FACTORS ASSOCIATED WITH MATERNAL COMPLICATIONS AMONG
WOMEN WHO DELIVERED AT THE PRESBYTERIAN HOSPITAL, AGOGO

BY

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DECLARATION

I, Belinda Maal-Ire Bulley, declare that except for the other people’s investigations which have been duly acknowledged, this work is the result of my own original research and that this dissertation, either in whole or in part has not been presented elsewhere for another degree.

…………………………… Date …………………………….

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------------------------------- Date …………………………….

Dr. Patricia Akweongo
(Supervisor)
DEDICATION

This work is dedicated to the blessed memory of my beloved father, Mr. Octavio Bulley.
ACKNOWLEDGEMENT

I am grateful to God Almighty for his grace and mercies to see to the successful completion of this programme. I am also thankful to my supervisor, D.r Patricia Akweongo for her contributions and constructive criticisms.

I would like to extend my appreciation to the General Manager and staff of Presbyterian Hospital, Agogo, for granting me the opportunity to use the hospital as the study area.

To my beloved husband, Kofi Dadzie, I appreciate your fervent support and encouragement.

I am also grateful to my family and friends for their prayers and motivation.
ABSTRACT

Introduction: Many women die as a result of pregnancy and delivery-related complications and most of these deaths occur in sub-Saharan Africa as a result of preventable circumstances. It is believed that factors such as maternal age, parity, gravida, ANC attendance, decision to seek health care at the onset of complication and the availability of prompt care are associated with maternal complications.

Literature suggests that the quality of care for maternal complications is woefully inadequate especially in lower-income settings thereby worsening the complications which could either result in near misses or maternal mortalities.

Treating maternal complications is also a major cost to women and their households since treatment sometimes exceed their disposable income. This impoverishes most of them and results in a high rate of absconders and abandonment of mothers at the health facilities by their families.

The aim of the study was to determine the proportion of women that developed complications during delivery and the factors contributing to maternal complications. The study also sought to determine the perception of care and cost to patients for treating maternal complications at the Presbyterian Hospital, Agogo.

Methods: A cross-sectional study was conducted at the Presbyterian Hospital, Agogo from June 01- June 30, 2019, where the delivery register was reviewed to identify socio-demographic and obstetric factors of women who delivered in 2018. In-depth interviews were also conducted with women on admission and health professionals at the obstetrics/gynaecological department to obtain information on the perception of care and direct cost of maternal health services. For quantitative data obtained, the univariate analysis of categorical variables was presented in frequencies and proportions. Multiple logistic
regression analysis was used to determine the association between independent variables and maternal complication. Logistic regression was done to determine individual factors associated with maternal complications. Qualitative data was analysed under broad themes in line with the research objectives; perception of maternal care and cost of treating maternal complications.

**Results:** From this study, it was found that 57 (16.8%) of the 340 women who delivered at the hospital developed one form of maternal complications. One maternal death and 4 stillbirths were identified. Maternal Mortality Ratio of 298 deaths per 100,000 live births and Maternal Complication of 169 cases per 1,000 live births were recorded in the study. The most diagnosed maternal complication was postpartum haemorrhage with 17 (29.8%) cases. Risk factors of maternal complication were caesarean section in current pregnancy [aOR 95CI:0.07 - 0.3134] and multiple births [aOR 95CI:1.16 - 27.34]. Hepatitis ‘B’ was found to be the leading known medical condition among mothers in the study. Patients who delivered at the hospital perceived quality of care to be high but complained about the cost involved in treating maternal complications especially when they had registered with the National Health Insurance Scheme.

**Conclusion:** Factors associated with maternal complications are multiple births and delivery via caesarean section. Even though patients perceived the quality of care to be good in terms of promptness of care and good interpersonal relationship, the cost of accessing maternal care in health facilities poses a challenge. Policy makers should be put in place to make maternal care financially accessible especially for mothers with low socioeconomic status.
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<td>Antenatal Care</td>
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<td>aOR</td>
<td>adjusted Odds Ratio</td>
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<td>APH</td>
<td>Antepartum Haemorrhage</td>
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<td>CI</td>
<td>Confidence Interval</td>
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<td>Caesarean Section</td>
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CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Maternal complications and maternal morbidities are used interchangeably to refer to health problems related to pregnancy and childbirth. The complication could set in during pregnancy (severe complications of pregnancy), during childbirth (obstetric labour complications) or after delivery (puerperal disorders). About nine million women worldwide experience some form of pregnancy-related complications annually (Cecatti et al., 2011) and most of these complications lead to maternal deaths particularly in low and middle-income countries where most women do not receive adequate obstetric care (Tunçalp, Hindin, Adu-Bonsaffoh, & Adanu, 2013).

Maternal complications are ranked according to the level of severity with Severe Maternal Outcome (SMO) being either a near miss or mortality. Severe maternal morbidity relates to a wider classification of women who develop pregnancy-related complications but did not involve critical illness management such as blood transfusion (Norhayati, Surianti, & Nik Hazlina, 2015). A maternal near miss is surviving a life-threatening condition during pregnancy, delivery, after delivery or forty-two days after an abortion which could have resulted in death (World Health Organization, 2011). Some of the maternal complications include obstetric haemorrhage, pregnancy-related infection, abortive outcome and hypertensive orders (Oladapo et al., 2016). Even though pregnancy poses some level of risk of complications for any woman, studies show that lower and higher maternal ages, medical conditions such as diabetes or previously diagnosed medical conditions, previous caesarean section, high parity and poor ANC attendance could
contribute to complications in pregnancies and deliveries (Goffman et al., 2007; Purandare, 2013).

Maternal near-miss has become another measure of improvement in maternal health because its occurrence is more frequent than maternal deaths. According to Purandare (2013), developing countries use maternal near-miss to obtain a wider and comprehensive understanding of the shortcomings in the health system with regards to obstetric care and provide reliable remedies to prevent future occurrence. The World Health Organization (2011) developed a near-miss approach for the evaluation of the quality of care for severe pregnancy ill-health where near misses were categorized according to clinical-based, management-based and organ dysfunction. Tunçalp et al. (2013) grouped maternal near-misses according to identification criteria, near-miss by region, organ dysfunction and mixed criteria.

Quality care for maternal complications could prevent progression to maternal mortality. According to Saxena, Srivastava, Dwivedi, & Bhattacharyya (2018), gaps in quality of care existed essentially in delivery and post-partum stages. Pirkle, Dumont, & Zunzunegui, (2011) posit that poor quality of care can lead to maternal mortality both directly (inappropriate medical practice) and indirectly (delayed health service utilization). Poor women are likely to suffer a double burden of lower facility utilization and poor quality of care (Larson, Vail, Mbaruku, Mbatia, & Kruk, 2016).

In Ghana, maternal morbidities appear to be on the increase despite significant interventions geared towards improving maternal health. A study by Tunçalp et al. (2013) in urban Ghana indicate the incidence of potentially life-threatening conditions is 157 cases per 1000 live births and maternal near-miss of 28.6 cases per 1000 live births. Addressing factors that contribute to
complications during childbirth could go a long way to improve the health of women and their unborn babies.

1.2 Problem Statement

Globally, the lives of about 350,000 and 500,000 women are lost as a result of pregnancy-related complications (Haliq, 2015). Ghana had a high maternal mortality ratio of 319 per 100,000 live births as at 2015 and thus could not attain the Millennium Development Goal (MDG) five (5) of reducing by three-quarters of maternal deaths. Many of these deaths and complications occur among women residing in remote and poorer communities. A number of interventions have been initiated by successive governments in Ghana to improve maternal health through free antenatal care (ANC), free delivery and free NHIS registration for pregnant women. These measures have yielded some positive results, but not up to expectation. Surviving a maternal complication presents emotional and social implications as some women suffer from one form of disability or the other. The cost of treating obstetric complications also poses a possible major financial burden on women and their families (Borghi et al., 2003; Dalaba et al., 2015; Quayyum, Nadjib, Ensor, & Sucahya, 2010). Some patients are not also satisfied with the quality of care provided especially in public health facilities for the management of the complications through compromised patient safety, inadequate clinical care and sometimes demand payments without receipts (Saxena et al., 2018) which result in further deterioration of their conditions.

The Asante Akyem North District of Ghana where this study was conducted has been recording high maternal mortality rates in the past years (i.e. 152 deaths per 100,000 lives in 2016, 277 deaths per 100,000 live births in 2017 and 482 deaths per 100,000 live births in 2018) with absolute figures of 4 deaths in 2016, 7 deaths in 2017 and 11 deaths in 2018. The Ashanti
Region has also seen an increase in institutional maternal mortality rate from 139 deaths per 100,000 live births in 2017 to 184 deaths per 100,000 live births in 2018 (Osei, 2019).

Studies in Ghana on factors contributing to maternal morbidities are also mostly limited to urban areas. For instance, Tunçalp et al (2013) recorded 157 cases of potentially life-threatening conditions per 1000 live births and maternal near-miss of 29 cases per 1,000 live births in a study in Accra, while Peprah (2016) also recorded about 33 cases of severe maternal complications per 1,000 live births in two health facilities in Kumasi.

This study seeks to assess the factors associated with maternal complications among women who delivered in Presbyterian Hospital, Agogo which is a rural health facility in the Ashanti Region and serves as the major referral facility for the three districts in the Asante Akyem area and beyond mostly for obstetric care. The study also explored the financial burden that obstetric complications pose to poor and underprivileged households and the perception of the quality of maternal care.

1.3 Objectives of the Study

1.3.1 General Objective

To assess factors associated with maternal complication among women who delivered at Presbyterian Hospital, Agogo.

1.3.2 Specific Objectives

The specific objectives of the study are:

- To determine the proportion of women with obstetric complications
- To know the factors that account for obstetric complications
• To explore patients’ perception of care for maternal complications
• To explore the perception of financial cost of treating maternal complications

1.4 Research Questions

• What proportion of women develops complications in Presbyterian Hospital during delivery?
• What factors account for obstetric complications?
• What is the patient perception of care for maternal complications in Presbyterian Hospital, Agogo?
• What are the costs to patients for treating maternal complication?

1.5 Justification of the Study

Most of the maternal complications result in deaths and so identifying factors that contribute to maternal complications could be a way achieving Sustainable Development Goal 3.1 of reducing maternal mortality ratio to less than 70 per 100,000 live births by 2030. The study findings will provide relevant information for major stakeholders to address the risk factors identified and also put in strengthening mechanisms to improve the health of pregnant women. The study will also provide insights on different aspects of quality improvement to be strengthened in Presbyterian Hospital to make it a hub for obstetric care within the district and the region in general.
The framework seeks to explain the contributory factors of maternal complications which could result in a near miss or even death. Complications in pregnancy can in one way or the other be ascribed to factors related to the pregnant woman such as her maternal age, number of pregnancies, and ANC attendance. Awareness and understanding of complications and risk factors of pregnancy and the ability to pay for intervention can also complicate one’s health. For instance, if a pregnant woman has no knowledge about danger signs in pregnancy, she may not be able to detect any complication. If the condition worsens and there is a problem of inadequate funds for medical bills -for those who are uninsured- and other non-medical expenses such as transport and feeding, she is likely to stay home until the situation gets out of hand. The delays in the referral processes identified by Thaddeus & Maine (1994) can also contribute to maternal
complications particularly the first (i.e. delays in making the decision to seek health care) and the
third forms of delays (i.e. delays in receiving appropriate care at the health facility). Past history
of significant medical conditions such as obesity, hypertension and prior caesarean sections can
also contribute to maternal complications. The availability of emergency obstetric care,
blood/blood products, life-saving medicines and qualified and highly motivated health
professionals can affect the condition of women who are rushed to the hospital as a result of
pregnancy-related complications. The effects of maternal complications are enormous from
financial, emotional to reduced quality of life.

