KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY-KUMASI

COLLEGE OF HEALTH SCIENCE

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF POPULATION, FAMILY AND REPRODUCTIVE HEALTH

TOPIC:

AN ASSESSMENT OF PRACTICES OF PREVENTION OF PERINATAL TRANSMISSION OF HEPATITIS B AT HEALTH FACILITIES IN THE ASHANTI REGION OF GHANA.

BY:

AISHA ALI ISSAKA

OCTOBER, 2019

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KUMASI, GHANA

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BY:

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DECLARATION

I hereby do declare that except for references to other people's work which have been duly acknowledged, this piece of work is my own composition and neither in whole nor in part has this work been presented for the award of a degree in this university or elsewhere.

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NYANSAPƆ WƆ SANE NO BADWENMA

DEDICATION

I dedicate this work to my father, Alhaji Ali Issaka and my son, Mohammed Awal Alhassan, who have been my anchor, keeping me grounded and focused.

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DEFINITION OF TERMS

Hepatitis B Virus Infection: People who test HBsAg positive

Acute Hepatitis B Infection: HBV infection within the first 60days of infection to 6 months

Chronic Hepatitis B Infection: HBV infection that persist for more than 6 months

Perinatal/ Vertical Transmission: Transmission of Hepatitis B virus infected mother to her unborn child during pregnancy, labour or delivery. Also called Mother-To-Child Transmission.

Horizontal Transmission: All other modes of transmission aside from perinatal, sexual or intravenous drug use that exposes an uninfected person to the HBV

Antenatal Care: The provision of education and health care to pregnant women by health workers to ensure best health conditions for the mother and the foetus from conception to the onset of labour

Perinatal Period: Period from 22weeks of gestation to 7 days post delivery

Post-Natal Care: healthcare and education provided to mother from the delivery of the placenta to 6 weeks thereafter.

Neonatal Period: comprises the first 28days post delivery

Early Neonatal Period: the first 7 days of birth

Late Neonatal Period: the period from 7 days to 28 days from birth

Co Infection Of HBV/ HIV: hepatitis B virus infected person who is also infected with the HIV or the HIV infected person who also has HBV

Universal Birth Dose Vaccine: Administering of monovalent vaccine to all newborns with 24 hours of birth

ABBREVIATION/ ACRONYMS

AASLD: American Association of the Study of Liver Diseases

ALT: Alanine Aminotransferase

ANC: Antenatal Care

APGAR: Appearance, Pulse, Grimace, Activity, and Respiration

CS: Cesarean Section

CD4: Cluster of Differentiation 4

CHB: Chronic Hepatitis B infection

CHPRE: Committee on Human Research, Publication and Ethics

CI: Confidence Interval

CLD: Chronic Liver Disease

DHIMS: District Health Information and Management Systems

DM: Diabetes Mellitus

DNA: Deoxyribonucleic Acid

EASLD: European Association for the Study of Liver Diseases

EPI: Expanded Program on Immunization

GHS: Ghana Health Service

GHSS: Global Health Sector Strategy

Hb: Hemoglobin

HBeAg: Hepatitis B envelope Antigen

HBIG: Hepatitis B Immunoglobulin

HBsAg: Hepatitis B surface Antigen
HBV: Hepatitis B virus

HCV: Hepatitis C virus

HIV: Human Immunodeficiency Virus

JHS: Junior High School

JSS: Junior Secondary School

KATH: Komfo Anokye Teaching Hospital

KNUST: Kwame Nkrumah University of Science and Technology

KSH: Kumasi South Hospital

LFTS: Liver Function Tests

MCH: Mother and Child Hospital

MGH: Manhyia Government Hospital

MTCT: Mother to Child Transmission

NEG: Negative

ODK: Open Data Kit

PLWH: People Living with HIV

PMTCT: Prevention of Mother to Child Transmission

POS: Positive

PPH: Post-partum Hemorrhage

PROM: Pre-Labour Rupture of Membranes

PWID: People Who Inject Drugs

SD: Standard Deviation

SGH: Sundress Government Hospital

SHS: Senior High School

SSS: Senior Secondary School

STI: Sexually Transmitted Infection

SVD: Spontaneous Vaginal Delivery

TGH: Tafo Government Hospital

TOP: Termination of Pregnancy

UNICEF: United Nations International Children's Emergency Fund

UTI: Urinary Tract Infection

WHO: World Health Organization

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ABSTRACT

INTRODUCTION: Hepatitis B virus (HBV) infection remains the leading contributor to global prevalence of liver diseases. Ghana is highly endemic for HBV. There is also a high prevalence of the condition among blood donors and pregnant women. HBV is the most common cause of chronic hepatitis, liver cirrhosis and hepatocellular cancer among children and adults in Ghana.

Humans are the only source of infection of the HBV. The hepatitis B virus infection is caused by a 42-nm DNA virus in the family Hepadnaviridae. There are two main modes of transmission of HBV, vertical transmission (mother to child, MTCT) and horizontal transmission. Infected individuals may be asymptomatic or symptomatic and may present as an acute or chronic infection.

The strategies for the national control of HBV are limited to surveillance of acute viral hepatitis, education and three completed HBV vaccine doses in the infant. Little is done to reduce MTCT of HBV. There is therefore the need to assess the current practices of PMTCT of HBV to identify the gaps in current practices and propose recommendations that may help improve the current situation.

METHODS: A cross sectional design was be used for this study. Data on the practices of HBV was collected with the aid of a semi-structured questionnaire among mothers and their newborns at the Komfo Anokye Teaching Hospital. One hundred and ninety-one (191) mothers and their newborns were assessed.

RESULTS: The prevalence of HBV among mothers was 4.52%. There was no coinfection of

HIV amongst mothers. Mothers had average knowledge of HBV. PMTCT of HBV was limited to screening of mothers for HBsAg at ANC. No exposed newborn received the monovalent vaccine or the HBIG. Maternal factors associated with uptake of PMTCT of HBV included age, religion, level of ANC facility, number of contacts with care providers, screening for HIV and Syphilis and previous vaccination practices**.**

CONCLUSION: Increase education of mothers on HBV. The prevalence of HBV among mothers is at the intermediate level, need to study the barriers and facilitators of PMTCT of HBV and adopt a strong national policy and implementation program that will make accessible diagnostic tests, antiviral therapy and universal birth dose in addition to current strategies to curb the vertical transmission of HBV, its chronic squeal and the maintenance of HBV in the population.

Key words: Hepatitis B virus infection, knowledge, mothers, newborns, prevention, mother- to- child transmission

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CHAPTER 1- 1.0 INTRODUCTION

1.1 BACKGROUND INFORMATION

Hepatitis B virus (HBV) infection remains the leading contributor to global prevalence of liver diseases. In 2015, an estimated 257 million people were living with HBV worldwide, with a total of 1.3 million deaths attributable to all causes of hepatitis, which included deaths from acute hepatitis, liver cancer and cirrhosis (World Health Organization [WHO], 2017c). Infection with HBV contributed about 887,000 deaths, which constitute about 68% of all deaths due to liver diseases stated above. These deaths occurred from the chronic complication of HBV mainly cirrhosis of the liver and cancer of the liver (WHO, 2017c). The epidemic of HBV affects mainly the WHO African Region and the Western Pacific Region (WHO, 2017a). Hepatocellular carcinoma is the second most common cause of cancer in African men and third most common cause of cancer in African women, with more than 75% of cases being related to chronic hepatitis B, despite the availability of a safe and effective vaccine for more than two decades (Andersson *et al.*, 2015).

In a meta-analysis of prevalence studies of HBV in Ghana by Asenso et al, the pooled prevalence for studies from 1995 to 2015 was 12.3%. However, the pooled prevalence between 2010- 2015 was 10.2% (Ofori-Asenso and Agyeman, 2016). Another study conducted in Kumasi, indicated an average prevalence of 8.68% with variations among closely related population (Amidu *et al.*, 2012).

These studies indicate that Ghana is highly endemic for HBV, which is an important public health problem. The endemicity is higher in the northern as compared to the middle and coastal

regions, and the rural as compared to urban areas. There is also a high prevalence of the condition among blood donors and pregnant women (Ofori-Asenso and Agyeman, 2016). The Hepatitis B virus infection is the most common cause of chronic hepatitis, liver cirrhosis and hepatocellular cancer among children and adults in Ghana (Okyere, 2016).

Humans are the only source of infection of the HBV. The hepatitis B virus infection is caused by a 42-nm DNA virus in the family Hepadnaviridae. The virus is also called a Dane particle has an excess of its surface protein known as hepatitis B surface antigen (HBsAg) circulate in the blood of infected persons. The infection may cause an acute viral hepatitis which is usually asymptomatic especially when acquired at birth. It may also lead to chronic hepatitis which may be asymptomatic or lead to liver cirrhosis or hepatocellular carcinoma decades after the acute infection. The risk of progression to chronic sequelae depends on the mode of transmission. Vertical transmission from mother to child has a 90% risk as compared to the 10% risk from horizontal transmission (Locarnini *et al.*, 2015).

The clinical manifestation of HBV ranges from asymptomatic HBV carriers to fulminant liver failure, chronic hepatitis to hepatic cirrhosis and hepatocellular carcinoma. These clinical manifestations may vary depending on the individual's age at infection (Locarnini *et al.*, 2015). Less than 10% of children under 5years old show symptoms, while 30 to 50% in adults demonstrate symptoms (McMahon et al in Hou, Liu and Gu, 2005). The risk of chronic HBV infection varies inversely with age; 80 to 90% of neonatal infections, 30 to 60% of infants, 5% or less of adults (Hyams et al., 1995 in Hou, Liu and Gu, 2005).

The Hepatitis B virus infection is spread effectively through contact with contaminated blood and semen and saliva. The modes of transmission of HBV are grouped mainly into horizontal

transmission and vertical transmission. Vertical transmission of the HBV is also called the mother to child transmission, which usually occurs in the perinatal period during labour and delivery. The horizontal transmission refers to all other modes of transmission which include; early inapparent childhood infection, tribal tattooing and scarification, sexual contact, blood transfusions, unsafe injection practices, injecting drug use and occupational exposure of health care workers (Locarnini *et al.*, 2015).

Perinatal infection occurs frequently if the mother with HBV is HBeAg-positive and has a high level of serum HBV-DNA. When infants born to HBsAg-positive mothers do not receive perinatal hepatitis B vaccine and immunoglobulin prophylaxis, infection rates in exposed and unexposed infants are 70 to 90% and 10 to 20%, respectively, of which 90% will progress to chronic infection (Beasley, 1988). The preventive effect of the hepatitis B monovalent vaccine and immunoglobin is shown by 90% of newborns within 24 hours of birth. There is little evidence that HBV is transmitted through breast milk (Hou, Liu and Gu, 2005).

Perinatal transmission of HBV is the most important contributor to the incidence of HBV in highly endemic countries like Ghana (Locarnini *et al.*, 2015). Strengthening of services of prevention of mother to child transmission (PMTCT) of HBV is a key ingredient in the elimination of HBV as a public health threat. The PMTCT of HBV may be grouped into antenatal practices, perinatal and delivery practices, postnatal and post vaccination serological testing in the infant.

These PMTCT services include: education of all pregnant women about HBV, early screening of pregnant mothers for HBV, regular follow up with HBV viral loads and treatment when indicated in the second and third trimesters, hepatitis vaccination with HBV vaccine and

immunoglobin at birth to the exposed neonate. According to the Global Health Sector Strategy (GHSS) on viral hepatitis, the indicator of PMTCT of HBV is the HBV birth dose vaccination coverage. The global coverage of birth dose HBV vaccination is 39% (WHO, 2017b). WHO and UNICEF estimate on immunization coverage has no available data on the birth dose in Ghana. This is because of a lack of national policy for universal HBV birth dose vaccination in Ghana (Ghana Health Service [GHS], 2016)(WHO and UNICEF, 2017).

