital found that, majority of the antenatal mother's perception on caesarean section was positive. This finding is contrary to the observations of Adageba et al., (2008) where majority of study participants held negative perceptions about caesarean section. In the Upper West region of Ghana, Gandau et al., (2019) also found a higher proportion of women having negative perceptions about caesarean section. Although the findings of Prah et al., (2017) showed improvements of maternal perceptions, about four out of every ten women had a negative perspective of caesarean section which agrees with the

findings of this study. The findings of Dorkenoo & Abor, (2021) from the Korle-Bu Teaching Hospital in Ghana also showed improvements in maternal perceptions about caesarean section when compared with earlier findings like Adageba et al., (2008) and Gandau et al., (2019).

In Uganda, Waniala et al., (2020) identified several misconceptions which hindered the acceptance of caesarean section as a maternal health intervention. Additionally, although Lawani et al., (2019) found a high level of awareness and indications for caesarean section in a tertiary hospital in Nigeria, similar misconceptions created morbid aversion towards its utilization. Panti et al., (2018) outlines among other factors that, maternal perception of womanhood, pain during labour and dellivery and high cost hindered the open acceptance of caesarean section among pregnant women. These misconceptions were somehow minimal in the current study among antenatal mothers at the 37 Military Hospital in Ghana as the main reasons cited for choosing vaginal delvery were its safety, natural process and as a main preference method. The findings nothwithstanding, should inform the need for health care providers to adequately address misperceptions about caesarean section among antenatal mothers to foster maternal decisions when the need arises.

5.4 Perceptions of Health Workers about Caesarean Section Deliveries

Health care providers showed good perception about caesarean section as majority were positive to procedure as maternal health intervention. It was revealed that, health workers recognized the importance of adequate counselling and education before granting women's request for caesarean section. This finding is important to improving maternal and neonatal

health and critical to ensuring that, caesarean section procedures are performed when needed and should follow education and counselling. Similar to the findings from this study, Juma et al., (2016) found positive health workers' perspectives to caesarean section.

The favourable perceptions of health workers are usually influenced by principles and clinical guidelines as well as gathered experiences from providing services (Bakker et al., 2021; Juma et al., 2016). As found in this current study, health workers did not prefer caesarean section to vaginal deliveries and majority were ready to offer it as an option only when it was indicated for medical or clinical reasons. Thus, it corroborates the findings of Shah et al., (2018) where some health care providers wait during labour progression for an indication rather than quickly recommending a caesarean section when it is not medically indicated. It further agrees with observations of Smith et al., (2022) in Ireland, where clinicians also perceived birth as a natural process and should not be interfered with unless as a necessary health intervention. This perspective and practice of health workers at the hospital should be harnessed and utilized to appropriate the prevention of caesarean section when not necessary (Shah et al., 2018).

Health workers at the hospital should continue to professionally exhaust options for safe vaginal delivery before negotiating for caesarean section among pregnant women as part of the efforts to reduce unnecessary and unindicated cases for caesarean section (Kingdon et al., 2018a). The role of health workers in influencing the overall decision of caesarean section procedures cannot be underestimated as they are directly involved in the decision for a caesarean delivery (Eide & Bærøe, 2021; Panda et al., 2018). Their perspectives are therefore, of critical importance and should be focused on ensuring optimal care for the woman and baby (Panda et al., 2018).

5.5 Factors Influencing Preference for Caesarean Section among Antenatal Mothers

The study found that maternal age, educational level, number of pregnancies and deliveries previous caesarean section, knowledge level and maternal perceptions were the independent factors associated with preferring caesarean deliveries ($p<0.05$) in bivariate analysis. However, the adjusted model showed previous caesarean section and number of pregnancies as the influencing factors for preferring caesarean section among antenatal mothers at the 37 Military Hospital. The findings showed that, women with a previous emergency caesarean section were more than 13 times likely to prefer CS. Also, those who had a previous elective CS were about 54 times more likely to elect for a caesarean section for their current pregnancy.