It is well known that the socio-demographic characteristics and medical conditions of a pregnant
woman could result in complications. Older women and very young women are likely to suffer
maternal near misses (Goffman et al., 2007). A study by Purandare (2013) indicated that 61.2%
of maternal near-miss cases occurred in women who did not receive effective ANC. The
expenditure on treating maternal morbidities is very high which sometimes discourages women
and their families from utilizing emergency obstetric service (Borghi et al., 2003; Dalaba et al.,
2015; Quayyum et al., 2010).
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction
This chapter reviews literature related to maternal health complications, the possible factors associated with maternal health complications, cost of treating maternal health complications as well as the perception of the quality of care by women who had experienced complications during childbirth.

2.2 Maternal Health Complications
Many definitions have been ascribed as a result of trying to conceptualize maternal complications. In order to fully understand the term maternal complication, there is the need to distinguish between maternal morbidity and maternal complications which are closely related terminologies in maternal health. Sikder et al. (2014) broadly defined maternal morbidity as any ill-health or condition experienced during pregnancy, delivery or 42 days after delivery and further indicated that morbidity could be non-complicated, complicated or a near-miss. Koblinsky, Chowdhury, Moran and Ronmans (2012) argue that maternal morbidities are not always significantly life-threatening conditions but could have adverse effects on the quality of lives of women. Firoz et al., (2013) share similar thoughts and added that the causes of maternal morbidities are complex and diversified depending on the duration, seriousness and the general types of diagnosis. It could, therefore, be inferred that the acute form of maternal morbidities is mostly referred to as obstetric/maternal complications.

Most of maternal deaths are as a result of complications due to pregnancy-related conditions with WHO (2015) indicating that about 830 women worldwide die needlessly on a daily basis due to
maternal complications. Developing countries with their weak health systems and poor health resources are the worst affected with a woman dying from childbirth-related complications each minute in estimation (UNICEF, 2009).

Maternal complications could either be classified according to pregnancy outcomes or induced abortions or miscarriage (WHO, 2009). Complications by birth outcomes (live birth/ stillbirth) are postpartum haemorrhage, eclampsia, sepsis and obstructed labour while complications by induced abortions or miscarriages include haemorrhage and sepsis. Hoque, (2011) includes cord prolapse, retained placenta, prematurity delivery as some forms of obstetric complications.

In assessing key complications associated with maternal mortalities based on WHO analysis, Khan, Wojdyla, Say, Gülmezoglu, & Look, (2006) identified fevers/lower abdominal pain or puerperal sepsis, haemorrhage, convulsions, ruptured uterus and prolong labour as the leading direct causes of deaths while complications from malaria, HIV/AIDS, Tuberculosis, severe anaemia and heart conditions were considered as indirect causes of maternal deaths. Going further, they asserted that haemorrhage is the leading cause of maternal deaths in low-income settings, hypertensive disorders predominately higher among Southern Americans and the Caribbean. In advanced countries, complications of anaesthesia and caesarean sections were identified as the leading causes of maternal deaths. According to Say, Chou, Gemmill, Tuncalp, Moller…Alkema (2014), haemorrhage, hypertensive disorders and sepsis account for more than 50% of maternal mortalities globally. Interventions for managing maternal complications include caesarean sections, hysterectomy, blood transfusions, repair of lacerations, vacuum extractions, intensive care management among others depending on the severity of the condition (Darcha, 2015; Firoz et al., 2013).
A near miss literally means experiencing a life-threatening maternal complication which could have almost resulted in death but was survived (Dalaba et al., 2015; Koblinsky et al., 2012; Nelissen et al., 2013). In order for a case to be considered a near miss, WHO (2011) recommends organ-system dysfunction, disease-specific and intervention specifics as criteria. This classification has been criticized as a result of its practicality, especially in developing countries. For instance, Nelissen et al. (2013) in a study in a rural referral facility in Tanzania reported that all criteria were not met in their classification of near-miss and proposed the lowering of some thresholds such as the number of blood transfusions.

2.3 Factors Associated with Maternal Complications

The causes of complications cannot be associated with a specific factor as they occur mostly under unpredicted circumstances and are mostly presented as emergencies (Filippi, Chou, Ronmans, Graham, & Say, 2013). Being pregnant alone, therefore, puts a woman at risk of complications in the first place. Certain conditions are however considered as risk factors of maternal complications and have been classified under patient factors and facility factors.

2.3.1 Patients Factors Associated with Maternal Complications

The patient factors consist of the socio-demographic characteristics of the woman, economic, biological factors, health-seeking behaviours and previous health conditions which could constitute a risk in pregnancy and childbirth.

Socio-Demographic Factors

Many studies relate socio-demographic characteristics in the analysis of risk factors associated with women with complications. Factors such as maternal age, marital status, educational background, economic status and religion sometimes play a role in complications. According to Sikder et al., (2014) teenage mothers are more likely to experience acute maternal outcomes as
well as women who are thirty-five (35) years and above at the time of pregnancy or childbirth. Najati & Gojazadeh (2010) specifically indicated in a study involving 186 mothers less than 18 years that maternal age under 18 years is a risk factor for both maternal and neonatal complications. A cross-sectional study in Japan by Ogawa et al. (2017) also found that maternal age of 45 years and above was highly associated with the risk of severe birth outcomes particularly among women who conceived naturally. Callaghan, Mackay, & Berg, (2008) also reported that very young and old reproductive ages experienced severe maternal complications especially among black women in a study in the United States involving the review of National Hospital discharge survey from 1991 and 2003. In Nigeria, using a prospective case-control study in a university teaching hospital, it was found that a greater proportion of near misses were recorded among women aged 40 years and above compared to the controls (Adeoye, Onayade, & Fatusi, 2013).

Socioeconomic and education status of women and their households could also contribute to maternal complications. It is therefore not strange that maternal mortality rates are unacceptably high in Sub-Saharan Africa but very low in advanced economies (WHO, 2015). Women who are not economically sound, no education and less empowered are unlikely to use maternal health services such as family planning, ANC and skilled delivery which account for complicated pregnancies and childbirth (Darcha, 2015; Pembe et al., 2009; Turab et al., 2013; UNICEF, 2009). In a study involving thirty-one (31) developing countries, Ahmed, Creanga, Gillespie, & Tsui (2010) found that women who had completed primary education were five times more likely to have supervised deliveries compared to the least educated ones. Women with some level of education were also 3 times and twice likely to visit antenatal clinics and use modern contraceptives respectively compared to their less-educated counterparts. Pembe et al., (2009) in
research in rural Tanzania involving 1,118 women interviewed for potentially life-threatening maternal complications asserted that women with secondary or higher levels of education had an increased likelihood of awareness of obstetric danger signs compared to women with little or no education. Many studies have also reported similar findings hence improving maternal health goes beyond just providing health services but also encouraging female education and economic empowerment particularly in the rural communities in developing countries where total fertility rates are high (GMHS, 2017).

A case-control study in Western Kenya by Liambila & Kuria, (2014) involving 294 cases of maternal complications and 291 controls however established no association between demographic and socio-economic factors and the risk of experiencing obstetric complications.

**Antenatal Care Visits for Improved Maternal Health**

One of the ways of improving maternal health is the promotion of antenatal care visits among pregnant women in order to educate them about their current health conditions, provide some basic information on danger signs of complications and nutrition (UNICEF, 2009). It is recommended that pregnant women attend ANC at least four (4) times but this is mostly not the case especially in low-resource settings where attendance is low which increases the risks of developing pregnancy-related morbidities. A retrospective cohort study involving 2,706 women on admission as a result of labour pains from January to December 2007 in South Africa showed that women who did not attend ANC suffered childbirth complications which were 1.8 times more than those who had ANC services for four or more times (Hoque, 2011). A prospective study in Nepal Medical College Teaching Hospital with 322 women who delivered, the perinatal mortality rate was found to be 16 times higher in women who did not attend ANC compared to those who had more than 4 visits (Tuladhar & Dhakal, 2011). There is therefore the need to
promote ANC visits by identifying barriers such as distance from a health facility and advocacy for the importance of the visits as Tuladhar & Dhakal (2011) indicated that women who lived very far from a health facility are less likely to utilize ANC as a result of transport costs and loss of productive hours.

Many countries are making conscious efforts to make ANC attractive by making them free of charge. In Ghana, free ANC has somehow increased ANC attendance as depicted in the 2017 Maternal Health Survey where ANC attended by skilled personnel stood at 98%. A study in Tamale Teaching Hospital by Darcha (2015) also revealed that only 0.3% of the study participants did not attend ANC with 4 or more visits rated at 85.9%. Inasmuch as ANC coverage is increasing, there are some concerns on the quality of services rendered. For instance, Pembe et al., (2009) reported that even though most women in rural Tanzania attended ANC, their knowledge of danger signs of complications was low.

**History of Medical Conditions**

Women who have chronic diseases are also prone to complications during pregnancy and childbirth. A prospective case-control study by Adeoye et al. (2013) in some selected teaching hospitals in Ille Ife in Nigeria between July 2006 and July 2007 posit that hypertension is a major cause of severe maternal morbidities and called for the need to find strategies to avert the recent rise in the burden of non-communicable diseases. Similarly, a cohort study by Drenthen et al. (2010) involving 1,302 pregnant women with congenital heart disease (CHD) indicated that maternal and neonatal complications were commonly associated with women with CHD. Women with Polycystic Ovarian Syndrome (PCOS) were mostly diagnosed with gestational diabetes mellitus and have a high risk of developing miscarriages (Palomba et al., 2015)
Obstetrics History Factors

The number of Parity and gravidity has been identified as risk factors for developing maternal complications. Gravida simply means the number of times a female is or has been pregnant irrespective of the pregnancy outcome while parity refers to the number of deliveries which could either be a live birth and stillbirth (Tidy, 2014). Findings by Hoque (2011) indicate that women who have not given birth before (i.e. primigravid, parity nil) are 12 times more likely to develop obstetric complications while grand multiparity women are five times at risks of developing complications during delivery. First-time pregnant women are at high risk of developing pre-eclampsia, delayed first stage of labour (though regarded as normal) and difficult labour while women with more than five births are likely to suffer from the abnormal fetal presentation and ruptured uterus (Tidy, 2014). 32.2% of obstetric complications were recorded among women delivering for the first time in a study by Darcha (2015). This is to indicate that due consideration should be given to such women to ensure their safety and their unborn babies against the risks identified.