The research looks at the practices of PMTCT of HBV to identify gaps and provide evidencebased recommendation to bridge these gaps with the goal of eliminating or reducing the overall burden of HBV in Ghana

1.2 PROBLEM STATEMENT

A year and a half ago, the World Health Assembly launched the Global Health Sector Strategy (GHSS) on viral hepatitis. The GHSS calls for the elimination of viral hepatitis as a public health threat by 2030; by the reduction of new infection by 90% and mortality by 65% (WHO, 2017b). As part of its five synergistic interventions to achieve this ambitious target is the prevention of mother to child transmission of HBV.

Studies in Ghana have shown an extremely high prevalence of HBV among pregnant women (Adade Bempong, 2016; Ofori-Asenso and Agyeman, 2016). However, the strategies for the national control of HBV are limited to surveillance of acute viral hepatitis, education, screening of mothers at antenatal booking visits and three completed HBV vaccine doses in the infant (GHS, 2016). Little is done to reduce MTCT of HBV.

There is therefore the need to assess the current practices of PMTCT of HBV to identify the gaps in current practices and propose recommendations that may help improve the current situation.

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1.3 RATIONALE OF STUDY

Ghana adopted the vaccination against HBV as part of its expanded program on immunization (EPI) in 2002. However 17 years on, studies have shown that despite this intervention the country is still highly endemic (Rufai *et al.*, 2014; Adade Bempong, 2016; Ofori-Asenso and Agyeman, 2016).

This trend is indicative of the need to adopt other control measures to augment the EPI towards elimination of HBV in Ghana. There is therefore the need to focus on PMTCT of HBV to accelerate the progress of elimination of HBV in Ghana and reduce its consequent morbidities and mortalities.

This is an introductory study to assess the current practices of PMTCT of HBV among pregnant mothers and their newborns in the Ashanti region. It hopes to provide information about the current situation, identify shortfalls and propose recommendations on how to improve PMTCT of HBV. The evidence gained may add to literature and inform public policy to strengthen PMTCT of HBV across the nation.

1.4 CONCEPTUAL FRAMEWORK

The figure 1 below presents as per the extant literature, the conceptual framework of the practices of PMTCT of HBV among mothers and their newborns. The framework focuses on the assessment of sociodemographic factors, maternal knowledge, care that mothers and their

newborns receive from the antenatal period to the early postnatal period that contribute to the PMTCT of HBV. This framework is my construct based on literature review and objectives of this study.

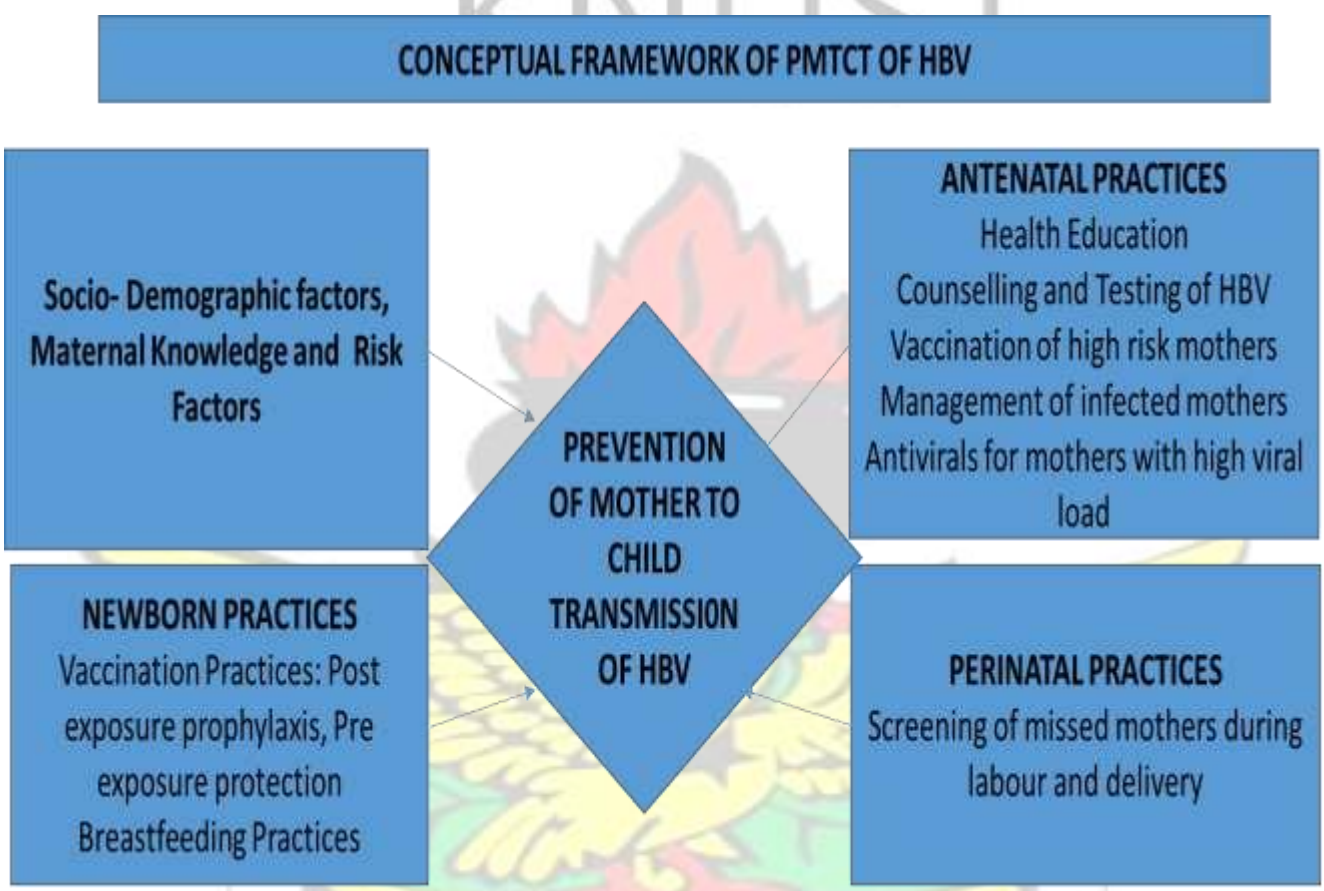

Figure 1: Conceptual framework of PMTCT of HBV (Author's construct)

1.5 RESEARCH QUESTIONS

1. What is the mother's knowledge on PMTCT of HBV?
2. What are current practices of PMTCT of HBV from antenatal to the early neonatal period
3. What proportions of:
    a. Pregnant women are screened over the antenatal to early neonatal period?

b. Exposed neonates receive the birth dose vaccination?

4. What is the prevalence of HBV and coinfection of HIV among pregnant women?
5. What maternal factors influence uptake of PMTCT of HBV?

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1.6 GENERAL OBJECTIVE

To assess current practices of PMTCT of HBV among mothers and their newborns during antenatal to the early neonatal period within health facilities in the Ashanti Region of Ghana

1.7 SPECIFIC OBJECTIVES

1. To assess the knowledge of pregnant women about PMTCT of HBV
2. To describe practices of PMTCT of HBV from the antenatal to the early neonatal period
3. To determine proportion of the following:
   a. Pregnant women screened for HBV over the antenatal to delivery
   b. Exposed neonates who receive the birth dose of vaccination against HBV
4. To determine the prevalence of maternal HBV infection and coinfection with HIV. 5. To assess the influence of maternal factors on PMTCT of HBV

1.8 PROFILE OF STUDY AREA

The Kumasi Metropolis is where the study will be conducted. It is the capital city of the Ashanti region. The Metropolis shares boundaries with Kwabre East and Afigya Kwabre

Districts to the north, Atwima Kwanwoma and Atwima Nwabiagya Districts to the west, Asokore Mampong and Ejisu-Juaben Municipality to the east and Bosomtwe District to the south. It is approximately 270km north of the national capital, Accra. Kumasi has a surface area of approximately 214.3 square kilometers which is about 0.9 percent of the region's land area. However, it accommodates about 36.2 percent of the region's population.

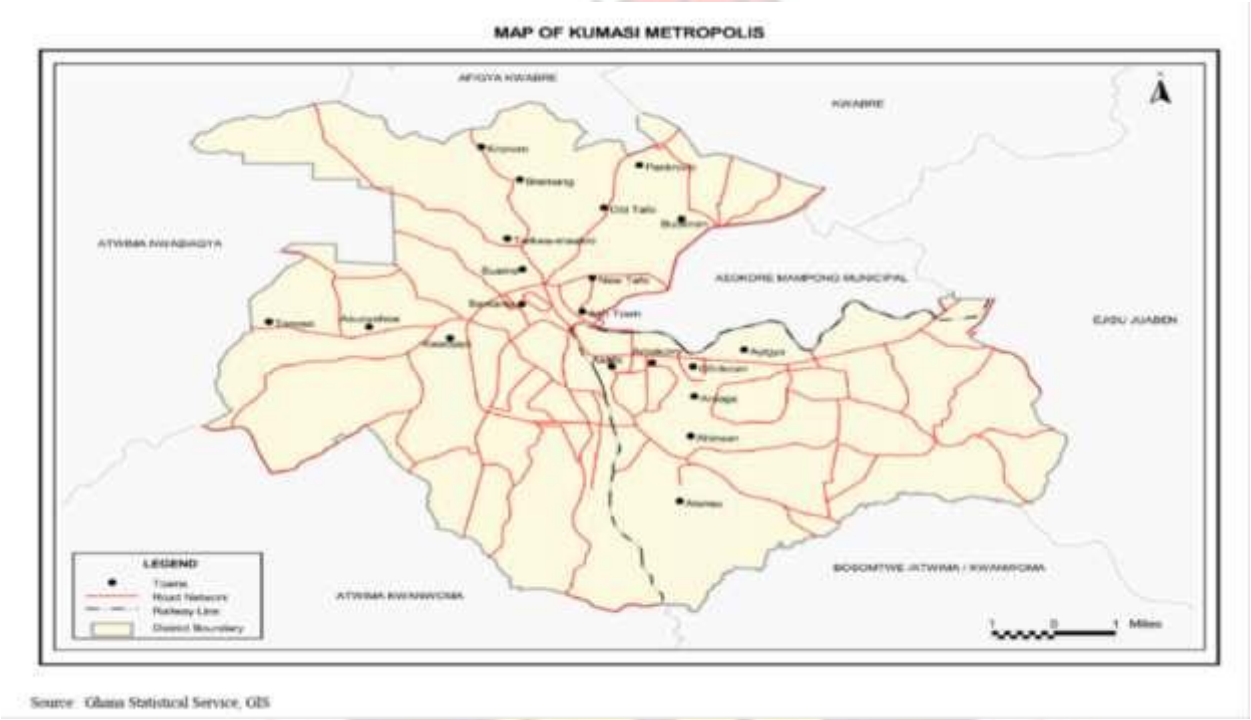

Figure 2: Map of Kumasi Metropolis

The total population of the metropolis as at the 2010 census was 1,730,249 with a potential labour force of 1,095,190 (65.3%). Over thirty three percent (33.2% of the population between ages 0- 14 and the remainder above 65 years. Female in their reproductive years were 514, 640. The total fertility rate was 2.6, the crude birth rate of 22.8 per 1000 population and a general fertility rate of 76.5/1000 women in their reproductive years. Majority (89.4%) of

children born in the metropolis survive. The women between ages 25-54 had the highest number of children and the highest child surviving rates.

The Kumasi metropolis is completely urbanized. It has a wide array of infrastructure that provides social services to residents. There are available facilities of healthcare delivery, teaching and learning, water supply, electricity transmission, information and technology, transport and security services. There are 136 health facilities of which 21 are public health facilities, the rest are privately owned. The biggest facility is the Komfo Anokye Teaching Hospital, which is a tertiary institution used by residents and others across Ghana and overseas.