The finding of previous caesarean section influencing preference for caesarean deliveries for current pregnancy aligns with the findings of Lokko, (2018) in Ghana where women with a previous caesarean birth were more likely to prefer same for their current pregnancy. Also, Bam et al., (2021) also reported from their study in Ghana that, a woman's history of caesarean section and knowledge of the procedure influenced their decision and preference for caesarean birth. In India, Saxena et al., (2019) also found that women with a previous caesarean delivery had preference for caesarean section for current pregnancy to vaginal delivery which corroborates the findings of this study. In their study, Mahindra et al., (2022) reported among a groups of Indonesian that, pregnant women were more than 16 times likely to undergo a caesarean section for current pregnancy when there was a history of previous caesarean section. These are further supported by the findings of Dusabe et al., (2018) in Uganda where women with a history of caesarean section preferred to deliver their current baby through the same procedure.

The consideration of the factors that were independently associated with the preference of caesarean births are worth discussing as they provide a comprehensive view of maternal choice regarding their preferred mode of delivery. For instance, maternal age was reported in addition to having a previous caesarean section as one of the factors that influenced decision to accept elective caesarean section in Ghana (Bam et al., 2021). In addition, the findings of Lokko, (2018) showed that maternal age and education were influencing factors for having a caesarean delivery which agrees with the findings of this study. This is further supported by the findings of Manyeh et al., (2018) who found age, education and number of pregnancies of a woman to influence their choice of caesarean section for a current delivery. Alhassan, (2022) among other factors also reported that, maternal age was associated with caesarean deliveries and further supported by the findings of Welay et al., (2021) from Ethiopia.

In a meta-analysis by Islam et al., (2022) among 36 sub-Saharan African countries reported findings that support the influence of maternal education on preferring caesarean births. In their findings however, education of partner and average income were significant factors in influencing caesarean births which were not found by this study. In Bangladesh, the findings of Ahmed et al., (2022) confirms the finding that maternal age influenced caesarean section. Shi et al., (2016) and Loke et al., (2015) report from their various studies in China that, the age of women was associated with their preference for caesarean births. The findings of Chelangat et al., (2021) from Kenya also confirms the finding that, maternal education influenced maternal preference for a particular mode of delivery. The findings of Saxena et al., (2019) confirms the influence of education on preferring a caesarean section but disagreed with age as found in this study.

The association of maternal knowledge from this study is incongruent with the findings of Ansah, (2018) who found high knowledge to be associated with caesarean section preference among women in Cape Coast, Ghana. According to Afaya et al., (2018), the preference for caesarean section was influenced by maternal knowledge of the indications and perceived consequences of the procedure and is further confirmed by Dorkenoo & Abor, (2021) who reported that mothers with adequate knowledge on caesarean section procedures and risks were more likely to undergo one. A study by Matemanosak & Suwanrath, (2021), although confirms the influence of age, their findings suggested that, inadequate knowledge levels influenced preference for caesarean section which is contrary to the findings of this current study. Poongodi & Renuka, (2020) did not find any association between maternal knowledge and preference of caesarean section in India as found in this current study.

The foregoing discussion shows that, although the study identified history of caesarean section from the adjusted regression model to influence preference for CS, the other factors from the unadjusted analysis are important in ensuring a holistic approach to improving the effective utilization and prioritization of caesarean section as an important maternal health intervention. It is of utmost importance therefore, for health workers to consider the age, educational level as well as the obstetric history of antenatal mothers during counselling and health education. Additionally, pragmatic efforts and steps should be taken to influence the knowledge, attitudes and perceptions of antenatal mothers to rightly align their mode of delivery preferences for positive birth outcomes.

5.6 Contribution to Knowledge, Strengths and Limitations

The study was based on the researcher's conceptualization of interacting factors including socio-demographic, obstetric, knowledge, attitudes and perceptions of antenatal mothers to influence their preference of caesarean deliveries at the 37 Military Hospital. The study findings clearly indicates that, maternal preference for caesarean section can be influenced independently by these factors or an interplay of them. The study used a purposive sampling technique to select antenatal mothers within their third trimester of pregnancy in order to control for selection bias. The study was conducted among antenatal mothers in the 37 Military Hospital in the Greater Accra region. This can therefore, limit the study findings as the situation may be different from other hospitals and health facilities in the Greater Accra region and other parts of the country.