Prior caesarean section is also a risk factor of maternal complications. In recent times, caesarean sections have been on the increase globally (Tadevosyan et al., 2019) with many raising health concerns especially in low-income settings where the safety of the procedure is deemed to be low. In a prospective observational study of 8,070 caesarean sections performed between January 1998 to June 2000 in Malawi, Fenton (2003) reported that the procedure accounts for major preoperative obstetric complications compared to advanced countries. A cross-sectional study by Litorp et al., (2014) in a teaching hospital in Tanzania involving 467 maternal near misses and 77 maternal deaths found that about 21% of them were as a result of caesarean section complications. This means that a pregnant woman who had already given birth through a
caesarean section is likely to develop complications since she may have sustained some complications in the previous procedure. There is, therefore, the need to ensure the reduction of unnecessary caesarean sections and also train health personnel on safety to prevent complications resulting from the procedure (Litorp et al., 2014).

2.3.2 Health Facility Factors Associated with Maternal Complications

Using the Thaddeus and Maine model, Knight, Self, & Kennedy (2013) posit that factors such as non-availability of essential medicines and equipment and poor human capital are mostly characterized in health facilities in low-income settings. A study by Combs Thorsen, Sundby, & Malata, (2012) highlight that more than half of the women faced one form of treatment delay when they arrive at the health facility. Instances such as lack of trained health workers, limited clinical documentation, missed diagnoses, insufficient communication among staff and the families, lack of blood and other services were identified.

2.4 Perception of Maternal Care in Health Facilities

Maternal health depends on the quality with which service is provided. In a low-income setting like Ghana, quality of care for maternal health is generally regarded as poor (Broek, 2015). According to Pirkle, Dumont, & Zunzunegui (2011), poor quality of care can lead to maternal mortality through unfitting medical practices and delayed health service utilization. Quality of care does not have a universally acceptable definition and is sometimes explained with factors such as patient care, health system and other areas such as safety of care and efficiency (Broek, 2015)

Pirkle et al. (2011) assert that efforts geared towards decreasing maternal deaths are primarily centered on improving the number of services provided at the expense of quality of the services rendered. Broek (2015) alludes the lack of attention to quality maternal health as a result of the
difficulty in determining indicators in terms of conceptualization and practicality. He further adds that the inability to achieve MDG 5 and the need to achieve SDGs in 2030 has drawn attention to quality in maternal care.

Maternal death reviews and criterion-based audits have been identified as the two ways of measuring the quality of maternal care (Broek, 2015).

A study by Tuyisenge & Luginaah (2015) on the perception of mothers and experiences of accessing maternal health care in Rwanda reveal that effective patient relationship by health professionals, provision of adequate information on the medical conditions of patients, prompt service delivery and effective management of medical conditions are some of the tenets of quality maternal care. According to Liambila & Kuria (2014), some women indicated that they were subjected to disrespect and abuses which are mostly linked to a higher propensity of developing maternal complications. Disrespect and abuse of women who seek maternal services are mostly physical and verbal abuses, care without consent, non-confidential care, non-dignified care, discrimination, abandonment of care and detention (Liambila & Kuria, 2014).

In conceptualizing quality of care, Tunçalp, Hindin, Adu-Bonsaffoh and Adanu (2012) grouped quality of maternal care into experience and provision of care. The experience of care is made up of provision of information to the client, good interpersonal relations and adequate health professionals and infrastructure. Provision of care as a dimension of quality consists of referral pathways, evidence-based guidelines and protocols and how maternal emergencies are managed. Quality of care is expected to lead to patient/client satisfaction and high tendencies of use of health services in later periods when needed.
2.5 Cost of Obstetric Care

In a bid to improve maternal health, many countries have put in interventions to make care financially accessible. For instance, Rwanda, Mozambique, Sierra Leone, Liberia, Ghana, Nigeria, Zambia, Lesotho, Burundi, Kenya and Niger are among countries in Africa which have made maternal health care free to some extent as at 2010 (Sikder et al., 2014).

Studies have indicated that the cost of maternal care mostly deters women and their families from using health facilities. Steele et al. (2019) conducted a retrospective study by reviewing maternity registers at St John Hospital in Lesotho, before (i.e. from January 2012 to December 2013) and after the removal user fees (January 2014 to June 2015). It was found that facility-based deliveries increased by 49% in a district hospital in Roma, Lesotho while neonatal deaths declined from 4.8 to 1.3 per 1000 live births.

Cost of illness can be classified under the perspective of patients and health facilities and the society (Shwe, Riewpaiboon, Chaikledkaew, & Youngkong, 2019). From patients’ dimension, cost of treatment entails direct medical and non-medical costs as well as indirect costs. Direct medical cost is made up of fees paid for drugs and other medical services in respect of the illness. Direct non-medical cost includes transportation, meals and accommodation for both patients and their relatives. Indirect costs constitute the time lost by patients during treatment and recovery and some form of disability suffered as a result of ill-health (Shwe et al., 2019). Health facilities consider the only direct medical cost associated with the treatment of health conditions while the societal cost is the combination of patients and the health facilities perspectives.
Ghana introduced a fee exemption for delivery programme for all women in 2004 with financial support from funds released from lower debt repayment (HERA, 2013). However, after 2007, women who were not active members of the NHIS paid for their delivery fees since maternal care exemption policy was fused in NHIS. Under the exemption package, pregnant women do not have to pay premium to encourage women to enroll onto the scheme. Maternal services such as ANC, delivery, caesarean section and PNC are free of charge (Anafi et al., 2018). The cost of free maternal health to Ghana health system has been classified under forfeited revenue to the NHIS as a result of premium exemption of pregnant women. According to the National Health Insurance Authority annual report, from 2008 to 2011, between 380,000 and 500,000 women were registered annually with NHIS under the exemption policy which constituted about 6% of the active NHIS membership (NHIA, 2012). There is also an increase in human resource costs, investment costs in infrastructure as well as increase in recurrent costs to meet increasing demand for maternal health.

In evaluating the free maternal health initiative, it is found that patients incurred some significant costs which resulted in the delay or non-usage of health facilities thereby resulting in pregnancy-related complications (Anafi et al., 2018; Dalaba et al., 2015). Using twelve (12) focus group discussions (FDG) and six interviews involving ninety women in six chosen communities in Accra, Ghana, Anafi et al. (2018) found that even though direct cost of delivery care was wholly free, cost relating to ANC and indirect cost of maternal care was for a fee which impeded the utilization of health facilities particularly for obstetric care.

In a cross-sectional study involving sixty women who had experienced maternal complication between February and April 2014 in the Kassena-Nankana District, Dalaba et al (2015) reported that women and their households incurred about 79% indirect cost which is not covered by the
free maternal health initiative. With the direct medical costs, patients sometimes incur cost due to shortage or non-availability of prescribed drugs and other services such as ultrasound and laboratory investigations.

2.6 Health belief model

The health belief model (HBM) was designed by the US public health researchers in the 1950s to provide explanation and predict health-related behaviours (Abraham & Sheeran, 2016). HBM asserts that people’s beliefs about health conditions, perceived benefits and barriers to actions and self-efficacy determines involvement in health improvement behaviours. The model is found to be important in modern times in the areas of health promotion and understanding of the utilization of health services including maternal care. It has five components mainly perceived severity, perceived susceptibility, perceived benefits, perceived barriers and self-efficacy. Many findings have been carried out using the perceived barriers to understand the utilization of health facilities by pregnant women. Perceived barriers according to the model refer to one’s assessment of impediments to behavioural change. It is believed that an individual may consider a health condition as serious with a potential of resulting in severe outcomes and also knows that a particular action has the tendency to minimize the anticipated threat. Certain barriers could deter involvement in health promotion behaviours. Costs, inconvenience, dangers signs of health behaviour and discomforts are perceived to be barriers. Onasoga, Osaji, Alade and Egbuniwe (2014) report that females in their reproductive years perceive non-awareness of services, attitude of health workers and financial accessibility as barriers to utilization of maternal health services in Bayelsa State in Nigeria. A study in rural Cambodia identified physical, cognitive, organizational, mental and socio-cultural factors as hindrances to women to patronize maternal health services by skilled professionals (Matsuoka, Aiga, Rasmey, Rathavy, & Okitsu, 2010). If
pregnant women perceive financial and geographical barriers to maternal health access, they would not seek medical care when they experience any form of complications and this can sometimes result in complications.

2.7 Summary

This chapter presented a review of the literature related to maternal complications. It brought to bear socio-demographic factors from the perspective of patients as well as health facilities that contribute to complications in pregnancies and childbirth. Most of the studies only reviewed single aspects related to maternal morbidities without comprehensive study on maternal morbidities such as risk factors, quality of care and cost of maternal complications which were dealt with in separate studies. This study, however, investigated risk factors, perception of financial cost of treating maternal complications and the perception of care from the perspective of patients.
CHAPTER THREE

METHODS

3.1 Introduction

This chapter provided information on the methods used to obtain and analyse data on factors associated with maternal complications among women who delivered in Presbyterian Hospital, Agogo.

3.2 Study Design

A descriptive cross-sectional study was carried out at the Presbyterian Hospital, Agogo. Both quantitative and qualitative approaches were employed in the study in order to fully address the research objectives. Quantitative data was obtained using a checklist which reviewed factors associated with maternal complications from the hospital’s labour register from January to December 2018. In-depth interviews were also conducted with patients and health professionals to elicit views and perceptions on the management and financial costs of maternal complications.

3.3 Study Area

The study was conducted at Presbyterian Hospital in the Asante Akyem North District (AAND) of the Ashanti Region of Ghana. According to the Ghana Statistical Service (2015), the district has an area of 1,126km² and a density of 70.63/km². The population is estimated to be 79,551 with one-half of the household population living in rural areas. Females constitute 51.2% of the total population with a Total Fertility Rate of 3.8 which is above the regional figure of 3.5. Women in Fertility Age is 19,092.

About 69% of the population aged 15 years and older are economically active. The main occupation of the employed population is skilled agricultural, forestry and fishing. The literacy rate among the population aged 11 years and above is 79.2%. Like many Ghanaian traditional
settings, women in Asante Akyem North district have limited autonomy regarding decision making on their own health. Most of their decisions are influenced by their husbands/partners and other male relatives, religious leaders and other elderly female relatives such as mothers in law and mothers (Peprah, 2016). This practice sometimes causes delays in seeking health care at the onset of complication as a result of the consultations required. The rural location of the study area makes them rely on herbal medications since they believe that herbal medicines have the potency to protect them and their unborn babies (Darcha, 2015).

Figure 2: Map of Asante Akyem North District
3.4 Study Site

Presbyterian Hospital, Agogo is the oldest mission hospital in Ghana established in 1931 with a bed complement of 250 and staff strength of 453 (with 25 doctors) currently. It is the major referral centre for the three districts in the Asante Akyem and beyond. Services include obstetrics/gynaecology, surgery, internal medicine, ophthalmology, dental, accident and emergency etc.

Maternity services include antenatal care, postnatal care, labour ward, pharmacy, a lie-in and 24-hour theatre services. In 2018, the hospital recorded 2,278 supervised deliveries, 85 stillbirths, 1,435 ANC registrants, 2,365 postnatal registrants and 11 maternal deaths (DHIMS II, 2019).