1.9 SCOPE OF STUDY

The study was limited to mothers who had delivered and were at the Komfo Anokye Teaching Hospital at the time of study. Data were collected from the maternal and child records as well. The focus of the study was to assess the practices of PMTCT of HBV among the participants as outlined in the specific objectives and the conceptual framework of the study.

The study was limited to the practices among mothers, did not look at institutional practices. The study was also limited to the antenatal, intrapartum and early neonatal period. It does not look at practices in the postnatal period and the infant.

1.10 ORGANIZATION OF THE REPORT

The thesis was organized into six chapters. Chapter one was the introduction and it covered the background information PMTCT of HBV, the problem statement, rationale of the study,

the conceptual framework, research questions, general and specific objectives, profile of study area and the scope of the study. Chapter two reviewed related literature based on the objectives and study variables of the study. Chapter three described the methodological approach to the study including the study type, study area, variables to be measured, instruments used, sampling technique and size, pre-testing, data management, analysis and ethical issues. Limitations and assumptions employed in the study are also captured under this chapter. Chapter four and five covered results of the study and discussion respectively. Finally, chapter six catalogued the conclusions and specific recommendations to stakeholders based on the major findings made in the study.

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CHAPTER 2- 2.0 LITERATURE REVIEW

2.1 INTRODUCTION

Hepatitis B infection is a ubiquitous infection of the human being by a virus called the hepatitis b virus (HBV). It is a small enveloped, partial double stranded deoxyribonucleic acid (DNA) virus belonging to the Hepadnaviridae family. It has about 9 different genotypes which vary with ethnic and geographical areas and the extent of disease progression (Chu *et al.*, 2003; Lin and Kao, 2017,) WHO, 2015). It is a hepatotropic virus, which causes acute or chronic inflammation of liver that maybe mild or lead to subsequent sequelae such as liver decompensation, necrosis and fibrosis (cirrhosis) and hepatocellular carcinoma. Immunocompetent individuals are most likely to have an acute infection with about 5% resulting in chronic infections. Neonates, children and immune deficient individuals on the other hand, tend to have chronic infections, which lead to carrier states and subsequent transmission and maintenance of the infection in the population. Ninety percent of infections from birth to six months of age lead to chronic infections. This reduces to less than 20% by age five (Centers for Diseace Control and Prevention (CDC), 2015; Tran, 2016). Majority of chronic HBV infections in the world occurred during childhood.

2.2 TRANSMISSION OF HBV

The infection may be transmitted via transdermal or mucosal exposure to infected blood and blood products, needle stick injuries, contacted with contaminated semen, vaginal secretions, saliva, sweat, communal living where there may be sharing of razors and toothbrushes.

Individuals who are at high risk include health care providers, people with multiple sexual partners, intravenous drug abuse users, multiple blood transfusion. People living in highly endemic regions tend to have the infections amongst household occupants and family members especially from child to child. This is known as the horizontal transmission and accounts for 50% of childhood infections that cannot be explained by mother to child transmission (Norah A. Terrault et al., 2016; WHO, 2015).

Vertical transmission refers to perinatal transmission of HBV from infected mother to the unborn baby. The majority of babies are exposed in the intrapartum period when the foetus passes through the birth canal. Little evidence supports the transmission through breastfeeding of the exposed baby. In-utero transmission is rare and may be associated with disruption of the feto-maternal circulation through threatened abortions or antepartum hemorrhage. Mothers who are positive for HBV envelope antigen (HBeAg) and have high viral loads are more likely to transmit the infection to their babies (Howell, Lemoine and Thursz, 2014; Jin *et al.*, 2014; Shimakawa *et al.*, 2014; Zhang *et al.*, 2014; Phd *et al.*, 2017). Hence the agreement by guidelines of the WHO, European Association of the Study of Liver disease (EASL) and American Association for the Study of Liver Disease (AASLD) to treat mothers with these characteristics in the third trimester of pregnancy (Norah A. Terrault et al., 2018; Norah A. Terrault et al., 2016; Tran, 2016; WHO, 2015). The advent of an effective vaccine portends the ability to prevent HBV in newborns and eliminate this infection in the near future. Other measures proposed by the global health sector strategy on viral hepatitis include: HBV vaccination, prevention of perinatal transmission of HBV, safe blood and injections, harm

reductions programs for persons who inject drugs and testing and treatment of person with chronic hepatitis B infection (CHB) (WHO, 2017).

2.3 PREVALENCE OF HBV

Despite the presence of these effective measures, Africa and Asia still record moderate to high prevalence of this infection (Ott *et al.*, 2012; Schweitzer *et al.*, 2015; Stanaway *et al.*, 2016; WHO, 2017; Razavi-Shearer *et al.*, 2018). HBsAg endemicity is classified as low (<2%), lowintermediate (2–4.9%), high- intermediate (5–7.9%) and high (8%) (Locarnini *et al.*, 2015). A modelling study in 2016 estimates the global prevalence of HBV at (3.9%) or 291 992 000 million infections (Razavi-Shearer *et al.*, 2018).

According to WHO, in 2015 HBV accounted for 275 million infections and caused more deaths than tuberculosis or human immunodeficiency virus infection (HIV) mostly in its African and Western Pacific regions (WHO, 2017). An earlier review of studies from 1990 to 2007 indicated the global prevalence at 250 million in 2005 with high endemicity in sub Saharan Africa and East Asia and low endemicity in Latin and North America and Western Europe (Ott *et al.*, 2012). This is evident of an increasing number of total HBV infections and subsequent deaths worldwide (Stanaway *et al.*, 2016) or more efficient and complex data collecting systems and increasing population size (WHO, 2017).

About 60 million people in Africa are living with CHB, which accounts for about a quarter of the world's infections(Spearman *et al.*, 2017) (WHO, 2017). Endemicity ranges from intermediate to high. Systemic reviews of studies in Ethiopia, Cameroun, Nigeria and Ghana demonstrated prevalence that ranged from 7.4% to 13.6% with Nigeria and Ethiopia recording the highest and lowest prevalence respectively. The prevalence amongst blood donors was

more than 8% in all the studies. Ghana recorded the highest prevalence amongst the pregnant women at 13.1 %. All studies indicated a higher prevalence in rural compared to urban communities (Belyhun et al., 2016; Bigna et al., 2017; Musa et al.i, 2015; Ofori-Asenso & Agyeman, 2016). In both the Ghana and Nigeria studies the highest prevalence was amongst the adult age group (Musa *et al.*, 2015; Ofori-Asenso and Agyeman, 2016). In 2016, the Ghana Health Service (GHS) reported a total of 51, 743 cases of acute viral hepatitis with a case fatality rate of 0.23%, which had increased from 2015. The service also reported 1,148 CHB infection, of which 2% resulted in mortality (GHS, 2016).

2.4 PREVALENCE OF HBV AMONG PREGNANT WOMEN

Studies in sub Saharan Africa have reported wide ranges of seroprevalence of HBsAg amongst pregnant women at antenatal clinics. The heterogeneity may result from urban versus rural settings, study design and methods and the country of study.

The seroprevalence of HBsAg in pregnant women ranges from 2.4% in Ghana (Luuse *et al.*, 2016), 3.1% in Rwanda (Nyamusi et al., 2017), 3% and 7.8% in Ethiopia (Tegegne *et al.*, 2014a) Metaferia et al., 2016), 11% in Uganda (Bayo *et al.*, 2014), 9.7% in Cameroun (Frambo *et al.*, 2014) and 10.5% in Nigeria (Atilola *et al.*, 2018). The risk factors for positivity varied across studies, some reported an increased risk in women with a history of blood transfusion and concomitant HIV infection (Noubiap *et al.*, 2015,)Atilola *et al.*, 2018). Another study reported risk of surgical excision as a factor (Guingané *et al.*, 2016). Another study found a history of working in the hospital and gestational diabetes as independent factors associated with HBsAg positivity (Nyamusi *et al.*, 2017). Multigravid women were more likely to test

positive as compared to primigravid women in one study (Luuse *et al.*, 2016) whilst in another study women less than 20 years were more likely to test positive for HBsAg (Bayo *et al.*, 2014). Most of the studies demonstrated high prevalence of HBeAg amongst positive mothers whilst one study recorded a high prevalence of HBV in cord blood from exposed neonates (Tegegne *et al.*, 2014b). Another study in a teaching hospital in Ethiopia stated that individuals with no formal education had higher risks as compared to mothers who had completed at least secondary school. It also found that even though mothers with multiple risk factors tend to test positive than individuals with single or no risk factors, the difference was not statistically significant (Metaferia *et al.*, 2016). Other studies, however, did not find any significant risk ratio for history of surgery, blood transfusion, abortion, scarification, piercing, tattoos, condom use, sexually transmitted infections, number of sexual partners, hemoglobin levels and other blood indices and being HIV positive (Frambo *et al.*, 2014)(Bayo *et al.*, 2014).

A study of 2010 archived samples of pregnant women in Ghana stated the prevalence of HBsAg at 14.33% and HBeAg at 1.23%, prevalence was higher in the northern regions of the country as compared to the southern regions and also higher in rural areas as compared to urban areas (Adade Bempong, 2016). Also a systemic review from 1995 to 2015 included 5 studies amongst pregnant women and mothers who had delivered estimated prevalence of HBV between 10.5% to 16.0% with a pooled prevalence (13.1%) that was not statistically different from the general population (Ofori-Asenso and Agyeman, 2016).

2.5 PREVALENCE OF HBV/ HIV COINFECTION AMONGST PREGNANT WOMEN

A meta-analysis of 12 studies involving 8162 HIV patients from 1999 to 2016 in Ghana estimated that coinfection ranged from 2.4% to 41.7% and a pooled prevalence of 13.6%

(Adom Agyeman and Ofori-Asenso, 2016) whereas prevalence of HIV among pregnant women at the antenatal clinics was 1.8%, ranging from 1.2% to 3.2% from the Northern region to the Greater Accra region((GHS) National AIDS and STI Control Programme (NACP), 2016).

A prospective study in South Africa reported prevalence of 7.4% among urban women living with HIV (Hoffmann *et al.*, 2014) , whilst another study in Rwanda (Mutagoma *et al.*, 2017)and Ethiopia (Zenebe *et al.*, 2014) reported a prevalence of 4.1% and 19.0% respectively. The risk factors for coinfection included young adults, urban residence, more than 2 pregnancies, syphilis infection, blood transfusion, body tattooing, surgery, unsafe injections and abortion (Zenebe *et al.*, 2014; Mutagoma *et al.*, 2017).

2.6 KNOWLEDGE OF PREGNANT WOMEN ABOUT PMTCT OF HBV

Studies had demonstrated poor knowledge of mother to child transmission of HBV and its prevention among pregnant women(Bayo et al., 2014; Frambo et al., 2014; Guingané et al., 2014; Han et al., 2017; Noubiap et al., 2015; Tegegne et al.,2014a). A study in an urban district of Burkina Faso demonstrated low levels of knowledge of HBV. About half of the mothers knew about the perinatal transmission of the HBV. Health workers had higher awareness as compared to housewives. Also, a previous screening of HBV increased knowledge scores. Slightly more than a third of the mothers had knowledge that vaccination, safe sex, screening blood donors and use of disposable equipment were preventive methods of HBV. About half of mothers knew that HBV could be treated and that it was also a deadly disease(Guingané *et al.*, 2016).

A hospital-based study in China reported that more than half of the mothers were unaware that HBV could be transmitted through unprotected sexual intercourse. A fifth of mothers did not know that HBV could be transmitted from an infected mother to her infant (Han *et al.*, 2017). A study conducted in the antenatal clinic in a district hospital in Kenya reported more than half of mothers with no knowledge of HBV(Asundula *et al.*, 2016).Women who had higher education and were health workers had better knowledge scores (Asundula *et al.*, 2016;Guingané *et al.*, 2016; Han *et al.*, 2017).