Additionally, the study measured the preferred mode of delivery and this may vary from the actual mode of delivery when their time is due. The study used a semi-structured questionnaire and had the proclivity of recall bias. This was however, controlled by ensuring that the questions were basic and easy to understand after being pretested in a similar facility in Accra. These limitations notwithstanding, the study provides useful information on the maternal factors that influence the preference of caesarean deliveries at the hospital as well as the knowledge, attitudes and perceptions of antenatal mothers about caesarean section.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the summary of the study and the conclusions drawn based on the data used in answering the research questions. It also includes the recommendations made based on the findings of the study.

6.2 Summary of the Study

The study was conducted to determine the factors that influenced the caesarean deliveries among antenatal mothers at the 37 Military Hospital in the Greater Accra region of Ghana. The study used a cross-sectional design to answer the research questions. Data collection were through the review of delivery registers as well as from 409 antenatal mothers and 29 health workers. The study found that, 30.3% of the antenatal mothers had ever had a caesarean delivery before. Also, 27.1% of the women indicated a caesarean section as their preferred mode of delivery for their current pregnancy. Maternal reasons for preferring caesarean section were maternal request (48.6%), previous CS (41.4%) and health reasons (10%). The trend of total caesarean deliveries from the study was declining.

The study revealed that, 67.2% of the antenatal mothers receiving care at the 37 Military Hospital had adequate knowledge on caesarean section. It was also revealed that, 75.1% of antenatal mothers had positive attitudes towards CS deliveries. Among the ANC mothers,

57.2% had positive perceptions of caesarean section. The findings of the study also showed that, majority of health workers perceived antenatal mothers to be knowledgeable on caesarean section but indicated that the women had neutral attitudes towards caesarean section. The perception of health workers on caesarean section was also positive.

Maternal age, education, number of pregnancies, number of deliveries, history of caesarean section, adequate maternal knowledge, positive maternal perceptions were independently associated with caesarean deliveries among antenatal mothers receiving care at the hospital in bivariate analysis. From the adjusted logistic regression model, women with a history of caesarean deliveries and number of pregnancies were found to significantly influence election of caesarean deliveries.

6.3 Conclusion

Caesarean deliveries remain an important maternal health intervention to promote positive pregnancy outcomes in Ghana. Although, the level of caesarean section election among pregnant women was observed to be considerably high, the influencing factors were having a history of emergency or elective caesarean delivery as well as the number of pregnancies. Generally, total caesarean deliveries were declining although emergency CS was on the increase. Also, despite maternal knowledge, attitudes and perceptions being positive among antenatal mothers, intentional efforts are needed to further improve these factors among pregnant women during antenatal through the provision of accurate health information. Women should also be adequately counselled for opting for vaginal delivery when it is possible.

6.4 Recommendations

Based on the study findings, the following recommendations were made;

1. Health workers should adequately counsel antenatal mothers on modes of deliveries to make informed choices. This will help reduce the high level of caesarean deliveries among mothers at the 37 Military Hospital.
2. Health workers should ensure the provision of adequate accurate information on caesarean section including risks and complications as well as procedures during health education sessions at the hospital to improve knowledge, attitudes and perception of the women on caesarean section.
3. Health workers should use innovative approaches including social media and peer influence approaches as additional medium of disseminating health information to pregnant women.
4. Hospital management should hold continuous orientation and in-service training for health care providers on CS in order to adequately support women through appropriate counselling on birth options during provision of care.

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APPENDIX

Tool for records review (Retrospective Analyses)

Year	Cases				Indicat					
	Total Del	**Total CS**	**Elective CS**	**Emergency CS**	**Prolonged (obstructed) labour**	**Previous CS**	**Pre eclampsia**	**Poor Foetal Heart rate**	**Maternal medical condition**	**Abnormal Presentatio**
2017										
2018										
2019										
2020										
2021										

Informed Consent Form

Title: Factors Influencing Caesarean Deliveries at the 37 Military Hospital, Accra

Principal Investigator: Matilda Ama Sorkpor

Address:

General Information about Research

The study is to determine the prevalence rates, trends and factors that influence caesarean deliveries at the 37 Military Hospital in the Greater Accra Region of Ghana. The study will involve an enquiry into the knowledge, attitude and perceptions of women on caesarean deliveries. Participants will be engaged for about 15 to 25 minutes to respond to set of questions to allow the research come up with the factors that contribute to caesarean deliveries at the hospital. The study will not involve any invasive experiments but will only be responding to set of questions which will mostly require short answers.