3.5 Study Population

The study population involved the review of labour register of women who developed maternal complications during delivery from January to December, 2018 at the Presbyterian Hospital, Agogo. Patients on admission at the time of the study as a result of maternal complications during delivery and health care providers at the obstetrics/gynaecology unit of the hospital were interviewed to solicit information for the study.

3.5.1 Inclusion Criteria

The following criteria were employed as the basis of inclusion of study participants:

- Labour registers and folders of women who developed maternal complications during delivery at Presbyterian Hospital from January to December 2018.
- Health workers at the obstetrics/gynaecological unit of Presbyterian Hospital at the time of the study
- Patients who have delivered in Presbyterian Hospital and on admission at the time of the study as a result of maternal complications during delivery.
3.5.2 Exclusion Criteria

The following were used as the basis for exclusion:

- Women who developed maternal complication but were so ill and unable to participate in the study.
- Women with maternal complications during delivery in Presbyterian Hospital and health workers who did not consent to be part of the study.

3.6 Sampling

3.6.1 Sampling size determination

Using the Yamane (1967) formula

\[ n = \frac{N}{1+NE^2} \]

Where \( n \) - sample size
\( N \) – the population size - 2,278
\( e \) – the acceptable sampling error (precision level - 0.05)

\[ n = \frac{2,278}{1+2,278(0.05)^2} \]

With total deliveries of 2,278 recorded in 2018 and a precision level of 0.05, a sample size of 340 was chosen.

3.6.2 Sampling procedure

Systematic sampling technique was used to select 340 women from the 2018 delivery register of the hospital with a sampling interval of 7.0 (i.e. \( N/n \)). Five (5) was the first number to be selected using an online random number generator. Ten (10) women who had delivered in the hospital and currently on admission were interviewed. Five (5) each of mothers who developed maternal complication and those who did not develop complications were conveniently sampled to be
interviewed. Mothers who met the inclusion criteria and agreed to participate in the study were selected.

Based on the staff strength at the obstetric/gynaecological unit of the hospital, ten (10) health professionals were also interviewed based on the classification below:

<table>
<thead>
<tr>
<th>Professional</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obstetrician/Gynaecologist</td>
<td>1</td>
</tr>
<tr>
<td>Medical Officer</td>
<td>1</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>1</td>
</tr>
<tr>
<td>Midwives</td>
<td>4</td>
</tr>
<tr>
<td>General Nurse</td>
<td>2</td>
</tr>
<tr>
<td>Public Health Nurse</td>
<td>1</td>
</tr>
</tbody>
</table>

Health professionals were recruited based on their availability and willingness to participate in the study.

3.7 Data Collection Instruments

A review checklist was used to obtain data from the labour records of women who had complications during delivery in Presbyterian Hospital, Agogo, from January to December 2018. The review guide gathered information on the socio-demographic factors and obstetric history of patients. It was used to determine the proportion of complicated deliveries and the association between maternal morbidities and the factors outlined.

Two (2) different interview guides were designed for women who delivered and had complications as well as front line health workers. The interview guides were used to obtain information on patients’ perception of care and direct costs incurred in the treatment of the
complication. Health facility factors associated with maternal complications were also obtained from health professionals through interviews.

### 3.8 Study Variables

The study variables were made up of dependent and independent variables which have been categorized below:

#### 3.8.1 Dependent Variable

The dependent variable is maternal complications during delivery.

#### 3.8.2 Independent Variables

The independent variables constituted the following:

Patient factors such as maternal age, educational level, economic status, parity and gravida, previous health conditions, prior caesarean section (CS), ANC attendance, the decision to seek health care.

Health facility factors include the availability of emergency obstetric care packs, availability of logistics and human resources, provision of prompt care by the health professionals, patients perception of care for maternal health, the direct cost of treating maternal complications (both insured and uninsured), factors that patients consider in seeking health care.

Table 1: Variable Table with the operational definition

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operational definition</th>
<th>Mode of measurement</th>
<th>Scale of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Age at last birthday</td>
<td>Young, middle age, old</td>
<td>Continuous</td>
</tr>
<tr>
<td>Religion</td>
<td>Faith affiliation of the respondent</td>
<td>Based on the report by the respondent - Christian - Muslim - Traditionalist - Other (specify)</td>
<td>Nominal</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>The ethnicity of respondents</td>
<td>Based on Akan</td>
<td>Nominal</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Options</td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>To determine if the participant is married or not</td>
<td>Based on</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Single</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Married</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Divorced/separated</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Co-habitation</td>
<td></td>
</tr>
<tr>
<td>Level of education</td>
<td>The highest form of education obtained by the respondent</td>
<td>No education</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Basic (primary/JHS)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Secondary</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tertiary</td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td>Main occupation</td>
<td>Unemployed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Self-employed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Farming</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Government</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Others (specify)</td>
<td></td>
</tr>
<tr>
<td>Occupation of husband/partner</td>
<td>Source of employment of husband/partner</td>
<td>Expressed in terms of</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Formal employed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Farming</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unemployed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Others (specify)</td>
<td></td>
</tr>
<tr>
<td>Gravida</td>
<td>Number of times a participant have been pregnant</td>
<td>Expressed in terms of</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1, 2, 3, 4, 5 or more</td>
<td></td>
</tr>
<tr>
<td>Parity</td>
<td>Number of deliveries irrespective of the birth outcomes</td>
<td>Determined by 1, 2, 3, 4, 5 or more</td>
<td></td>
</tr>
<tr>
<td>Prior caesarean section</td>
<td>Expressed in terms of previous delivery of babies via caesarean section</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>History of health condition</td>
<td>Determined by the absence or presence of chronic health condition</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>The decision to seek health care</td>
<td>Expressed in terms of the period within which the patient decided to visit</td>
<td>Within one hour</td>
<td></td>
</tr>
<tr>
<td>at the onset of a complication</td>
<td>a health facility following the complication</td>
<td>After two hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Between three to six hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>After six hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>After a day</td>
<td></td>
</tr>
<tr>
<td>Number of ANC</td>
<td>The number of times a</td>
<td>Such as once, two times, three</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Such as once, two times, three</td>
<td>Nominal</td>
<td></td>
</tr>
<tr>
<td>visits</td>
<td>pregnant woman attended antenatal clinic times, four times or more than four times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understanding of maternal complications</td>
<td>Expressed by the ability to identify basic signs of complications such as bleeding, headache etc.</td>
<td>High understanding Moderate understanding Low understanding No understanding</td>
<td>Ordinal</td>
</tr>
<tr>
<td>Availability of emergency obstetric care</td>
<td>Expressed in terms of the availability of EmOC packs</td>
<td>Within 24 hours 48 hours</td>
<td>Nominal</td>
</tr>
<tr>
<td>Logistics and human resources</td>
<td>Expressed in terms of the availability of the needed equipment, infrastructure and skilled professionals for maternal care delivery</td>
<td>Yes No</td>
<td>Nominal</td>
</tr>
<tr>
<td>Prompt provision of care</td>
<td>Expressed in terms of administering care to patients by health professionals without undue delays</td>
<td>Yes No</td>
<td>Nominal</td>
</tr>
<tr>
<td>Perception of care by patients</td>
<td>Expressed in terms of the level of satisfaction with regards to the provision of care such as interpersonal, privacy, confidentiality etc.</td>
<td>High or low</td>
<td>Ordinal</td>
</tr>
<tr>
<td>The direct cost incurred as a result of treating a maternal complication</td>
<td>Expressed in terms of financial expenses borne by patients and their households</td>
<td>Total and mean direct medical and indirect medical costs</td>
<td>Nominal</td>
</tr>
</tbody>
</table>

### 3.9 Data Analysis

Quantitative data derived from the review of maternal records were entered into excel and exported to STATA version 15 for statistical analysis. Descriptive analysis (pie charts, frequency tables etc.) was used to summarise and present data on socio-demographic characteristics of participants. The analysis also used a chi-square test to determine the association between the
dependent and independent variables and the strength of associations was established using logistic regression analysis. The level of significance for the chi-square test was accepted at \( p<0.05 \) at 95% confidence level.

Qualitative data obtained from the interviews were audio recorded and transcribed verbatim and typed with Microsoft Word. Analysis of the interviews was carried out under the following broad themes in consonance with the study objectives; perception of care, knowledge of women concerning signs of complications and other patients’ factors associated with maternal complications, direct cost (i.e. medical and non-medical expenses) incurred in treating maternal complication and facility/hospital factors that affect maternal complications. Sub-themes were also developed from the data gathered to provide further explanations to the designated broad themes.

A coding book was used to facilitate coding into NVIVO Version 11 for the development of codes. Commonly repeated issues raised by study participants which were in line with research objectives were extracted into Microsoft Word to facilitate the write up.

**3.10 Ethical Consideration**

In order to address all potential ethical issues arising from the study, the following outlined activities were carried out:

**3.10.1 Ethical Clearance**

Approval was obtained from the Ghana Health Service Ethical Review Committee (GHS- ERC).
3.10.2 Approval from Study Area

A written request to use the Presbyterian Hospital, Agogo, was submitted to the management of the hospital. The district health directorate of the Asante Akyem North was also duly informed of the study.

3.10.3 Participants’ Consent

The consent of a patient or health professional who participated in the study was sought prior to their inclusion in the study. Individuals who were eligible for the study were enrolled in the study only after they had endorsed a written informed consent/assent form, either by signing or thumb-printing before they are interviewed.

3.10.4 Privacy / Confidentiality

The researcher ensured the confidentiality and privacy of the participants by using identifiers instead of the names of the participants and the data collected were kept under lock and key. Data obtained from the study was used for the purpose of the study and was only accessible to the principal researcher and supervisor.

3.10.5 Voluntary Participation

Participation in the study was voluntary which was well explained to prospective participants. They were also assured of withdrawal from the study at any point in time according to their own discretions and would not be denied of treatment of their medical conditions.

3.10.6 Potential Risks / Benefits

The study involved the review of maternal records of women with complications during delivery in 2018. Interviews were conducted with patients on admission due to labour-related complications and were required to provide some sensitive responses to questions posed
(unpleasant circumstances) which might cause pains or emotions hence could pose some risks to participants. Participants can choose not to answer any question. Participants in the study did not receive any material benefit from the study as this was communicated to them before the study. Their participation was duly acknowledged and informed of appropriate means to prevent future development of pregnancy and child health-related complications for their benefit.

3.10.7 Compensation

The participants involved in the study were informed that they would not receive any compensation package for their participation in the study.

3.10.8 Data Storage

All hard copies of data obtained from the field were transformed into electronic data using Excel, which was password encrypted. Data collected was stored in both electronic and hard copies for the period within which they were used. The participants were assured that the data collected was used for academic purposes and also inform policies.

3.10.9 Declaration of Conflict of Interest

The principal researcher, the supervisor and any of the research assistants recruited to participate in the study had no possible conflict of interest with respect to the research.

3.11 Funding Information

The study was fully funded by the researcher with no assistance from any other individual or an organization.
3.12 Quality Control / Pre-Testing

The interview guide was first pre-tested among women who developed complications during delivery at the Konongo Odumase Government Hospital in the Asante Akyem Central District. The hospital was chosen because it is also a district hospital and the populace share similar characteristics with the study site. This enabled the researcher to assess the effectiveness of the interview guide in soliciting the needed information for the study.