Another study in Ghana amongst midwives and physicians demonstrated good knowledge of HBV. However, it reported knowledge gaps in the use of HBV vaccine and immunoglobin in the newborn. it also reported a lack of training on PMTCT of HBV among the health workers(Adjei et al., 2016).

2.7 PRACTICES OF PMTCT OF HBV FROM ANTENATAL PERIOD TO THE PERINATAL PERIOD

Perinatal transmission of HBV may be defined as presence of HBsAg or HBV DNA at 6-12 months of life in an exposed infant. The presence of HBsAg or HBV DNA at birth may be transitory. Also the presence of antibodies (HBeAg, HBeAb, HBcAb) from birth up to 2 years of life do not imply chronic infection in the exposed child (Gentile and Borgia, 2014). The prevalence of HBsAg in children under 5 years of age and coverage of universal birth dose of HBV vaccine are indicators of PMTCT of HBV (WHO, 2015). This estimate may also include horizontal transmission of infection in highly endemic regions.

Vertical transmission of HBV is the most important contributor to the incidence of HBV in highly endemic countries (Locarnini *et al.*, 2015). Ninety percent of HBV infected children will develop CHB compared to 96% of adults who will clear the infections (Andersson *et al.*, 2015). Hence breaking the early transmission of HBV may prevent the propagation of HBV infection, reduce morbidity and mortality related to HBV infection. Strengthening PMTCT of HBV is a key ingredient in the elimination of HBV as a public health threat. The PMTCT of HBV may be grouped into antenatal practices, perinatal and delivery practices, postnatal and post vaccination serological testing in the infant(Gillespie, 2016; Sarin *et al.*, 2016).

These PMTCT services include: education of all pregnant women about HBV, early screening of pregnant mothers for HBV, regular follow up with HBV viral loads and treatment when indicated in the second and third trimesters, hepatitis vaccination with HBV vaccine and immunoglobin at birth to the exposed neonate.

2.8 MATERNAL SCREENING OF HBV

It is recommended that all pregnant mothers be screened in the first trimester for hepatitis B surface antigen (HBsAg) irrespective of their prior testing or vaccination status(Centers for Diseace Control and Prevention (CDC), 2015; Lampertico et al., 2017; Ségéral et al., 2018; N.A. Terrault et al., 2018; WHO, 2017).

Universal screening of pregnant mothers in Ghana was made a national policy a couple of years ago in the effort to estimate the prevalence of HBV among mothers and the possible introduction of universal dose vaccine (GHS, 2016). Also the NACP recommends baseline screening of all pregnant women living with HIV with HBsAg, vaccination is recommended

for uninfected mothers after initiation of ARVs to increase immunological response((GHS)(NACP), 2016). A high coverage of screening leads to an increased number of reported cases and vaccination of neonates, hence PMTCT of HBV (Harder *et al.*, 2011). The use of rapid diagnostic test for HBV (HBsAg and HBeAg) was found to have a high sensitive and specificity compared to the confirmatory ELISA test in Cambodia. The test was found to be a high quality cost effective practice in settings where HBV DNA was expensive or unavailable (Ségéral *et al.*, 2018).

Mothers screened who are negative and at high risk for acquiring the infection may be vaccinated against HBV. The high risk mothers include people living with HIV (PLWH), partners of HBV infection, HCV infection, mothers who work in nursing homes, hospitals, prisons, people who inject drugs (PWID), end stage kidney disease and diabetes mellitus (DM) (Nelson, Jamieson and Murphy, 2014).

Mothers who test positive to the initial rapid test, will need a confirmatory test and serological profile, HBV DNA quantitative test at baseline and at 28 weeks. Again, mothers who have low viral load are monitored till delivery when the infant is vaccinated within 24 hours. Mothers who have high viral loads, may be started on ARVs such as lamivudine, tenofovir or telbivudine in the third trimester and infants vaccinated with immunoglobulin and the monovalent vaccine (CDC , 2015; Tran, 2016).

2.9 ANTIVIRAL THERAPY

All pregnant women who have CHB infection and meet the criteria for treatment must be put on antiviral therapy. This include mothers who have evidence of either compensated or decompensated liver cirrhosis regardless of their liver alanine transaminase (ALT) levels,

HBeAg status or HBV DNA quantity. Also, mothers older than 30 years with persistently abnormal ALT levels and high HBV replication evidence by HBV DNA of greater than 20,000IU/ml irrespective of their HBeAg status.

In low resource settings, like Ghana, where HBV DNA testing may be expensive or unavailable, the decision to treat may be based on the abnormal ALT. In mothers who have a coinfection with HIV, treatment is started for those with severe chronic liver disease (CLD) regardless of their CD4 count. Also, those who have CD4 counts less than 500cells/mm^3 are started on treatment regardless of the stage of liver disease. Antiviral therapy is deferred in mothers without evidence of CLD, normal levels of ALT and HBV DNA levels of less than 2000IU/ml (WHO, 2015; Lampertico P, Agarwal K, Berg T, Buti M, Janssen H. Papatheodoridis G, Zoulim F, 2017; Terrault *et al.*, 2018).

Tenofovir is preferred to lamivudine and telbivudine because of its greater resistance and safety profile in monoinfected pregnant women. Interferon based therapy is contraindicated in pregnancy (WHO, 2015; Tran, 2016; Lampertico P, Agarwal K, Berg T, Buti M, Janssen H. Papatheodoridis G, Zoulim F, 2017; Terrault *et al.*, 2018). Regular monitoring is required for mothers who are 30 years or less with no evidence of cirrhosis but high DNA levels of 20,000IU/ML or between 2,000 and 20,000IU/ML with normal or intermittently normal ALT and HBeAg negative status (WHO, 2015).

The WHO did not make any key recommendation on the use of antivirals as PMTCT because of lack of conclusive data. The American and the European Association of the Study Of Liver Diseases (AASLD/ EASL) however suggest the use of antivirals to prevent perinatal transmission in mothers who have HBsAg positive and HBV DNA greater than 200,000IU/ml

(Terrault *et al.*, 2016; Lampertico P, Agarwal K, Berg T, Buti M, Janssen H. Papatheodoridis G, Zoulim F, 2017).

However, there is evidence that at high maternal DNA level of between greater than 2x $log10^6$ to $log10^8$ about 3% of babies may be infected despite timely vaccination with monovalent vaccine and the hepatitis B immunoglobulin and completion of 2 or 3 scheduled vaccine doses within 6 months of age (Gentile and Borgia, 2014). Some guidelines recommend mothers with these high DNA levels be treated with antivirals as prophylaxis to prevent vertical transmission of HBV. The exact time to start is not agreed upon, however, between 24 to 32 weeks, for a period of 12 weeks and monitored during the post delivery period. Monitoring may be done every 3 months for 6 months post-delivery for hepatic flares (Lampertico P, Agarwal K, Berg T, Buti M, Janssen H. Papatheodoridis G, Zoulim F, 2017; Terrault *et al.*, 2016). All mothers who meet the criteria for antiviral therapy must be screened for HIV to prevent resistance to monotherapy use of tenofovir or lamivudine (Lampertico *et al.*, 2017).

2.10 DELIVERY

Studies have reported varying outcomes in exposed babies delivered by vaginal delivery as compared to caesarean section. Studies that initially supported caesarean delivery for PMTCT of HBV realised no significant differences after adjusting for maternal HBV DNA levels (Tran, 2016). There is however general consensus amongst the AASLD, EASLD and WHO that caesarean section is not recommended solely for the PMTCT of HBV (WHO, 2015; Terrault *et al.*, 2016; Lampertico P, Agarwal K, Berg T, Buti M, Janssen H. Papatheodoridis G, Zoulim F, 2017). Another study which grouped exposed babies who have been immunized

by mode of delivery into caesarean section, vaginal delivery and assisted vaginal delivery found no difference in rates of chronic infection amongst the various groups (Wang et al., 2002 in Zhang et al., 2014).

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2.11 UNIVERSAL BIRTH DOSE VACCINATION

WHO recommends the vaccination of all newborns at birth or within 24 hours of birth for the monovalent vaccine of HBV followed by 2 or 3 subsequent doses of monovalent vaccine or combined vaccines of HBV. This is especially important in areas with high prevalence of CHB, high levels of positive HBsAg amongst mothers(WHO, 2017). A loss of the birth dose vaccine may cause as many as 90% of newborns, born to mothers with HBsAg and HBeAg positive, become infected by the six weeks' period (World Health Organization (WHO), 2015).

According to the Global Health Sector Strategy (GHSS) on viral hepatitis, the indicator of PMTCT of HBV is the HBV birth dose vaccination coverage. The global coverage of birth dose HBV vaccination is 39% (WHO, 2017b); however WHO and UNICEF estimate on immunization coverage has no available data on the birth dose in Ghana, this is because of a lack of national policy for universal HBV birth dose vaccination (GHS, 2016; WHO and UNICEF, 2017).

2.12 HEPATITIS B IMMUNOGLOBULIN (HBIG) ADMINISTRATION AT BIRTH

The combination of HBIG and HBV vaccination administered within 12 hours of birth has greatly reduced perinatal transmission of HBV even though failure rate occur in 5-10% of newborns delivered to mothers with HBeAg positivity and high viral loads(Terrault *et al.*,

2016). The AASLD recommends this combination immunoprophylaxis to all exposed newborns (Terrault *et al.*, 2016). The WHO guidelines, recommends that this combination is beneficial in babies of mothers who are HBsAg and HBeAg positive. However, in term babies born to mothers who are HBsAg positive but negative for HBeAg, there is no significant benefits in prevention of perinatal infection compared to the monovalent vaccine only (WHO), 2015). Ghana lacks a structured program pertaining to universal birth dose vaccination and the HBIG administration at birth (GHS, 2016). Again majority of midwives and physician are unaware of the combination regimen as against the immunoglobin administration at birth (Adjei *et al.*, 2016). Another study determined the combination immunoprophylaxis to be cost effective in well resource settings, whereas the monovalent vaccination alone was found to be optimal in resource constraint areas like Ghana (Chen et al., 2013 in Sarin *et al.*, 2016).

2.13 BREASTFEEDING PRACTICES

The World Health Organization (WHO) recommends breastfeeding in HBsAg positive mothers because of lack of evidence to support a difference in transmission rate in newborns among breastfed and formula fed infants, there is however limited information on the effects of antivirals secreted in breast milk (WHO, 2015). This view was supported in a study by Pirillo and her colleagues who reported insignificant levels of HBV DNA in breast milk(Pirillo *et al.*, 2015). However, some guidelines recommend breastfeeding as long as the infant receives immunoprophylaxis at birth (Dionne-Odom, Tita and Silverman, 2016). Mothers have to prevent cracked or sore bleeding nipples, and they may have to suspend breastfeeding until resolution of symptoms (Eke, Onyire and Amadi, 2016). Again the lack of difference in

chronic infection of HBV among breastfed infants has been attributed to lactoferrin which is thought to neutralize the HBV in breast milk (Zheng et al., 2011 in Zhang et al., 2014). Breastfeeding is not contraindicated in mothers with CHB on either lamivudine or tenofovir because of the use of evidence of its safety use in mothers with HIV (Terrault *et al.*, 2016).

Early initiation of breastfeeding is recommended as soon as possible within the first hour of delivery (WHO, 2017). Babies initiated within the first hour of birth have lower risk of neonatal mortality compared to 2-23hours and beyond 24 hours after delivery (Khan *et al.*, 2014; Smith *et al.*, 2017).