Possible Benefits

There will be no direct remuneration for participating in the study. The findings will however, contribute to improving caesarean deliveries and maternal and newborn care as a whole. This will help to prevent bad outcomes of pregnancies and ensure that, women in need of the right interventions get them.

Confidentiality

There has been put in place measures to ensure that, the information you provide for this study will be kept confidential. In collecting the information, no personal identifiers that can link you to the information provided will be collected. Also, your name will not be indicated on an of the forms to ensure complete anonymity. All information provided will only be used for the purpose to achieving the study objectives. The information will not be shared with any other person or institution. The collected information will be kept under lock and key and soft copies secured with passcodes which will be exclusively available to the investigator.

Compensation

There will not be any form of compensation in cash or in kind in any way.

Voluntary Participation and Right to Leave the Research

Participation in the study is voluntary. You are at liberty to decline or withdraw from the study at any moment you want to do so. Your decline or withdrawal will in no way affect the kind of care and treatment you will receive at the hospital.

Contacts for Additional Information

In the course of your participation, should you have any concerns or questions, you can reach the principal investigator on the details provided below

Name:

Contact:

Your rights as a Participant

This research has been reviewed and approved by the 37 Military Hospital Institutional Review (37MH-IRB). If you have any questions about your rights as a research participant you can contact the IRB Office between the hours of 7:30am-2:00pm through the mobile phone 0591759506 or email addresses: irbmilhosp@gmail.com

Volunteer Agreement

The above document describing the benefits, risks and procedures for the research titled, factors influencing caesarean deliveries at the 37 military hospital, Accra has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate as a volunteer.

_____ _____

____

Date Name and signature or mark of volunteer

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered and the volunteer has agreed to take part in the research.

_____ _____

Date Name and signature of witness

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

_____ _____

Date Name Signature of Person Who Obtained Consent

Semi-structured questionnaire for ANC women.

SN	Variable	Responses	Entry Code
A.	***Socio-demographic***		
1	Age (completed years)	….....years	age
2	Locality	….....	loc
3	Marital status	[0] Not married [1] Married	mstat
4	Educational level of mother	[0] No formal education [1] Basic [2] Secondary/Vocational/Technical [3] Tertiary	edum
5	Employment status	[0] Not employed [1] Employed	emp
6	Religious affiliation	[0] Non-affiliated [1] Christianity [2] Islam [3] Traditional [4] Other groups	rel
7	Educational level of husband or partner	[0] No formal education [1] Basic [2] Secondary/Vocational/Technical [3] Tertiary	eduh
8	Access to computer	[0] No [1] Yes	acco
9	State of Family income	[0] <GHC500 [1] GHC500-1000 [2] GHC1001-1999 [3] GHC2000+	sfam
B.	***Obstetric history***		
10	Total number of pregnancies	….....	nprg
11	Total number of deliveries	….....	del
12	Number of living children	….....	livc
13	Ever had miscarriage/still births	[0] No [1] Yes; Number….....	mstb
14	Ever had a caesarean section	[0] No [1] Yes; Number….....	hcs

15	What case was it?	[0] N/A [1] Emergency [2] Election	csc
16	What was the reason (indication) for your previous CS)	[0] Don't know [1] Non-reassuring foetal heart rate [2] Maternal medical condition [3] Maternal request [4] Abnormal presentation [5] Physician advice [6] Placental complication [7] Bleeding (Antepartum haemorrhage) [8] Infections or diseases [9] Other complications ….....	ind
17	What was your experience with previous CS	….....	exp
18	How would you describe your experience	[0] Negative [1] Positive	dex
C.	***Knowledge on CS*** *(Where* 1 – Strongly disagree, 2 Disagree, 3 - Neutral, 4 – Agree and 5 – Strongly agree)		
19	Caesarean section is conducted to save the life of the mother and child	[0] No [1] Yes	knw1
20	Vaginal delivery is possible after caesarean section.	[0] No [1] Yes	knw2
21	Caesarean section always requires blood transfusion*	[1] [2] [3] [4] [5]	knw3
22	Caesarean section is reasonable for breech presentations	[1] [2] [3] [4] [5]	knw4
23	Infections and complications usually occur after caesarean section	[1] [2] [3] [4] [5]	knw5
24	Caesarean section is very safe for the baby	[1] [2] [3] [4] [5]	knw6
25	There is less bleeding in caesarean section than vaginal delivery	[1] [2] [3] [4] [5]	knw7
26	Caesarean section is less painful	[1] [2] [3] [4] [5]	knw8
D.	***Attitude towards CS*** *(Where* 1 – Strongly disagree, 2 Disagree, 3 - Neutral, 4 – Agree and 5 – Strongly agree)		
27	Caesarean section is not natural and an acceptable method	[0] No [1] Yes	att1