Research assistants were provided with the requisite training with regards to the research objectives, appropriate data collection, ethical considerations and data entry skills to enhance data accuracy.

All audio interviews transcribed were double-checked with the written notes obtained to ensure that all relevant information required to make the study successful was not missed.

3.13 Dissemination of Results

The findings of the study would be available to the Ministry of Health (MOH), District Health Directorate of Ghana Health Service (GHS), Asante Akyem North, Christian Health Association of Ghana, (CHAG), University of Ghana (UG), and also the Research and Development Unit of the Presbyterian Hospital, Agogo. The study results would also be presented at seminars related to maternal and child health as and when required, published in peer-reviewed journals and also be made available at the University of Ghana website and the library of School of Public Health to facilitate accessibility by other researchers.
CHAPTER FOUR
RESULTS

4.0 Introduction

The chapter presents the findings of the study obtained from a cross-section of women whose data were reviewed from the delivery register in 2018 as well as mothers who had delivered and were on admission at the time of the study. Information from health professionals at the Obstetrics/Gynaecological unit have also been presented in this chapter. The results were obtained using a review checklist and interview guides. The results are presented in line with the research objectives.

4.1 Socio-Demographic Characteristics of the Mothers

A total of 340 mothers with age range 15-43 years were interviewed in this study (Table 2). The mean age of the mothers was 27.6 years (SD=0.39). Majority of the mothers were within the ages of 21 and 30(51.5%), close to 30% of the mothers were 31 - 40 (29.5%) years. Most of the mothers had attended school to the Junior High level 154(45.3%) and only 40(11.8%) reported never attending school. About 234(68.8%) lived in rural areas (Table 2).

Table 2: Socio-demographic characteristics of mothers.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 and less</td>
<td>56</td>
<td>16.5</td>
</tr>
<tr>
<td>21 – 30</td>
<td>175</td>
<td>51.5</td>
</tr>
<tr>
<td>31 – 40</td>
<td>101</td>
<td>29.7</td>
</tr>
<tr>
<td>above 40</td>
<td>8</td>
<td>2.4</td>
</tr>
<tr>
<td>Educational Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No level of education</td>
<td>40</td>
<td>11.8</td>
</tr>
<tr>
<td>Primary</td>
<td>41</td>
<td>12.1</td>
</tr>
<tr>
<td>JHS</td>
<td>154</td>
<td>45.3</td>
</tr>
<tr>
<td>SHS</td>
<td>64</td>
<td>18.8</td>
</tr>
<tr>
<td>Area of residence</td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td>Tertiary</td>
<td>41</td>
<td>12.1</td>
</tr>
<tr>
<td>Rural</td>
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<td>68.8</td>
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<td>Semi-urban</td>
<td>79</td>
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<td>Urban</td>
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<td>7.1</td>
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<th>Percentage</th>
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<td>Teacher</td>
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<td>6.8</td>
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<tr>
<td>Farmer</td>
<td>50</td>
<td>14.7</td>
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<tr>
<td>Nurse</td>
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<td>3.8</td>
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<td>Seamstress</td>
<td>32</td>
<td>9.4</td>
</tr>
<tr>
<td>Hairdresser</td>
<td>34</td>
<td>10.0</td>
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<tr>
<td>Unemployed</td>
<td>48</td>
<td>14.1</td>
</tr>
<tr>
<td>Student</td>
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<td>6.2</td>
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<td>Other Occupations</td>
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<tr>
<th>NHIS</th>
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<th>Percentage</th>
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</thead>
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<td>Insured</td>
<td>323</td>
<td>95.6</td>
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<tr>
<td>Not-insured</td>
<td>15</td>
<td>4.4</td>
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</table>

4.2 Proportion of mothers who developed complications during delivery

![Pie chart showing 16.76% with complication and 83.24% without complication]

Figure 3: Proportion of mothers delivering with complication

Of the 340 women who delivered at the hospital, 57(16.8%) reported a form of maternal complication (Figure 2).
4.3 Types of maternal complications

A total of 57 women had some form of maternal complications. Of this number postpartum haemorrhage (PPH) recorded the highest with 17 (29.8 %) cases followed by premature rupture of membrane (PROM) with 8 (14.0%) cases. Seven (12.23%) cases of Antepartum haemorrhage were recorded with six (10.5%) each of Pre-eclampsia and Pregnancy-induced Hypertension recorded.

A woman developed 3 different complications – PPH, PROM and Chorioamnionitis while two (3.51%) mothers had both PPH and PIH.

Table 3: Category of maternal complications

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of complication</td>
<td>PPH</td>
<td>17</td>
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<tr>
<td></td>
<td>PPH/PIH</td>
<td>2</td>
<td>3.5</td>
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<tr>
<td></td>
<td>PPH/PROM/Chorioamnionitis</td>
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<td>1.8</td>
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<tr>
<td></td>
<td>Obstructed Labour</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Chronic Hypertension</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>PIH</td>
<td>6</td>
<td>10.5</td>
</tr>
<tr>
<td></td>
<td>PROM</td>
<td>8</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td>Eclampsia</td>
<td>2</td>
<td>3.5</td>
</tr>
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<td></td>
<td>APH</td>
<td>7</td>
<td>12.2</td>
</tr>
<tr>
<td></td>
<td>Placenta praevia</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Pre-eclampsia</td>
<td>6</td>
<td>10.5</td>
</tr>
<tr>
<td></td>
<td>Preterm Contractions</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Gestational Diabetes</td>
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<td>1.8</td>
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<tr>
<td></td>
<td>3rd degree tear</td>
<td>2</td>
<td>3.5</td>
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<tr>
<td></td>
<td>GERD Pregnancy</td>
<td>1</td>
<td>1.8</td>
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<tr>
<td></td>
<td>Total</td>
<td>57</td>
<td>100.00</td>
</tr>
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</table>

4.4 Obstetrics characteristics of mothers

From Table 4, 31(9.1%) of mothers had undergone caesarean section before. Majority of the study participants had no known health condition 305(90.9%) and those who had hepatitis ‘B’
were 15(4.4%). Only 4(1.2%) of mothers had stillbirths. Majority of the women, 189 (55.6%) had 2-4 gravida followed by 80(23.5%) with primigravida. Only 8 (2.35%) mothers reported gravida > 8. Women with parity of 1-2 were the highest with 145(42.6%) and the least was parity of >5 constituting 28 (8.2%) mothers. Nulliparity was 107 (31.5%). One maternal death was recorded in this study representing a maternal mortality ratio of 298 deaths per 100,000 live births.

Table 4: Obstetric characteristics of women

<table>
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<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage%</th>
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<tbody>
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<td>Caesarean Section (CS)</td>
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<td></td>
<td>Previous CS</td>
<td>31</td>
<td>9.1</td>
</tr>
<tr>
<td>Antenatal attendance</td>
<td>No visit</td>
<td>9</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td>1-3 visits</td>
<td>62</td>
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<td></td>
<td>4 or more visits</td>
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<td>79.1</td>
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<td>Known Health Condition</td>
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<td>HIV</td>
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<td>1.8</td>
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<tr>
<td></td>
<td>Hepatitis B</td>
<td>15</td>
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</tr>
<tr>
<td></td>
<td>UTI</td>
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<td>0.6</td>
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<tr>
<td></td>
<td>Diabetes</td>
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<td>0.6</td>
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<tr>
<td></td>
<td>Chronic Hypertension</td>
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<td>Syphilis</td>
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<td>1.5</td>
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<td></td>
<td>SVD</td>
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<td>Vacuum Extraction</td>
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<tr>
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<td>1</td>
<td>80</td>
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<td></td>
<td>2-4</td>
<td>189</td>
<td>55.6</td>
</tr>
<tr>
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<td>5-7</td>
<td>63</td>
<td>18.5</td>
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Parity

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<td>1-2</td>
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<tr>
<td>3-5</td>
<td>60</td>
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</tr>
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<td>28</td>
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</table>

Number of babies

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<th></th>
<th>Singleton</th>
<th>328</th>
<th>97.3</th>
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</thead>
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<tr>
<td>Multiple</td>
<td>9</td>
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<td>2.7</td>
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</tbody>
</table>

4.5 Factors associated with Maternal Complications

Mode of delivery ($X^2=38.6609$, COR=.5520, and P-value =0.002), known health condition ($X^2=25=25.9074$, COR=1.1704 and P-value =0.002) and number of babies born ($X^2=10.4231$, COR=6.9500 and P-value=0.007) were found to be associated with maternal complication (Table 5).

Table 5: Factors associated with maternal complication among women who delivered

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>No complication (%)</th>
<th>With complication (%)</th>
<th>$X^2$</th>
<th>COR</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal age</td>
<td>20 and less</td>
<td>45 (80.36)</td>
<td>11 (19.64)</td>
<td>1.8751</td>
<td>1.0316</td>
<td>0.581</td>
</tr>
<tr>
<td></td>
<td>21 - 30</td>
<td>150 (85.71)</td>
<td>25 (14.29)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>31 - 40 above 40</td>
<td>81 (80.20)</td>
<td>20 (19.80)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>no education</td>
<td>7 (87.50)</td>
<td>1 (12.50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary</td>
<td>35 (85.37)</td>
<td>6 (14.63)</td>
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<tr>
<td></td>
<td>JHS</td>
<td>126 (81.82)</td>
<td>28 (18.18)</td>
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<tr>
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<td>SHS</td>
<td>52 (81.25)</td>
<td>12 (18.75)</td>
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<tr>
<td></td>
<td>Tertiary</td>
<td>37 (90.24)</td>
<td>4 (9.76)</td>
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<tr>
<td></td>
<td>Semi-urban</td>
<td>63 (79.75)</td>
<td>16 (20.25)</td>
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<tr>
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<td>23 (95.83)</td>
<td>1 (4.17)</td>
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<td>Geological location</td>
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<td>19 (19.19)</td>
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<tr>
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<tr>
<td></td>
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<td>1 (7.69)</td>
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<tr>
<td>Occupation</td>
<td>Number</td>
<td>Percentage</td>
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<tr>
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<td>--------</td>
<td>------------</td>
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<tr>
<td>Seamstress</td>
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<td>Other occupations</td>
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<td>4(20.00)</td>
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</tr>
<tr>
<td>Gravida</td>
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<td></td>
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<tr>
<td>Primigravida</td>
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<td>3.32  1.333  0.282¥</td>
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<td>21(75.00)</td>
<td>7(25.00)</td>
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<td>Antenatal attendance</td>
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</tr>
<tr>
<td>4 visits and below</td>
<td>89(84.76)</td>
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<td>0.2537 1.1756 0.614</td>
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</tr>
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<tr>
<td>Mode of current delivery</td>
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<tr>
<td>Caesarean section</td>
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<tr>
<td>SVD</td>
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<td>17(7.80)</td>
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</tr>
<tr>
<td>Vacuum extraction</td>
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<td>0(0.00)</td>
<td></td>
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<td></td>
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</tr>
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<td>Previous caesarean section</td>
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<tr>
<td>Known health condition/procedure</td>
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<td></td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>13(86.67)</td>
<td>2(13.33)</td>
<td></td>
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<tr>
<td>UTI</td>
<td>0(0.00)</td>
<td>2(100.00)</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Hysterectomy</td>
<td>0(0.00)</td>
<td>1(100.0)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>0(0.00)</td>
<td>2(100.00)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Syphilis</td>
<td>3(100.00)</td>
<td>0(0.00)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>3(60.00)</td>
<td>2(40.00)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth outcome</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stillbirth</td>
<td>2(50.00)</td>
<td>2(50.00)</td>
<td>3.2040 .1957 0.132</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live birth</td>
<td>281(83.63)</td>
<td>55(16.37)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of babies delivered</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singleton</td>
<td>278(84.76)</td>
<td>50(15.24)</td>
<td>10.423 6.9500 0.007*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple</td>
<td>4(44.44)</td>
<td>5(55.56)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¥=Fishers exact  *=P value < 0.05
Furthermore, a simple logistic regression was performed to test for the strength of their association. The results are shown in Table 6.