2.15 BATHING PRACTICES

The first bath is given to remove any contaminants such as faeces, urine, harmful maternal secretions in babies exposed to HIV, HBV, HCV (Kuller McManus, 2014). These may be reduced by bathing the baby with water and mild soap (Nelson, Jamieson and Murphy, 2014). The WHO recommends that newborns are bathed after 24 hours, however in areas where this is not permissible, bathing should be done after 6 hours (WHO, 2013;Silvestre *et al.*, 2018). Bathing in exposed infants to HIV, HBV and HCV is recommended as soon as newborn is stable to take the first bath to prevent transmission to nursery staff and reduce contact time to infectious fluid (Kuller McManus, 2014).

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CHAPTER 3- 3.0 METHODOLOGY

3.1 STUDY METHODS AND DESIGN

The study employed quantitative methods of inquiry. A cross sectional hospital-based study was done.

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3.3 STUDY AREA:

The study was based in the Komfo Anokye Teaching Hospital (KATH) the second largest teaching hospital in Ghana and the main referral centre in the northern sector of Ghana. KATH is located in the Kumasi Metropolis which is the capital of the Ashanti region of Ghana with an estimated population of 4,780,380 according to the 2010 population census.

The hospital is a 1200 bed facility, which employs about 4000 workers. It has 15 directorates of which the obstetrics and gynecology directorate is the second largest. The directorate has the largest deliveries in the Ashanti region. It is located on the A block, its labour and emergency services located at the NAKSA- BECCA block, reproductive and family planning services block, specialist consulting rooms and general outpatient office.

The postnatal wards include the ward A1, A1 annex and A2. The A1 ward is also known as the high dependency ward for high risk deliveries especially hypertensive disorders, A1 annex is the postnatal ward for mothers who had spontaneous vaginal deliveries and A2 was for mothers who had post caesarean section delivery. These wards have 23, 11 and 35 beds respectfully.

3.4 STUDY POPULATION

The population comprised all women who had delivered and were either detained or on admission at Komfo Anokye Teaching Hospital in the Kumasi metropolitan area and their newborns at the time of study. This included women who had delivered elsewhere, were referred in for further care and had been admitted for care.

3.5 STUDY VARIABLES

Tables 1 and 2 shows the list of dependent and independent study variables respectively.

The primary exposure variables are:

1. The antenatal practices
2. Labour and delivery practices
3. Early newborn care practices.

The confounding variables are the

1. Socio-demographic characteristics of mothers,
2. Health status of mothers and newborns,
3. The health care provider
4. Type and setting of health facility used by mother

Table 1: DEPENDENT STUDY VARIABLES

NO.	VARIABLE	TYPE OF VARIABLE	OPERATIONAL DEFINITION	SCALE OF MEASUREMENT

SOCIODEMOGRAPHIC INDICATORS				
1.	Mothers Knowledge Of HBV	Dependent	Assessment of knowledge of HBV among mothers	Categorical, ordinal
ANC PRACTICES INDICATORS				
2.	HBV status	Dependent	Test negative or positive mothers	nominal
3.	Further HBV tests	Dependent	Additional tests for HBV positive mothers and their results	nominal
4.	Frequency of HBV test	Dependent	Repeated test of serum markers for HBV in the positive mothers, duration interval and gestations at which tests were undertaken	nominal
5.	Antiviral prophylaxis	Dependent	Use of antivirals such as lamivudine, tenofovir as prophylaxis for PMTCT, gestation started and follow up.	Categorical, nominal
6.	HBV Vaccinations for high risk mothers in pregnancy	Dependent	HBV vaccination for mothers who have HIV, multiple sexual partners in the last 6 months, intravenous drug use	Nominal
LABOUR AND DELIVERY PRACTICES INDICATORS				
7.	Screening of missed mother at delivery for HBV	Dependent	Screening of missed mothers for HBsAg at delivery	Categorical, nominal
NEWBORN PRACTICES INDICATORS				
8.	Time of bathing of newborn	Dependent	An estimate of time from birth to bathing of newborn from records	Categorical, ordinal
9.	Vaccinations that newborn has received	Dependent	monovalent vaccine and hepatitis B Immunoglobulin received by the exposed newborn	Categorical, nominal

Table 2: INDEPENDENT STUDY VARIABLES

NO.	VARIABLE	TYPE OF VARIABLE	OPERATIONAL DEFINITION	SCALE OF MEASUREMENT
SOCIODEMOGRAPHIC INDICATORS				
1.	Age	Independent	Age recorded in completed years disregarding of fractions of days and months	Discrete, numerical
2.	Marital Status	Independent	Marital status of the mother	Nominal
3.	Employment	Independent	Whether the mother is economically active or not	Nominal
4.	Occupation	Independent	The type of work that mother is engaged in at the place of work	Nominal
5.	Educational status	Independent	Highest level of formal education that the mother every attended or is attending	Ordinal
6.	Ethnicity	Independent	Ethnic group that the mother belongs to	Nominal
7.	Religion	Independent	Religion practiced by mother	Nominal
8.	Location of residence	Independent	Name of the area of residence of the mother	Nominal
9.	Nationality	Independent	The country which the mother belongs	Nominal
ANC PRACTICES INDICATORS				
10.	Date of booking visit	Independent	First day of ANC	Nominal
11.	Gestation at booking	Independent	Gestation at booking from last menstrual period or early scan in weeks	Discrete, numerical
12.	Gravidity	Independent	Number of all pregnancies carried by the mother including viable and non-viable pregnancies	Discrete, numerical

13.	Parity	Independent	Pregnancies of mother that has past viability (24 weeks)	Discrete, numerical
14.	Number of abortions	Independent	Loss of pregnancy before viability	Discrete, numerical
15.	Contraceptive use	Independent	Contraceptive use before onset of pregnancy	nominal
16.	Type of contraceptive use	Independent	Natural and all other types of contraceptive use	nominal
17.	History of STI and HIV, UTI, DM, HPT, hemotransfusion	Independent	Maternal history of these disease during or before pregnancy	nominal
LABOUR AND DELIVERY PRACTICES INDICATORS				
18.	Mode of delivery	Independent	Spontaneous vaginal, assistive vaginal or caesarean delivery of foetus	Categorical, nominal
19.	Assistive Procedures at delivery	Independent	Methods of assistive vaginal delivery used at delivery of foetus	Categorical, nominal
20.	Complications at labour and delivery	Independent	Maternal complications recorded in maternal records and from interview	Categorical, nominal
NEWBORN PRACTICES INDICATORS				
21.	Birth weight of newborn	Independent	Birth weight of newborn as recorded in the records	Discrete, numerical
22.	Apgar score of newborns	Independent	Apgar score of newborns in 1minute and 5 minutes as recorded	Discrete, numerical
23.	Complications of newborn	Independent	As recorded in maternal and newborn records	Categorical, nominal
24.	Time of establishing breastfeeding	Independent	An estimated of time from time of birth to time of first breastfeeding	Categorical, ordinal

3.6 SAMPLING

3.6.1 SAMPLING TECHNIQUE

A multi stage sampling method was employed. Kumasi Metropolis was purposively selected from the districts in the Ashanti region. Komfo Anokye Teaching Hospital (KATH) purposively selected from Kumasi Metropolis which has six government hospitals namely KATH, Kumasi South Hospital (KSH), Maternal and Child Health Hospital (MCH), Tafo Government Hospital (TGH), Manhyia Government Hospital (MGH) and Suntreso Government Hospital (SGH). This is because KATH is a tertiary institution, which has specialists in all the fields of medical and surgical practice. This is because KATH is a tertiary institution, which has specialists in all the fields of medical and surgical practice. The structures and personnel required to provide the necessary care and practices for PMTCT of HBV especially with respect to the use of antiviral therapy in pregnancy and postpartum is more likely to be available. The study participants were selected from the postnatal wards in a systematic sampling technique. The index bed was chosen randomly and every other bed was sampled; unoccupied beds were replaced with the next occupied bed. The A1 annex was sampled twice a day because mothers were discharged 6 hours post-delivery.

These mothers were interviewed with a semi-structured questionnaire using the ODK app installed on smart phones. Maternal and newborn records were used as additional sources of information.

3.6.2 SAMPLE SIZE

The live births for the Kumasi Metropolis in the year 2017 were 33,421 (District Health

Information Management Systems [DHIMS], 2017). The prevalence (p) of HBV among mothers in Ghana was 13.1% to 14.3% and average of 13.7%, (Adade Bempong, 2016; OforiAsenso and Agyeman, 2016), A confidence interval (z) of 95% was taken, with a power of 80% and the margin of error (d) of 0.05. The sample size formula based on population survey and proportion below was used. $\mathbf{n = z^2p(1-p)/ d^2}$; n= $(1.96)^2$*0.137*0.863/ 0.05^2 = **181.68**, n= sample size

The minimum sample size calculated was 181. A non-respondent rate of 10% was added making the total respondents interviewed 199.

3.7 PRE-TESTING

Nineteen of the structured questionnaires were pre-tested among mothers at KATH, mother and baby unit.

3.2 DATA COLLECTION TECHNIQUES AND TOOLS

Data on the practices of PMTCT of HBV were collected with the aid of a semi-structured questionnaire among mothers and their newborns at the Komfo Anokye Teaching Hospital (KATH) in the Kumasi metropolis in the Ashanti Region of Ghana.

The questionnaire contained sections to elicit the socio-demographics of respondents, their knowledge of HBV, their ANC history, delivery and perinatal care of the mother and the newborn. Knowledge about vaccination of the newborn at birth, birth weight, Apgar score at delivery and complications related to the mother and the newborn was also collected. Ten questions on knowledge about PMTCT of HBV were asked. The questions were scored and categorized into good, average and poor. All questions had a maximum value of 1 and minimum of 0 except for question 3 and 6b which had maximum value of 4 and 2 respectively.

Good knowledge was graded as a score of 11 to 14, average knowledge as score of 6 to 10, and poor knowledge as less than 6.

SMART PHONE AND TABLET DATA COLLECTION

All data were collected using an electronic tablet and a smartphone with the aid of a software known as Open Data Kit (ODK) collect designed to run on android systems. The questionnaire was written in English and the questions were converted to formats readable by the software through basic programming, after which they were uploaded onto a secured cloud server, which acted as both the host and storage system for the data collected with the password known only to the principal investigator. Each research assistant was equipped with an electronic tablet that has the ODK collect and has been configured to communicate with the cloud server to access the questionnaire. All the information picked from the respondents was sent to the server and aggregated for analysis.

Three (3) data collectors were trained to administer the questionnaire.

3.8 DATA HANDLING

The data collected were stored electronically on two different laptops with two different backup information on externals hard drives. Each of these sources were password protected to ensure, electronic data is not altered, erased, lost or accessed by unauthorized individuals. The principal investigator, academic supervisor and statistician were the only ones with access to the data during the period of research. This measure was to ensure, integrity, confidentially, security and preservation of research data.

3.9 DATA ANALYSIS

Stata version 14.2. Statistical analytic software was used for analysis. The data collected was checked for accuracy, completeness, consistency and validity on a daily basis after close of day. Results of data analysis were presented in the form of frequency and chi square tables. The indicators of the dependent variable, which was PMTCT of HBV, was screening of mothers for HBsAg, antiviral therapy for indicated mothers, immunization for high risk mothers, screening of missed mothers at labour or delivery and reception or otherwise of a universal birth dose of HBV. These were compared with the other independent variables by use of bivariate (chi- square) analysis.

3.10 ETHICAL CONSIDERATION

Ethical clearance for the study was sought from the Kwame Nkrumah University of Science and Technology, Committee on Human Research, Publications and Ethics (CHPRE). On the field, written informed consent was endorsed by mothers before being interviewed. All data collectors from the field identified themselves personally to the mothers and the facility in-charges. The rational and nature of the study were explained to each participant. There was no physical risk to participants except for disclosure of hepatitis b infection status. The accessibility to this information was restricted as described in the data handling. Also, there were no inducements to participate in the study. Mothers did so freely. There were no direct physical benefits to participants, however the knowledge gained from this research will inform policy which may be beneficial to all. Participants had the option to quit the study at any point during the use of the questionnaire.