28	Caesarean section should be done when vaginal delivery is risky	[1] [2] [3] [4] [5]	att2
29	With or without complications, I would never request caesarean section*	[1] [2] [3] [4] [5]	att3
30	I believe mothers should have the right to request for caesarean section	[1] [2] [3] [4] [5]	att4
31	Caesarean section prevents deformation of the female genital area	[1] [2] [3] [4] [5]	att5
32	I do not have any problem undergoing caesarean section when necessary	[1] [2] [3] [4] [5]	att6
33	I don't like caesarean section because of the abdominal scars*	[1] [2] [3] [4] [5]	att7
34	How do you generally feel about caesarean section?.....		att8
E.	***Perceptions towards CS***		
35	Caesarean section has bad consequences	[0] No [1] Yes	per1
36	Infants born by caesarean section are more intelligent than vaginal delivery*	[0] No [1] Yes	per2
37	Having caesarean birth does not conform to culturally inspired motherhood and child birth	[1] [2] [3] [4] [5]	per3
38	I can use caesarean section to get a desired day or date of birth	[1] [2] [3] [4] [5]	per4
39	Can you further describe your general perceptions towards caesarean section?	….....	per5
F.	***Expected mode of delivery for current pregnancy***		
40	What is your preferred mode of delivery for your current pregnancy	[0] Caesarean Section [1] Vaginal delivery	mdel
41	What is/are reason (s) for the preferred mode of delivery	….....	rmde

Semi-structured Questionnaire for health workers

SN	Variable	Response
	Background of Healthcare provider	
2	Cadre of care provider	[0] Medical officer/Doctor/Obstetrician Gynaecologist [1] Midwife [2] Anaesthetics
3	Total number of working years as care provider	……..
4	Length of working at 37 MH	…….
	Indications for CS??	
6	What are the main reasons for CS among clients at this facility (Indicate in order at least the 5 most occurring ones)	
7	How would you describe the knowledge and attitude of pregnant women towards CS	Knowledge….. …….. Attitude …. ……..
	Health workers' Perception on CS (Rate based on the following responses 1 – Strongly disagree, 2 Disagree, 3 - Neutral, 4 – Agree and 5 – Strongly agree	
8	Caesarean section births should only be indicated for medical or clinical reasons	[1] [2] [3] [4] [5]
9	It is important to counsel mothers before granting them CS on request	[1] [2] [3] [4] [5]
10	I prefer caesarean section to vaginal delivery for pregnant women	[1] [2] [3] [4] [5]
11	Infants born by caesarean section are intelligent than vaginal delivery*	[1] [2] [3] [4] [5]
12	Having caesarean birth does not conform to culturally inspired motherhood and child birth	[1] [2] [3] [4] [5]
13	Caesarean section can be used to get a desired day or date of birth for the child	[1] [2] [3] [4] [5]

Timelines (Year :2022)

Month/Activity	**May-July**	**August**	**September**	**October-December**
Preparation of drafting of proposal				
Submission and approval for ethical clearance				
Data collection				
Data analysis				
Writing report and submission				

Budget and Budget Justification

Stage	**Activity**	**Quantity**	**Unit cost**	**Total (GHC)**
Proposal	Printing (pages)	45	0.60	**27**
	Binding	2	4	**8**
	Ethical clearance	1	100	**100**
Data Collection and analysis	Printing of questionnaires	450	1	**450**
	Data collectors	2	200	**400**
Final report	Printing	4	150	**600**

Miscellaneous				**500**
Total (GHC)				**2,085**