It was found that the odds of maternal complication for those who had HIV was 1.43 (95% CI=0.20-10.13) compared to those who had no known health condition. Also, those who had Hepatitis B had an odds ratio of 1.14 (95% CI= 0.22-5.76) of having a maternal complication at delivery compared to those who had no known health condition. In addition, the odds of those mothers who had Spontaneous Vaginal Delivery was 0.15 (95% CI=0.07-0.31) protective against maternal complication than for those who had a caesarean section. Also, the odds of the mothers who had multiple babies of having a maternal complication was 5.79 (95% CI= 1.19-28.21) compared to those who had singletons (Table 6).

Table 6: Multiple logistic regression for risk factors of maternal complications among women who delivered at the Presbyterian Hospital.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Adjusted OR</th>
<th>95 CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Known Health condition</strong></td>
<td>No condition</td>
<td>REF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>1.60</td>
<td>0.25 - 10.03</td>
<td>0.618</td>
</tr>
<tr>
<td></td>
<td>HIV</td>
<td>1.64</td>
<td>0.26 - 10.38</td>
<td>0.722</td>
</tr>
<tr>
<td></td>
<td>Hepatitis B</td>
<td>1.14</td>
<td>0.22 - 5.75</td>
<td>0.878</td>
</tr>
<tr>
<td></td>
<td>Urinary Tract Infection</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diabetes</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chronic Hypertension</td>
<td>6.12</td>
<td>0.27 - 136.3</td>
<td>0.2530</td>
</tr>
<tr>
<td></td>
<td>Syphilis</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mode of current delivery</strong></td>
<td>Caesarean Section</td>
<td>REF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SVD</td>
<td>0.153</td>
<td>0.07 - 0.3134</td>
<td>0.000*</td>
</tr>
<tr>
<td></td>
<td>Vacuum Extraction</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of babies delivered</strong></td>
<td>Singleton</td>
<td>REF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Multiple</td>
<td>5.63</td>
<td>1.16 - 27.34</td>
<td>0.030*</td>
</tr>
</tbody>
</table>

n/a= OR could not be obtained because a cell contains zero
4.6 Presentation of Findings using Qualitative Approach to address Perception of Maternal Care and Financial Costs of Maternal Healthcare

Among the women interviewed, four (4) delivered via Caesarean Section, two (2) were cases of third (3rd) degree perineal tear. One case of Pregnancy-induced Hypertension (PIH), pre-eclampsia and prematurity were also recorded. One case was a referral from another health facility. All the mothers interviewed had active NHIS membership.

4.6.1 ANC Visits

All the 10 women interviewed attended antenatal care more than four (4) times when they were pregnant. Both health professionals and mothers agreed that ANC visit played an important role in the wellbeing of mothers and unborn children. Mothers interviewed shared the information they received during ANC visits and expressed satisfaction. Women who did not develop complications during delivery indicated that because they heeded to the directives of health workers during ANC visits, they were able to take good care of themselves which facilitated their safe delivery. Women who developed complications also mentioned that they were able to identify certain danger signs which enabled them to report promptly to the hospital for management.

“*The information was very significant to me. This is because before I became pregnant I didn’t have any whitish discharge but when I became pregnant, during urinating, I saw them so because of the information they gave, I was able to report it for treatment and also with the yellowish vomit, they told me that it would be fever which can also affect the unborn child*” (patient complicated 3).

4.6.2 Decision making in seeking maternal health services

Decision making in seeking health care delivery plays a crucial role since any delay could lead to maternal complications. From the responses gathered, it was realized that most women are unable to make decisions on their own regarding maternal health care and mostly depended on
their husbands/partners and relatives particularly in the determination of where to deliver and acceptance of referrals. Most of the women interviewed indicated that they were directed by either their partners or family members to deliver in Agogo hospital.

“I have not developed any problem so far with regards to my care when I come here. Even when I was pregnant, all my relatives said that I should come to Agogo” (patient complicated 2)

“When I was not feeling too well, my partner told me to come to Agogo hospital to deliver because when I went to Roman hospital, they admitted me from Tuesday to Friday without any major care” (Patient complicated 3)

Health professionals also indicated that some partners could threaten their wives to refuse a referral to Agogo Hospital because they are in charge of decision making in the family.

“Sometimes, they tell you that their husbands tell them that if they come to Agogo to deliver, then they will not bear the financial cost because they think referring them to the hospital will bring about a lot of costs.” (Health professional 7)

Mostly it is their husbands that take the decision for them so unless the husband decides that they should come to the clinic, they will not come. They have to wait for their husbands to give them money. So imagine if they have complications until the husbands decide that they should come to the hospital, they don’t come (Health professional 4)

4.6.3 Perception of how socioeconomic status of mothers affect maternal complications

Most of the women interviewed were either engaged in petty trading, peasant farming or were unemployed with low educational status due to the rural settings of the district. Their spouses were mostly peasant farmers. Health professionals engaged in the study expressed worry concerning the inability of some patients to afford transportation to attend ANC visits. They indicated that due to their low socioeconomic background, they mostly develop complications. Some pregnant women, according to the health professionals also attributed complications to superstition as a result of the ignorance.

“Most of the pregnant women are not well educated and sometimes tell you that they forgot to take their medications. Some also have low income and will tell you that they didn’t get money to
buy their drugs, I was relying on my husband to buy the medicines for me but did not do so”. (Health professional 10)

“The patients too are part of the problem because due to ignorant when a pregnant woman has oedema, they think the person is going to give birth to a male child meanwhile it is a complication that they need to report to the hospital as early as possible” (Health professional 4)

4.6.4 The referral system in the district on maternal complications

When asked on the state of maternal referrals to the hospital, Health professionals complained of poorly documented referral letters, delays in referrals and not accompanying patients to the referral health facility which affect the management of maternal complications.

“Sometimes, for instance, the pregnant woman has high BP and has been given salbutamol, the time the medicine was given will not be documented in the referral letter so you don’t know whether to continue with the drug or wait” (Health professional 1)

“There are some cases that when you see them, you ask why they have not referred earlier maybe they thought they could assist the patient so by the time they get here, most of the outcome is not good”. (Health professional 10)

4.6.5 Patients perception of maternal care

All the patients who had complications during delivery and those who did not develop any complications shared similar opinions with regards to the quality of care they received at the hospital. They shared their views on the interpersonal relationships, promptness of care and empathy and expressed satisfaction with the services they received during admission and compared their experiences with other health facilities they had used before.

“With my second birth which I delivered elsewhere, the baby’s weight was not as big as this current baby size, I really suffered, and I couldn’t even sit like I am doing right now. I had a tear but with this one, I did not suffer at all even though the baby was bigger. They really took care of me. I was also treated well, no verbal abuse or anything” (Patient uncomplicated 1)
“The workers are very good. How they relate to you and talk to you. In some places, you cannot approach a nurse to talk to but here, I went to a nurse to explain certain things to her and she listened to me very well and understood my situation. In the old facility I visited, it was not like that. They serve your medicines on time and are always around you. The friendliness and the rapid response they attach to their work make them easily approachable compared to other places I have visited” (Patient complicated 1).

Patients also indicated that they were impressed with the competencies of health professionals.

“For the caesarean section, I will say that it was good because the doctors provide the needed care for you and you will not have any complication after the procedure” (patient complicated 3).

In terms of interpersonal relationships of health professionals at the obstetrics/gynaecological unit, this is what a patient said.

“….ooh in fact, they are very friendly and professional. They provided all the care I needed” (patient complicated 2).

“This is my first experience with childbirth and I must say that the treatment was good. They related well with me and they encouraged me on the right things to do for the health of my baby and myself” (Patient complicated 3).

Some patients however indicated that due to some costs they incurred, they will not recommend the hospital to others for maternal services.

“Because of the cost involved, I will not tell my friends and family to come here especially to deliver here” (patient uncomplicated 4).

4.7 Perception of Cost of treating maternal complications

All patients interviewed complained of making payments when they accessed maternal health services even though they were NHIS card bearers. Those who had complications and those who underwent Caesarean section incurred higher costs than those who had a spontaneous vaginal delivery and did not develop complications.

“I incurred a lot of costs even though I have NHIS. Yesterday when I was about to deliver, I was made to buy some drugs and infusions but none of them was used on me. When I paid GH₵130.00, I was given only GH₵0.50 as change and other things, we paid more than GH₵200.00 so far meanwhile I didn’t get any complication” (Patient uncomplicated, 5)
“I spent a lot when I was on admission even though I have NHIS. I was made to pay for drugs and medical consumables more than GH400.00. It wasn't so easy. I had to stay with my baby for 3 weeks because he was born prematurely (Patient complicated 5)

Those who were referred incurred costs such as accommodation for attendants, feeding and high transportation but those who developed complications but were not referrals did not incur substantial non-medical costs.

“My sister has been travelling from Hamidu to Agogo hospital to take care of me. The transportation cost is too much. I can say that she spent more than GH100 on transportation alone”. (Patient complicated 4)

“I will say that I did not spend that much because my family is here and they provided food. I didn’t spend anything accommodating them. Also, I came here on Wednesday and I delivered and I am being discharged today – Friday”. (Patient uncomplicated 4)

Health professionals interviewed highlighted that the cost of accessing maternal health poses many barriers for accessing maternal health services resulting in complications in pregnancy and childbirth.

“Even though maternal health is free, there are some few charges so they think they cannot afford and will go to the TBAs. The TBAs is not really free but they don’t take monies but maybe fowls in exchange for the deliveries and they feel more comfortable with the TBAs than the nurses” (health professional 4).

“Most of the complications that we have which sometimes we are unable to manage or get the opportunity to manage are those who decide to deliver at home because they don’t have the money to come to the hospital in case they have to go through CS” (Health Professional 5)

4.8 Summary

None of the socio-demographic characteristics of women was found to be a significant risk factor. Obstetric factors such as multiple births and delivery via caesarean sections were found to be significant under the multivariate analysis. Patients also expressed satisfaction with
maternal care services they received during admission but complained of the associated payments they made in order to receive services.
CHAPTER FIVE
DISCUSSIONS

5.1 Introduction
This chapter is made of the discussion of the findings obtained in the preceding chapter. The discussion was carried out in line with the research objectives by integrating the analysis of the empirical study and related literature reviewed.