3.11 LIMITATIONS OF STUDY

The study was limited to only mothers who had delivered and on the postnatal wards of KATH in the Kumasi Metropolis. The prevalence of HBsAg was determined from the maternal records, the specificity and sensitivity of the serological tests used could not be determined. The small number of mothers who tested positive to HBsAg, made it difficult for more robust comparative statistics to be used in the data analysis. The study included mothers who had still births hence may not give an accurate picture of the vaccination newborn practices

3.12 ASSUMPTIONS

It was assumed that in this study, the current prevalence of HBV in the study population is similar to that recorded in the literature. It was also assumed that majority of the mothers spoke and understood either Twi or English or both very well and so understood the questions and were truthful in their responses. Again, it was also assumed that the documented antenatal, intrapartum and postnatal practices are representative of the practices of PMTCT of HBV Lastly, Komfo Anokye Teaching Hospital was assumed to be the facility with the highest deliveries in the Kumasi Metropolitan area and by extension had the majority deliveries in Kumasi.

CHAPTER 4 - RESULTS

4.1 INTRODUCTION

The section presents findings on the cross-sectional study that assessed practices of prevention of mother to child transmission of HBV in the Komfo Anokye Teaching Hospital amongst mothers and their newborns.

Data were collected on sociodemographic factors, knowledge of HBV, antenatal, labour, delivery, breastfeeding, bathing and vaccination practices of the newborn. Mothers who tested positive for both HBV and/or HIV were determined.

The total number of respondents was 199 – data from all of them were analysed after data cleaning. There were some non-responses with certain variables, however this did not affect the outcome of the study significantly.

4.2 SOCIODEMOGRAPHIC CHARACTERISTICS OF MOTHERS

Table 3 below summarizes the sociodemographic characteristics of mother. The mean age of mothers was 28.77 years (SD 5.95), majority of the respondents (97.49%) were between the ages of 16 and 40 years. Majority of the mothers (74.87%) were married, only a tenth (10.55%) had never had any formal education, whilst slightly more than a fifth had completed higher education (22.61%). Majority of the mothers (61.31%) were self-employed and about two fifths (39.20%) in the profession of trading. Nearly every four out of every five persons was a Christian (78.89%), Akan's were the majority (62.81%) and most of the women (84.92%) resided in Kumasi. All respondents were Ghanaians (99.50%) except for one who was Nigerian.

Table 3: SOCIO DEMOGRAPHIC CHARACTERISTICS

Variables	Frequency (N = 199)	Percentage
Age Group		
Less than 19	16	8.04
20- 24	28	14.07
25- 29	62	31.16
30- 34	57	28.64
35- 39	32	15.58
40- 44	5	2.51

MARITAL STATUS		
Single	12	6.03
Married	149	74.87
Cohabiting	36	18.09
Divorced	1	0.50
Widow	1	0.50
EDUCATIONAL STATUS		
No Formal Education	21	10.55
Primary	24	12.06
JHS	62	31.16
SHS	47	23.62
Higher	45	22.61
OCCUPATION		
Formal Employment	44	22.11
Self-Employed	122	61.31
Unemployed	33	16.58
RELIGION		
Christian	157	78.89
Muslim	41	20.60
No Religion	1	0.50
ETHNICITY		
Akan	125	62.81
Ewe	15	7.54
Guan	6	3.02
Grusi	5	2.51
Mole Dagbani	12	6.03
Frafra	9	4.52
Other	27	13.57
RESIDENCE		
Kumasi	169	84.92%
Outside Kumasi	30	15.08%
NATIONALITY		
Ghanaian	198	99.50%
Non-Ghanaian	1	0.50%

Source: Author's fieldwork, 2018

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4.3 KNOWLEDGE OF PREGNANT WOMEN ABOUT PMTCT OF HBV

As shown in Table 4, one hundred and sixty- eight mothers (84.42%) had heard about HBV, whilst 86 mothers (51.19%) knew that it was caused by a pathogen. Less than half of mothers knew the mode of spread of HBV. Only 40.70% knew that infected mothers could delivery via spontaneous vaginal delivery and even fewer (36.68%) knew that infected mothers could exclusively breast feed their babies. Greater than half (58.14%) thought that maternal medication could be used to prevent MTCT of HBV as compared to 16.25% (21) mothers who knew that vaccination of the newborn could prevent MTCT of HBV. Moreover, 61.81% of mothers agreed that vaccination of the exposed newborn at birth could prevent MTCT of HBV. Greater than half of mothers (50.8%) had an average knowledge score of 6.5 or higher; very few (5%) mothers had a good score. Higher proportion of mothers with higher education had average scores compared to mothers who completed JHS or SHS, whereas mothers who completed JHS or SHS had higher proportion of poor knowledge scores compared to those who completed higher education. Traders had poorer knowledge scores compared to professionals. There was no difference in knowledge scores of mothers from different ethnicities or residences.

Table 4: KNOWLEDGE OF MOTHERS ABOUT PMTCT OF HBV

VARIABLE	FREQUENCY (199)	PERCENTAGE
AWARENESS OF HBV		
Yes	168	84.42
No	28	14.07
Don't know	3	1.51
CAUSES OF HBV		
Pathogen	86	43.22

Dirt	15	7.54
Bad blood	5	2.51
Spiritual	2	1.01
Body contact	1	0.50
Don't know	59	29.65
Non-respondents	31	15.58
HOW IS HBV INFECTION SPREAD		
Unprotected sex with infected person	97	26.22
Living with an infected person	79	21.35
Saliva of an infected person	73	19.73
Contaminated blood	40	10.81
MTCT	33	8.92
Sweat of an infected person	13	3.51
Sharing of sharp objects with infected person	3	0.81
Sharing of sponge towel with an infected person	1	0.27
Don't know	31	8.39
Can a woman with HBV infection deliver by spontaneous vaginal delivery?		
Yes	81	40.70
No	24	12.06
Don't know	93	46.73
Non-respondents	1	0.50
Can a woman with HBV infection exclusively breastfeed her newborn?		
Yes	73	36.6
No	53	26.63
Don't know	73	36.68
Can a newborn be prevented from HBV infection?		
Yes	129	64.82
No	6	3.02
Don't know	64	32.16
Does vaccination of the mother prevent the newborn from HBV infection?		
Yes	115	57.79
No	18	9.05
Don't know	66	33.17
Can a pregnant mother be vaccinated against HBV?		
Yes	63	31.66
No	31	15.58
Don't know	105	52.76

How can an infected mother prevent her child from acquiring HBV infection?		
Maternal medication	75	37.69
Vaccination of child	18	9.05
Vaccination of mother	4	2.01
Caesarean section	4	2.01
Not breastfeeding	4	2.01
Education and medical advice	15	7.54
Healthy lifestyles	1	0.50
Don't know	5	2.51
Other	1	0.50
Non-respondents	72	36.18
Vaccination of the newborn prevents HBV		
Yes	123	61.81
No	5	2.51
Don't Know	71	35.68
Knowledge Score Category		
Good	10	5.03
Average	101	50.75
Poor	88	44.22
	MEAN	**CI**
Knowledge Score	5.71	5.25- 6.18

Source: Author's fieldwork, 2018

4.4 ANC, LABOUR AND DELIVERY AND NEWBORN PRACTICES OF PMTCT OF HBV

4.4.1 ANC FACILITY ATTENDED, HBV SCREENING

As shown in Table 5: All mothers enrolled for ANC except for 2 who never attended clinic until delivery. The average gestation at first ANC was 14 weeks, 35.7% of mothers booked between 14 to 26 weeks. The average number of ANC contacts was seven. One hundred and ninety- one (96%) mothers were tested for HBsAg at the booking visit, out of which 9 (4.52%) mothers tested positive for HBsAg. None of the mothers who tested positive for HBV were

followed up with LFT, serological profile, viral load. Hence none of the mothers were started on antiviral therapy.

Table 5: ANTENATAL PRACTICES: FACILITY ATTENDED, HBV SCREENING

Antenatal Practices	Frequency (N=199)	Percentage
Venue of ANC attendance		
No ANC	2	1.01
District Hospital	49	24.62
Health Center	45	22.61
Maternity Home	25	12.56
Private Hospital	44	22.11
Regional Hospital	2	1.01
Tertiary Hospital	32	16.08
Gravidity		
1	36	18.09
2- 4	122	61.31
5-11	41	20.61
Parity		
0	9	4.52
1- 4	170	85.42
5	10	5.02
6-11	15	4.02
Number of abortions		
0	159	79.90
1	22	11.06
2	14	7.04
3	1	0.50
4	2	1.01
6	1	0.50
Gestation at booking ANC visit		
Less Than 4 Weeks	1	0.50
4 - 8 Weeks	46	23.12
9 - 13 Weeks	58	29.14
14 - 26 Weeks	72	36.18
27 - 38 Weeks	10	5.03
Non respondents	12	6.03

Number of ANC Contacts		
0	2	1.51
1-4	20	10.05
4 - 8	98	49.25
>8	74	37.19
Non respondents	4	2.01
Mothers Screened For HBV		
Yes|	191	95.98
Not screened	8	4.02
HBsAg Test Result		
Positive	9	4.52
Negative	182	91.46
Not tested	8	4.02
Follow Up Tests for HBsAg positive		
Serological Profile		
No	9	100
Viral Load		
No	9	100
Liver Function Tests (LFTs)		
No	9	100
Serum Alt		
No	9	100
Antiviral Prophylaxis		
No	9	100

Source: Author's field work, 2018

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4.4.2 ANC PRACTICES: MEDICAL AND SURGICAL HISTORY AND CONTRACEPTIVE USE:

Table 6 shows that majority (96.98%) of mothers had no prior HBV infection, however only 14.7% had been vaccinated. A same number (2.5%) of mothers had prior infection and a family history of HBV. Mothers with other significant medical history included scarifications (26.63%), previous surgery (15.58%), hemotransfusion (5.53%), diabetes mellitus (1.5%), hypertension (3.02%), condom use (0.5%).

Table 6: MEDICAL AND SURGICAL HISTORY AND CONTRACEPTIVE USE

History of HBV	**FREQUENCY**	**PERCENTAGE**
Yes	5	2.51
No	193	96.98
Don't know	1	0.50
Previous Hepatitis B vaccination		
No	169	84.92
Yes	28	14.07
Don't know	2	1.01
Family history of hepatitis B		
Yes	5	2.51
No	170	85.43
Don't know	24	12.06
History of diabetes mellitus		
Yes	3	1.51
No	196	98.49
History of hypertension		
Yes	6	3.02
No	193	96.98
History of sickle cell disease		
Yes	3	1.51
No	193	96.98

History of scarifications		
Yes	53	26.63
No	146	73.37
Don't know |	3	1.51
History of previous surgery		
Yes	31	15.58
No	168	84.42
History of haemotransfusion		
Yes	11	5.53
No	187	93.97
Don't know	1	0.50
Contraceptive type		
No contraceptive use	133	66.83
Combine oral contraceptive pill	22	11.06
Emergency pill	3	1.51
One month injectable	2	1.01
3 months injectable	19	9.55
3 years implant	2	1.01
5 years implant	11	5.53
Intra uterine device	1	0.50
Condom	1	0.50
Natural method	3	1.51
Don't know	1	0.50
Non respondent	1	0.50

Source: Author's field work, 2018

4.4.3 ANC PRACTICES: STI SCREENING:

Table 7 shows about ninety-seven percent of mothers were screened for the first HIV test, 1.6% tested positive. Only 15.58% of mothers had the second HIV screening and all tested negative for HIV. About ninety-six percent of mothers were tested for syphilis, 1.56 % tested positive for syphilis.

Table 7: ANC PRACTICES: STI SCREENING

First HIV Screening	**Frequency**	**Percentage**
Yes	188	97.41
No	5	2.59
First HIV Test Result		
HIV positive	3	1.60
HIV negative	185	98.40
Repeat HIV Screening		
Screened	31	15.58
Not screened	165	84.18
Repeat HIV Test Results		
Not tested	168	84.42
HIV negative	31	15.58
Screening for Syphilis		
Screened	191	96.95
Not screened	6	3.05
Syphilis test result		
Syphilis negative	187	98.42
Syphilis positive	3	1.58

Source: Author's field work, 2018

4.4.4 LABOUR AND DELIVERY PRACTICES:

Table 8 summarizes the labour and delivery practices: All the interviewed mothers delivered at KATH except for 5 who were referred post-delivery. More than half of them (56.79%) had vaginal deliveries, caesarean section rate among the mothers was 43.2%. Majority (88.4%) of deliveries resulted in live births. Six (66.67%) of the HBV infected mothers had spontaneous

vaginal deliveries (SVD) whilst the other three underwent caesarean sections (CS) as compared to the 53.17% of non-infected mothers who had SVD and 42.63% who had CS.

Table 8: LABOUR AND DELIVERY PRACTICES

Delivery facility level	**Frequency**	**Percentage**
District hospital	2	1.01
Health center	2	1.01
Private Hospital	1	0.50
Tertiary hospital	194	97.49
Mode of delivery		
Caesarean section	86	43.22
Spontaneous vaginal delivery	110	55.28
Vacuum delivery	3	1.51
Outcome of delivery		
Live birth	176	88.44
Stillbirth	22	11.06
Non-respondent	1	0.50

Mode of Delivery	HBsAg Negative	HBsAg Positive
Caesarean Section	81 (42.63%)	3 (33.3%)
Spontaneous Vaginal Delivery	98 (51.59%)	6 (66.67%)
Vacuum Extraction	3 (1.58%)	0

Source: Author's field work, 2018

4.4.5 NEWBORN PRACTICES:

Table 9 summarizes the newborn practices of PMTCT of HBV. No baby received the monovalent vaccine nor the immunoglobulin for HBV. Majority of babies weighed between 2.5Kg to 3.49Kg. About 68.95% had Apgar score from 7 to 9 in the first minute and 59.68%

had Apgar scores of 9 to 10 in the fifth minute. About a fifth (19.6%) of the babies were admitted to NICU, the most common indications were low birth weight and prematurity. Only 12.73% of baby's breastfed in the first hour of live. Majority (91.56%) of babies were bathed 6 hours after birth.

Table 9: NEWBORN PRACTICES

Newborn Practices	Frequency	Percentage
Monovalent HBV vaccine		
No	176	88.4
Don't know	23	11.56
HBV Immunoglobin		
No	176	88.44
Don't know	23	11.56
Birth weight (Kg)		
0- 1.5	23	11.56
1.51- 2.0	19	9.56
2.01- 2.5	19	9.56
2.51-3.5	108	54.27
3.51- 4.5	32	16.08
4.5- 4.9	2	1.01
Non-respondents	7	3.52
Apgar score in the first minute		
0-2	24	12.63
3-4	10	5.26
5-6	21	11.05
7-9	131	68.95
9-10	4	2.11
Non-respondents	9	4.5
Apgar score in the fifth minute		
0-2	22	11.83
3-4	2	1.08
5-6	12	6.45
7-8	39	20.97

9-10	111	59.68
Non respondents	13	6.53
Admitted to NICU		
Yes	39	19.60
No	138	69.35
Still births	22	11.06
Birth to breastfeeding time (hours)		
0-0.99	21	12.73
1-1.99	14	8.48
2-23.99	104	63.03
24 -72	26	15.76
Non-respondents	34	17.09
Bath time after birth (hours)		
6	141	91.56
24	13	8.44
Non respondents	45	22.6
Missing value	1	0.5

Source: Author's field work, 2018

4.5 PREVALENCE OF HBV AND COINFECTION WITH HIV AMONG MOTHERS AND HBV ASSOCIATED FACTORS

4.5.1 Prevalence of HBV and Co infection with HIV

As shown in Table 10, majority of mothers (191/ 95.98%) were screened for HBV, a little over 4% were not tested or test not recorded in their antenatal records. the prevalence of HBV among the study population was 4.71%.

Table 10: PREVALENCE OF HBV AMONG MOTHERS

HBsAg Testing	HBV Negative	HBV Positive	Total
Yes	182(95.29%)	9(4.71%)	191 (95.98%)
Not Available	0	0	8 (4.02%)
Total	182	9	199

Source: Author's field work, 2018

Table 11 shows that no mother infected with HBV was coinfected with HIV and all 3 mothers who tested positive for HIV were not infected with HBV.

Table 11: HBV COINFECTION WITH HIV

	HBV Infected	HBV Negative	HBV Non-Respondents	Total
HIV Infected	0	3	0	3
HIV Negative	8	172	5	187
HIV Non-Respondent	1	7	3	11
Total	9	182	8	199

Source: Author's field work, 2018

4.5.2 Associated Factors for HBV Infection Among Mothers

Table 12 shows the factors that were associated with maternal infection included age, profession, religion, diabetes, previous HBV infection, family history of HBV, haemotransfusion, previous vaccination against HBV.

Table 12: ASSOCIATED FACTORS FOR HBV INFECTION

ASSOCIATEDFACTORS FOR HBV INFECTION	HBV INFECTED n(%)	HBV NOT INFECTED n(%)	Pearson chi square value	P value
1. Age			**34.67**	**0.001**
Less than-19	1(8.33)	11(91.67)		
20-24	4(14.29)	23(82.14)		
25-29	2(3.23)	59(95.16)		
30-34	1(1.75)	54(94.74)		
35-39	0(0.00)	31(100)		
40-44	1(20)	4(80)		

2. Marital Status			5.4094	0.713
Single	1(8.33)	10(83.3)		
Married	8(5.37)	137(91.95)		
Divorced	0((0.00)	1(100)		
Widow	0(0.00)	1(100)		
Cohabiting	0(0.00)	33(91.67)		
3. Educational Status			**17.2324**	**0.028**
No formal education	3(14.29)	16(76.19)		
Primary	0(0.00)	21(87.50)		
JHS	4(6.45)	56(90.32)		
SHS	2(4.26)	44(93.62)		
Higher	0(0.00)	45(100)		
4. Employment Status			7.6076	0.107
Unemployed	1(3.03)	29(87.88)		
Self- employed	8(6.56)	109(89.34)		
Formal employment	0(0.00)	44(100)		
5. Religion			**25.2014**	**0.000**
Christian	6(3.82)	146(92.99)		
Muslim	3(7.32)	36(7.32)		
No religion	0(0.00)	0(0.00)		
6. Ethnicity			16.2256	0.093
Akan	7(5.60)	115(92)		
Ewe	0(0.00)	15(100)		
Grusi	1(20)	4(80)		
Guan	0(0)	5(83.33)		
Mole-Dagbani other	0(0)	2(66.67)		
	1(2.22)	41(91.11)		
7. Residence			2.4735	0.29
Kumasi	6(3.55)	156(92.31)		
Outside Kumasi	3(10)	26(86.67)		
8. Parity			36.2094	0.552
0	0(0)	9(100)		
1-4	8(5.1)	149(99.95)		
5-11	1(4)	24(96%)		

9. Abortions No abortion One abortion More than one abortion	 6(3.77) 3(13.64) 0(0)	 146(91.82) 18(81.82) 18(100)	6.2178	0.797
10. Contraceptive Use No contraceptive use Pill(COC/Minipill/ Emergency) Short term hormonal injectable Long term hormonal injectable Intra uterine device Condom	 6(4.51) 1(4) 0(0) 2(6.67) 0(0) 0(0)	 122(90.98) 24(96) 20(97.37) 10(83.33) 1(100) 1(100)	0.2509	0.882
11. Syphilis Infection Positive Negative	 0(0) 9(4.81)	 3(100) 174(93.05)	**40.2722**	**0.000**
12. HIV Infection Yes No	 0 8(4.32)	 3(100) 172(92.97)	**17.3744**	**0.002**
13. Sickle Cell Disease Yes No Don't Know	 0(0) 9(4.66) 0(0)	 3(100) 177(91.71) 2(66.67)	7.1138	0.130
14. Haemotransfusion Yes No	 0(0) 9(4.81)	 11(100) 171(91.44)	**24.9729**	**0.000**
15. Previous Surgery Yes No	 1(3.23) 8(4.76)	 30(96.77) 152(90.48)	1.7262	0.422
16. Scarifications Yes No	 1(1.89) 8(5.48)	 48(90.57) 134(91.78)	3.3515	0.187

17. Previous HBV Infection Yes No Don't Know	 3(100) 6(3.09) 0(0)	 0(0) 182(93.81) 0(0)	**112.4931**	**0.000**
18. Previous HBV Vaccination Yes No Don't Know	 0(0.00) 9(5.33) 0(0)	 28(100%) 153(90.53%) 1(50%)	**13.8625**	**0.008**
19. Family History of HBV Yes No Don't Know	 0(0) 8(4.71) 1(4.17)	 5(100) 158(92.94) 19(79.17)	**11.6472**	**0.020**

Source: Author's field work, 2018

4.6 MATERNAL FACTORS THAT INFLUENCE THE UPTAKE OF PMTCT OF HBV

The indicators for uptake of PMTCT of HBV include screening for HBV at the first antenatal visit, further testing for HBV infected mothers, use of antiviral therapy in highly viremic mothers during ANC and vaccination of exposed neonates with the monovalent vaccine and or the HBIG within 24 hours of birth. I analyzed the maternal factors which may be associated with the screening during the first visit. This was because all infected mothers did not undergo any further testing, or received ARVs. There were also no exposed neonates who received the monovalent vaccine or the HBIG.

The table 13 indicates that maternal age, religion, antenatal facility, previous anti HBV vaccination and screening for HIV and syphilis had significant associations with mothers being screened for HBV at the first visit. The likelihood of mothers being tested was associated

with the age of the mother, level of ANC facility attended and the number of ANC contacts, religion and ethnicity, being tested for HIV and syphilis.

All mothers who attended tertiary, regional and private hospitals were tested as compared to those who attended maternity homes, health centres and district hospitals (Pr = 0.000).