5.2 Maternal complications at delivery
The first objective of this study was to determine the proportion of women who developed obstetric complications. The findings indicate that 17% of mothers in the study developed one form of complication representing 169 cases per 1,000 live births. The finding was higher than many studies conducted on maternal morbidities because unlike this study which considered maternal complication in its broader perspective, other studies only considered severe maternal morbidities, potentially life threatening maternal complications and maternal near misses. For instance, a study by Peprah (2016) looked at women who developed severe maternal morbidities using a case-control study at Kumasi South and Suntreso hospitals in the Ashanti Region and recorded 33 cases of severe maternal complications per 1,000 live births. A study by Tunçalp et al (2013) in an urban hospital in Accra recorded 157 cases of potentially life-threatening conditions per 1000 live births and maternal near-miss of 29 cases per 1000 live births. Litorp et al (2014) found 92 cases of maternal near misses per 1,000 live births in a cross-sectional study in a university hospital and a regional hospital in Tanzania.

Ghana’s maternal mortality ratio is estimated to be 319 deaths per 100,000 live births and the Ashanti Region where the study was conducted recorded MMR of 184 deaths per 100,000 live births.
births in 2018 which exceeded 139 deaths per 100,000 live births recorded in 2017. Presbyterian Hospital, Agogo also recorded MMR of 482 deaths per 100,000 live births in 2018. For the study population, 298 deaths per 100,000 live births were recorded. This shows that maternal mortality is on the rise in the Asante Akyem North district and the region at large. The reason for the rise could be as a result of maternal complications from a caesarean section and multiple births and challenges in the referral system of maternal cases within the district as found in the study. High maternal mortality rates would not augur well for Ghana as the world seeks to reduce global MMR to 70 deaths per 100,000 live births by 2030 as part of the Sustainable Development Goals.

The most diagnosed maternal complication was postpartum haemorrhage and was consistent with studies by Gidey, Bayray, & Gebrehiwot (2013); Khan et al. (2006); Vogel et al. (2014) where it was found that PPH is the leading cause of maternal morbidity in low-income settings. Hypertensive disorders were part of the least diagnosed complications in this study and it confirms the assertion by Khan et al. (2006) that hypertensive disorders were a common maternal complication in Southern America and the Caribbean.

5.3 Factors associated with maternal complications

Under the univariate analysis, socio-demographic factors such as maternal age, women level of education, geographical location and occupation were insignificant in relation to developing maternal complications. This finding is consistent with a case-control study conducted by Adeoye et al. (2013) in Nigeria where maternal age was not found to be associated with severe maternal morbidities. The reason for this could be that the study participants share similar socio-economic characteristics. Yego, D’Este, Byles, Williams, & Nyongesa (2014) however found
maternal age and level of education to be significant risk factors of maternal mortality in a case-control study in a tertiary hospital in Kenya.

Obstetric factors identified in the study include gravida, parity, previous caesarean section, mode of delivery, known health condition, birth outcomes, number of babies delivered and number of Antenatal visits during the current pregnancy.

Under the multiple logistic regression, mothers who had spontaneous vaginal delivery are 0.15 times less likely of developing a maternal complication (Table 6). This is similar to the findings by Fenton (2003) where caesarean section accounted for major obstetric complications compared to developed economies. Litorp et al (2014) also found that caesarean section complications constituted about 21% of maternal near misses and maternal deaths in Tanzania. From the study in Tanzania, 34.7% of the women were delivered by a caesarean section which is higher than the ideal rate considered by the international healthcare community of 10% -15%.

Known health condition of mothers prior to or during pregnancy was significantly associated with the development of complications during delivery under the univariate analysis of this study. Hepatitis B (5%) was found to be a leading health condition among the study participants. Ugbebor, Aigbirior, Osazuwa, Enabudoso, & Zabayo (2011) found 12.5% of the 5,760 pregnant women in a hospital-based cross-sectional study in Nigeria to have Hepatitis ‘B’ which is higher than this study probably because of the sample size difference. From the univariate analysis of this study, mothers with Hepatitis ‘B’ have 1.14 times more risk of developing maternal complications compared with those without any known health condition (Table 5). A study by Nguyen et al. (2009) also found that women who experienced Hepatitis ‘B’ during pregnancy
were likely to suffer from severe foetal outcomes. Other studies indicate that pregnant women who had Hepatitis ‘B’ were at risk of developing antepartum haemorrhage and gestational diabetes mellitus (Degli Esposti & Shah, 2011; Lao, Chan, Leung, Ho, & Tse, 2007).

The number of babies delivered can also contribute to the development of maternal complications as found in this study where women who carried multiple babies were 5.6 times more likely to develop maternal complications compared to mothers with singletons (Table 6). This is consistent with the findings by Naushaba, Razia, & Razia, (2010) where it was reported that prematurity was one of the main problems with multiple pregnancies. In addition to prematurity, Qazi, (2011) found that the risk of a pregnancy resulting in a baby with cerebral palsy is eight times higher in multiple pregnancies compared to singleton pregnancies.

Gravidity and parity were found not to be significant factors of maternal complications in this study and was consistent with findings by Peprah (2016) where the number of previous pregnancies and deliveries were not associated with severe maternal morbidities in a study involving two hospitals in Kumasi. Darcha (2015), Hoque (2011) and Tidy (2014) however reported some associations in first time pregnant women and those with multi-grand parity and maternal complications.

Antenatal care attendance rate among the study population was 97.4% for all visits and this is consistent with Ghana’s ANC coverage rate according to the 2017 maternal and health survey conducted in 2017. About 79.1% of the women attended ANC at least four times during
pregnancy and was found to be lower than the finding by Darcha (2015) where 85.9% of pregnant women attended ANC not less than four times in a study in Tamale Teaching Hospital. ANC attendance was not found to be a significant risk factor for maternal complications. Yego et al (2014) however reported that ANC attendance and maternal education were considered significant to severe maternal outcomes.

5.5 Perception of maternal health care

Findings from interviews conducted show that patients who accessed Presbyterian Hospital, Agogo for maternal services perceived care to be good. Mothers are satisfied with the customer care by the staff at the obstetrics/gynaecological unit of the hospital. They are also content with the promptness of care they received when they were on admission. This finding is similar to the study by Tunçalp et al. (2012) at a tertiary hospital in urban Ghana where mothers who suffered near misses expressed satisfaction with the care they received and indicated that they would like to deliver in the facility should they conceive again. Islam et al. (2015) also found that 85% of the women were satisfied with the care they received in selected public health facilities in Bangladesh. The study finding was contrary to findings by Liambila & Kuria (2014) where it was reported on the abuse of women who attended health facilities for maternal services. Broek (2015) indicated that the quality of care in developing countries is considered to be poor where patients expressed their displeasure regarding the experience of care with regards to attitude and communication of health workers. A study in Malawi conducted by Machira & Palamuleni (2018) found that most women complained of delays to respond to their needs. They also indicated that they were met with hostile attitudes and sometimes health workers used offensive words on mothers.
Patients in this study appreciated the good interpersonal and communication skills displayed by health professionals in the hospital and were satisfied with the competence they exhibited. Mothers who developed complications also indicated that they found some sense of relief because they could freely relate to health workers. This is similar to what Tunçalp et al. (2012) mentioned that a friendly environment for maternal health service provides means of coping with the complications they have developed during delivery. The motivation of health professionals is an integral part of sustaining workers’ competencies to make a meaningful impact in the work they do and this can be evidenced in the workers of Presbyterian Hospital. Thi, Thu, Wilson, & Mcdonald, 2015) reported that staff motivation is deemed to be crucial but it is mostly ignored in lower-income settings such as Ghana especially for those who work in rural communities to ensure that health care is accessible by all without geographical barriers.

Health professionals also mentioned that provision of training and workshops organised also serve as a form of motivation to equip them with the needed skills as well as update their knowledge base in the management of maternal complications.

5.6 Perception of financial cost of treating maternal complications

The study sought to find out costs women incurred in accessing maternal health services. Ghana in 2008 introduced free maternal healthcare in its bid to achieve Millennium Development Goal 5 of reducing maternal mortalities. Under this initiative, all pregnant women are freely enrolled on NHIS to access ANC services and deliveries free. All the ten women who reported being NHIS registrants and were expected to access free medical services provided by health facilities accredited by the National Health Insurance Authority. It was rather not the case in Presbyterian Hospital as pregnant women perceived that they paid for ANC and delivery services.
This study supports findings from Dalaba et al. (2015) where it was found that even though maternal health is free in Ghana, women incurred some cost in assessing care which mostly affects their households especially those in remote areas in the Kassena Nankana districts of Northern Ghana.

Treating maternal complications and maternal health, in general, poses a financial burden to women and their households. It also serves as a barrier to accessing services when they are pregnant as depicted in the health belief model. The model explains that barrier components such as cost of treatment and transportation were perceived to discourage people from undertaking a behaviour they deemed to be necessary for their health and in this case, utilization of maternal health services (Abraham & Sheeran, 2016; Onasoga et al., 2014). This could result in complications due to delays and the use of alternative approaches to maternal health care.

5.7 Limitation of the study

Presbyterian Hospital, Agogo, does not keep the folders of patients and it is only the Out Patient Department that is digitized hence the study relied only on information in the delivery register which did not contain information related to the referral and marital statuses of pregnant women which could have been associated with maternal complications among women whose records were reviewed. Due to these challenges, women whose information were reviewed were not able to be contacted for an interview since the delivery register did not have mobile phone numbers apart from their contact address which made it impossible to reach out to them.

During the study, only five (5) women who delivered with maternal complications were available and agreed to participate in the qualitative study. Notwithstanding the limitations stated, the study relied on the available information and factors associated with maternal complications were identified hence the challenges did not affect the robustness of the findings.
Five mothers who delivered at the hospital but did not develop complications were also interviewed to compare their experiences with mothers who developed complications.

5.8 Summary

Maternal complications could be addressed when women seek early health care. Financial barriers sometimes hinder women in low income settings from accessing healthcare even though they are aware of the immense benefits of prompt medical health care.
CHAPTER SIX
CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

The study shows relatively high cases (16.8%) of maternal complications with postpartum haemorrhage as the major form of complication. Hepatitis ‘B’ is also found to be a leading health condition among the study participants. Factors associated with maternal complications are a caesarean section in current delivery and multiple births. Key stakeholders such as pregnant women and their households, health providers and policymakers have significant roles to play in ensuring that complications are prevented if Ghana wants to win the battle against maternal mortality.

Women who delivered in the hospital commended the competencies of health professionals.

Maternal health care remains unaffordable since these mothers who delivered were made to pay for maternal health services at the hospital. Ghana prides itself with free maternal healthcare but in reality, it is not the practice since pregnant women perceived that they incur some financial cost when they accessed healthcare from antenatal care visits to delivery even when they have NHIS. The policy of free maternal health should be strengthened to remove financial barriers of accessing health care.
5.2 Recommendations

Policy (Ministry of Health)

Free maternal health care initiative introduced in 2008 was to remove financial barriers in accessing maternal health care in a bid to realize Millennium Development Goal five (MDG 5). Women incurred some substantive medical costs in health facilities during ANC, delivery and after delivery. The policy should cover comprehensively delivery services for mothers.

Public Health

The rate of maternal complications observed in this study calls for effective measures by the Ministry of Health to make caesarean section safe for mothers and their babies. Presbyterian Hospital should pay attention to multiple pregnant women as these factors were considered risk factors of maternal complications. There is also the need for sensitization of pregnant women on Hepatitis B to encourage early detection and screening.

The management of the hospital should provide the needed logistics for the effective management of postpartum haemorrhage to prevent further deterioration of maternal complications.

Research

Further research should be conducted on the causes of postpartum haemorrhage and the preventive measures as it was found to be the leading cause of maternal complication in this study.
REFERENCE


near-miss and death and their association with caesarean section complications: a cross-sectional study at a university hospital and a regional hospital in Tanzania, 1–10.


NHIA. (2012). ANNUAL REPORT.


APPENDICES

Appendix A: Interview Guide for Patients with Maternal Complications

Background information sheet on participants

Date of Interview ……………………

1. What is your age at your last birthday?……………………………………………………………..

2. Religious affiliation
   Christian
   Muslim
   Traditionalist
   Other (specify)…………..

3. Marital Status
   Married
   Single
   Divorced
   Co-habitation

4. Ethnic/tribal background
   Akan
   Ga
   Ewe
   Dagomba
5. Employment status

Formal employment
Trading
Unemployed
Other (specify)

6. 6a. Occupation of respondent
6b: Occupation of the spouse

Farmer
Public/civil servant
Self-employed
Other (specify)

7. 7a How much do you earn in a month?
7b How often you do earn income

8. Do you have health insurance?

Yes
No

9. How many times have you been pregnant/conceived?
1, 2, 3, 4, 5, more than 5

10. How many times have you delivered?
1, 2, 3, 4, 5, more than 5
11. What is the outcome of your current delivery birth? Single or multiple, life or stillbirth

12a. Have you undergone Caesarean Section before?
   Yes/ No
12b. If yes, how many times?
   Once
   Twice
   Thrice
   More than three times

13. Were you referred from a health facility to Agogo Hospital for delivery as a result of maternal complication?
   Yes/No
   If yes? Which facility
   Hospital
   Health centre
   Health post
   CHPS compound

14. How long did it take you to arrive at Agogo Hospital?
   Within one hour
   About two hours
   Between three and six hours
   More than six hours

15. How long have you been on admission as a result of the complication you developed during delivery? 
   24 hours
   Two days
   Three days
   More than three days

16a. Did you attend ANC during pregnancy?
   Yes/No
16b. If yes, how many times and which facility?
Once
Two times
Three times
Four times
More than four times

17. What were some of the information provided by the health facility during ANC to assist you to determine signs of complications at any point during pregnancy?
   - Information on risk factors of maternal complications
   - Information on nutrition
   - Information on signs and symptoms of complications

18. Do you think the information provided at ANC were relevant and adequate?
   - Yes/No

19. Did you have any complications during this Pregnancy?
   - Yes/No

20. When did the complication set in?
   - Before labour
   - Beginning of labour
   - During labour
   - After labour

21. In any of the stages above, were you informed of the type of complication you had developed by the health caregivers and what intervention(s) was provided?
   - Yes/No

22. In your opinion, do you think the hospital provided the needed care for the complication you developed?
   - Yes/No

23. Can you describe the competence and overall experience you had with health care providers i.e. midwives, doctors and nurses among others in the following areas
   - Skills
   - Interpersonal relationship
Empathy
Promptness of care
Availability of medicines and their services

24. Would you recommend Agogo Hospital to others based on your experience?
   Yes/ No
   Any reason for your choice
   ....................................................................................................................................

25. How much have you spent on medications and medically related items for your treatment
during admission for the complication?

26. What other expenses did you incur in relation to your care - transport, accommodation of
   attendants, feeding etc. .................................

27. How has the complication you developed affected your finances?
   ....................................................................................................................................
Appendix B: Interview Guide for Health Professionals

Background Information

Age

Sex

Profession

Working experience

1.0 What services do you provide for pregnant women in this facility?

2.0 Which services do the pregnant women patronize most? If ANC then probe
How does the number of ANC visits affect delivery outcomes?

3.0 What health information do you provide to women on pregnancy complications?

4.0 Are pregnant women and their relatives expected to know what constitutes maternal complications?

5.0 Can you describe the socio-economic status of women who attend your facility for maternal care services?

6.0 Can the economic status of a pregnant woman and her household pose a challenge in maternal health care?

7.0 How would you describe the referral system in the region/district within which you operate?

8.0 Is there an effective ambulance service to aid referrals to your facility?
9.0 What is the state of the following facilities in this hospital

<table>
<thead>
<tr>
<th>Facility</th>
<th>Very good</th>
<th>Good</th>
<th>Bad</th>
<th>Very bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Wards</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment/sanitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

10.0 What is the motivation or the drive of health professionals to work?

11.0 How will you rate the staff competency to provide the following EmOC services?

<table>
<thead>
<tr>
<th>Service</th>
<th>Very good</th>
<th>Good</th>
<th>Bad</th>
<th>Very bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration of oxytocin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MgSo4 administration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum extraction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Removal of retained products</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual removal of placenta</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caesarean section</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-abortion care</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perineal/cervical repair</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMTC</td>
<td></td>
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</tbody>
</table>

12.0 How would you rate the following equipment/instruments for EmOC

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Very good</th>
<th>Good</th>
<th>Bad</th>
<th>Very bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery instruments</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Surgical instruments

Anaesthesia equipment

13.0 Are they readily available at all times? Yes/No the options to make analysis
Appendix C: Delivery Register Review Checklist

WOMEN WHO DEVELOPED COMPLICATIONS DURING DELIVERY FROM JANUARY TO DECEMBER, 2018 IN PRESBYTERIAN HOSPITAL

1. Maternal age
2. Insured/uninsured
3. ANC attendance
4. Geographical location
5. Number of deliveries
6. Number of pregnancies
7. Any known medical conditions e.g. hypertension, diabetes, HIV/AIDS etc
8. Prior Caesarean Section
9. The type of complication
10. Complication outcome – near miss or a maternal death
11. Delivery outcome – a live birth or a stillbirth
12. Number of babies delivered – single or multiple
Appendix D: Participant Information Sheet

Title of Study: FACTORS ASSOCIATED WITH MATERNAL COMPLICATIONS AMONG WOMEN WHO DELIVERED AT THE PRESBYTERIAN HOSPITAL, AGOGO

Introduction: I am Belinda Maal-ire Bulley, the Principal investigator and a Master of Public Health student in the Department of Health Policy, Planning and Management of the School of Public Health, University of Ghana.

Contact: 0247800737

Email: bbbubbly2@gmail.com

Background and Purpose of the research: Maternal health complications pose challenges where a lot of lives are lost as a result of preventable circumstances especially among women in rural communities. In order to improve maternal health, there is the need to identify the factors that contribute to complications and also explore the perception of care by women who delivered in Presbyterian Hospital, Agogo. This study also seeks to determine the direct costs incurred in the treatment of maternal complication.

Nature of research: The study is both a quantitative and qualitative study which will take place at Presbyterian Hospital, Agogo, in the Asante Akyem North District. It will involve the review of labour registers and the interview of women on admission who delivered complications during delivery. Health professionals at the obstetrics/gynaecological unit will also be interviewed. An audio recorder will be used during the interviews. Participants are expected to share information on the factors that contribute to maternal complications during delivery, perception of care and
the cost of treating the complication. In all, 15 patients and 10 health professionals would be interviewed.

Participants’ involvement:

Duration /what is involved: Data will be collected from patients who are on admission as a result of maternal complication and health professionals of Presbyterian Hospital, Agogo through in-depth interviews. The interview will span for an average of 30 minutes.

Potential Risks: In participating in this study, you would be asked to share some personal views and experiences regarding maternal complications and may cause you to recount certain unpleasant memories which may bring you discomfort and pains. You do not have to answer every question or take part in the research if you do not wish to do so.

Benefits: Participating in the study will not yield any financial benefits to you, however findings from this study will contribute to improving maternal health. Also, findings will be beneficial to you to identify risks factors of maternal complications. The findings of the study will be used by policymakers to improve maternal health within the Asante Akyem North district and beyond.

Costs: You will not incur any cost if you agree to participate in the study apart from your time.

Compensation: As a participant of this study, you will not incur any cost apart from your time which would not attract any compensation.

Confidentiality: Your name and identity will not be recorded in this study. However, the information you are going to provide will be coded and will be treated strictly confidential. You are assured of total confidentiality to the information you will give. Apart from the Principal Investigator and Academic Supervisor, no one else will have access to the information provided.
Data will be collected using a digital tape recorder and note pads. All paper records will be stored safely stored in cabinets under lock and key while audio recording will be stored in password-protected folders. Paper and electronic records collected will be destroyed after a minimum of three years according to the research protocol.

**Voluntary participation/withdrawal:** Participating in this study is totally voluntary and you are free to withdraw your participation anytime without giving any reason for doing so. You would be giving the opportunity to end/pause the interview according to your discretion and you can ask any question for clarity during the interview.

**Outcome and feedback:** The findings and recommendations will be made available at the School of Public Health. It will also be disseminated to various stakeholders where necessary.

**Feedback to participant:** Findings of the study will be shared with participants at the end of the study.

**Funding information:** The study will solely be funded by the Principal Investigator.

**Sharing of participants information/data:** You are assured of total confidentiality of the information you will give. Apart from the Principal Investigator and Academic Supervisor, no one else will have access to the information provided.

**Provision of Information and Consent for participants**
A copy of the Information sheet will be given to you after it has been signed or thumb-printed to keep.
Who to Contact for Further Clarification/Questions:

Belinda Maal-ire Bulley
School of Public Health
University of Ghana
Legon
Email: bbbubbly2@gmail.com
Tel: 024800737

Dr Patricia Akweongo
School of Public Health
University of Ghana
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Email: akweongo@gmail.com
Tel: 0243138376

Mrs Hannah Frimpong
Administrator
Ethical Review Committee Secretariat
Ghana Health Service
Accra.
Tel: 050 704 1223
024 323 5225
Appendix E: Approval letter from Ghana Health Service Ethics Review Committee

Appendix E: Approval letter from Ghana Health Service Ethics Review Committee

<table>
<thead>
<tr>
<th>GHS-ERC Number</th>
<th>GHS-ERC 019/04/19</th>
</tr>
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<tbody>
<tr>
<td>Project Title</td>
<td>Factors Associated with Maternal Complications among Women Who Delivered in Presbyterian Hospital, Agogo</td>
</tr>
<tr>
<td>Approval Date</td>
<td>7th May, 2019</td>
</tr>
<tr>
<td>Expiry Date</td>
<td>6th May, 2020</td>
</tr>
<tr>
<td>GHS-ERC Decision</td>
<td>Approved</td>
</tr>
</tbody>
</table>

This approval requires the following from the Principal Investigator:

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report after completion of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.
- Please note that any modification of the study without ERC approval of the amendment is invalid.

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

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

SIGNED

DR. CYNTHIA BANNERMAN
(GHS-ERC CHAIRPERSON)

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