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Table 13: MATERNAL FACTORS ASSOCIATED WITH SCREENING FOR HBV

Maternal factors	**Not Screened n (%)**	**Screened n (%)**	**Pearson chi square**	**P value**
1. Age			**47.8294**	**0.008**
Less than-19	4(25)	12(75)		
20-24	1(3.57)	27(96.43)		
25-29	1(1.61)	61(98.39)		
30-34	2(3.51)	55(99.96)		
35-39	0(0.00)	31(100)		
40-44	0 (0.00	5(100)		
2. Marriage			3.0869	0.543
Single	1(8.33)	11(91.67)		
Married	4(2.68)	145(97.32)		
Cohabiting	3(8.33)	33(91.67)		
Divorced	0(0)	1(100)		
Widow	0(0)	1(100)		
3. Education No education	2(9.52)	19(90.48)	8.5438	0.074
Primary	3(12.50)	21(87.50)		
JHS	2(3.23)	60(96.77)		
SHS	1(2.13)	46(97.87)		
Higher	0(0.00)	45(100)		
4. Employment status			4.0440	0.132
Unemployment	3(9.09)	30(90.91)		
Self-employment	5(4.1)	117(95.9)		
Formal employment	0(0.00)	44(100)		

5. Religion			**24.2372**	**0.000**
Christian	5 (3.18)	152(96.82)		
Muslim	2 (4.88)	39(95.12)		
6. Ethnicity			**11.6728**	**0.040**
Akan	3(2.40)	122(97.60)		
Ewe	0(0)	15(100)		
Grusi	0(0)	5(100)		
Guan	1(16.67)	5(83.33)		
Mole-Dagbani	1(33.33)	2(66.67)		
other	3(6.67)	42(95.98)		
7. **Residence**			0.0432	0.0835
Outside Kumasi	7(4.14)	162(95.98)		
Kumasi	1(3.33)	29(96.67)		
8. Knowledge score			18.7494	0.601
Good	0(0)	10(100)		
Average	3(2.97)	98(97.03)		
Poor	5(5.68)	83(94.32)		
9. ANC facility			**51.8344**	**0.000**
No ANC	2(100)	0(0.00)		
Maternity Home	1(0.04)	24(99.96)		
Health Center	3(6.67)	42(99.93)		
District Hospital	2 (4.08)	47 (95.92)		
Private Hospital	0(0.00)	44(100)		
Regional Hospital	0 (0.00)	2(100)		
Tertiary Hospital	0(0.00)	32(100)		
10. Number of ANC Contacts			**56.2938**	**0.000**
No ANC	2(100)	0(0.00)		
1-4	3 (8.57)	32(91.43)		
5-8	3(3.61)	80(96.39)		
More than 8	0(0.00)	74(100)		
11. Total number of pregnancies			2.5845	0.275
1	3(8.33)	33(91.67)		
2-4	3(2.46)	119(97.54)		
More than 4	2(4.88)	39(95.12)		

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12. Previous BV vaccination			**12.1377**	**0.002**
No (169)	7(4.14)	162(95.86)		
Yes (28)	0(0.00)	28(100)		
13. Screened for HIV			**33.9866**	**0.000**
Not Screened	3(27.27)	8(72.73)		
Screened	5(2.66)	183(97.34)		
14. Screened for Syphilis			**62.9477**	**0.000**
Not Screened	4(66.67)	2(33.33)		
Screened	4(2.09)	187(97.91)		
15. Delivery facility level			0.2148	0.975
Health Centre	0(0)	2(100)		
District Hospital	0(0)	2(100)		
Private Hospital	0(0)	1(100)		
Tertiary Hospital	8(4.12)	186(95.58)		

Source: Author's field work, 2018 **CHAPTER 5- DISCUSSION**

INTRODUCTION

Hepatitis B virus infection is a public health threat and endemic in Ghana. The main modes of sustaining the transmission in our population is mother to child transmission and childhood horizontal transmission despite the introduction of vaccination in the country. However, little is done to prevent vertical transmission of the virus during antenatal, labour and delivery in Ghana. Current interventions in place include the testing of mothers during ANC and the vaccination of children with the 3 doses of penta-vaccine which includes the HBV vaccine at 1, 2 and 6 months of age according to the EPI. As a country there is the need to scale up interventions to cause an accelerated decline in the ongoing infection of HBV and hence further reduce morbidity and mortality associated with HBV. During my research, I came across studies of prevalence and knowledge, attitudes of HBV but no study on PMTCT practices in Ghana. The study sought to assess the knowledge and the current practices of

PMTCT among mothers and their newborns during the antenatal, labour and delivery, and also determine the prevalence and maternal factors that influence uptake of PMTCT of HBV. The study was limited to a teaching hospital in an urban setting, in Ghana. Mothers were interviewed after delivery with a semi- structured questionnaire their ANC records were used to assess the various practices and their newborn practices were assessed by records in their postnatal record and by interview of the mother. Also, the sample size was small. Hence findings may not be generalizable to the entire country.

5.1 PREVALENCE OF HBV AND CO-INFECTION WITH HIV

The prevalence of HBV (4.52%) amongst the mothers was in the low to intermediate category of (2-4.9%) similar to the estimated current world prevalence (Razavi-Shearer *et al.*, 2018) and that of a recent study in Ghana (Luuse *et al.*, 2016) and other studies in Africa (Tegegne *et al.*, 2014a; Aba and Aminu, 2015; Asundula *et al.*, 2016). However, most prevalence studies in Ghana and West Africa recorded intermediate to high levels of prevalence amongst pregnant women (Frambo *et al.*, 2014; Anaedobe *et al.*, 2015; Bigna, Marie A Amougou, *et al.*, 2017; Noubiap *et al.*, 2015; Adade Bempong, 2016; Ofori-Asenso and Agyeman, 2016). The study found testing negative or positive for HBV to be associated with age, profession, religion, previous HBV infection, family history of HBV, previous vaccination against HBV and haemotransfusion similar to other studies. Majority of HBV infection (77.8%) occurred from ages 22 to 30 years, whilst the highest number occurred amongst mothers aged 24 similar to other studies (Aba and Aminu, 2015; Anaedobe *et al.*, 2015; Asundula *et al.*, 2016). Six out of the nine (66.7%) infected mothers were diagnosed in the current pregnancy. Only twenty-eight (14.1%) of the mothers had been vaccinated prior to this pregnancy similar to a study in

Addis Ababa, Ethiopia that recorded 11% of mothers knowing their vaccination status (Tegegne *et al.*, 2014a).

Three mothers (1.51%) had HIV infection similar to the current national prevalence of less than 2% in the Ghana (GHS & NACP, 2016). The study however did not find any coinfection of HBV and HIV, this may be attributed to small size of the study as coinfection ranges from 2.4% to 41.7% in Ghana and studies in the African region (Hoffmann *et al.*, 2014; Zenebe *et al.*, 2014; Adom Agyeman and Ofori-Asenso, 2016; Mutagoma *et al.*, 2017).

5.2 KNOWLEDGE OF MOTHERS

Slightly more than half of mothers (50.8%) had average knowledge scores, whilst very few had good knowledge scores. However, most mothers fared poorly on important questions such as mode of spread, delivery and breast feeding in exposed children. This is similar to other studies which reported poor knowledge (Frambo *et al.*, 2014; Cheng *et al.*, 2015; Asundula *et al.*, 2016; Dun-Dery *et al.*, 2017). This may be explained by the educational status of mothers, 78% had completed at least JHS (Pr = 0.000) similar to studies (Frambo *et al.*, 2014; Asundula *et al.*, 2016; Dun-Dery *et al.*, 2017; Han *et al.*, 2017). Mothers fared poorly with knowledge on prevention of MTCT. The response rate was 64.8% for the question on prevention. Most mothers reported that medication, vaccination of the baby and seeking medical advice as the means of prevention. The reports of medication use were much higher than the knowledge of vaccination of the newborns as prevention. Further probing of mothers to what kind medication indicated that they were unsure of the exact medication to be used. Again, seeking medical advice did not indicate an exact mode of prevention, since all the methods of prevention were undertaken after appropriate medical advice. This suggested limited

knowledge of mothers on prevention. Hence the need for more education of mothers to know definitive preventive methods of MTCT.

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5.3 PRACTICES OF PMTCT OF HBV

Antenatal practices of PMTCT of HBV were limited to testing of HBsAg during the first visit irrespective of previous HBV vaccination or tests. The proportion of mothers tested for HBV was similar to mothers tested for HIV and syphilis which are routinely tested. The likelihood of mothers being tested was associated with the age of the mother, level of ANC facility attended and the number of ANC contacts, religion and ethnicity, being tested for HIV and syphilis.

All mothers who attended tertiary, regional and private hospitals were tested as compared to those who attended maternity homes, health centres and district hospitals (Pr = 0.000). The management of HBV infected mothers did not differ amongst the ANC facility levels. No mother was followed up with the required tests, nor were antivirals administered. Mothers who had unknown status at delivery were not tested. All the mothers who tested positive for HIV were not infected with HBV, yet they were not offered HBV vaccination during this pregnancy. There was no significant difference in the mode of delivery between infected and non-infected mothers. No exposed baby received immunoprophylaxis at birth. There was no difference in breastfeeding and bathing practices between infected and non-infected mothers. The above practices are clearly inadequate in the PMTCT of HBV. A study in the hospital reported cost and time as barriers to PMTCT of HBV amongst clinicians (Cheng *et al.*, 2015) There is a need to undertake further research amongst care providers to elucidate the

facilitators and barriers of PMTCT of HBV. The high degree of testing of HBsAg may have been facilitated by the national policy of the GHS. Hence the need to adopt clear national guidelines for PMTCT of HBV to reduce childhood infection and further chronic sequelae such as cirrhosis and hepatocellular carcinoma.

5.4 MATERNAL FACTORS THAT INFLUENCE PMTCT OF HBV

The study found testing of mothers for HBsAg at the ANC as the only practice of PMTCT of HBV among pregnant mothers and their newborn babies. As mentioned earlier in the results section, age, religion, ANC facility, ANC contacts, previous vaccination and screening for HIV and Syphilis were the main associations of screening for HBV. Teenage mothers made up half of the mothers who were not screened. Whereas more Christians were screened as compared to Muslims. Mothers who attended private, regional and tertiary ANC facilities were all screened compared to those who attended district hospital, health centers and maternity clinics. Mothers who were not screened had a smaller number of contacts with care providers. Mothers who knew their prior vaccination status were more likely to get screened. Mothers who were screened for HIV and Syphilis were more likely to be screened for HBV. The lack of other PMTCT of HBV practices may be attributed to factors such as cost, providers skill level, time, unavailability of tests and antiviral therapy and the lack of a national policy on PMTCT of HBV outside the screening of mothers and the three doses of vaccination as indicated in other studies (Thursz, 2016; Breakwell *et al.*, 2017).

CHAPTER 6- CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

The knowledge of mothers about HBV was average. The prevalence of HBV amongst mothers was 4.52% which is the low to intermediate range. The prevalence of HIV was 1.51%, no coinfection of HBV and HIV was reported. The current practice of PMTCT of HBV is limited to screening for HBsAg. No exposed baby received the monovalent nor the HBIG at birth. Maternal factors associated with screening for HBV included age, religion, level of ANC facility, number of ANC contacts with the provider, screening for HIV and Syphilis and previous vaccination status of mother.

6.2 RECOMMENDATIONS

1. Maternal knowledge on HBV need to be improved by education at the ANC facilities by midwives and other health care providers and other interactive media adopted by the ministry of health and its agencies to promote education on prevention of HBV from mother to child. National programs or policies that support women to attain higher education must be adopted by the ministry of education and its agencies and effectively implemented to improve knowledge of mothers.
2. The prevalence of HBV is in the intermediate region which is higher than the target of 2% recommended to meet the 2030 target of HBV elimination (Breakwell *et al.*, 2017). The barriers and facilitators of PMTCT of HBV in the health facilities must be identified by evidence-based methods undertaken by the ministry of health and or its agencies, to guide policy implementation of efficient practices to curb vertical transmission of HBV.

3. The need for further research by the scientific community in Ghana, to determine the rate of vertical transmission amongst exposed newborns and the risk of sequelae of chronic liver disease or hepatocellular carcinoma in Ghana.
4. The collaboration between biomedical scientist and health care providers to fashion innovative low cost, effective diagnostic tests for further management of HBV such as viral load, serology profile, liver function test that may reduce or remove the element of cost in the low resource settings such as Ghana.
5. Linking care of HBV to the established care of HIV amongst mothers who may require antiviral therapy may make available antiviral therapy at reduced cost. This requires political will and collaboration between the Ministry of Health, Ghana Health Service, the Ghana AIDS Commission, the teaching hospitals and all other stakeholders.
6. Ministry of health and its agencies must provide updates training to care providers across all levels of health facility in the management of PMTCT of HBV amongst pregnant mothers and the newborn.
7. The Ghanaian government and the ministry of health should develop a strong national policy and implementation program to roll out the management of HBV amongst pregnant women and the incorporation of the universal birth dose of HBV in the EPI plus program may cause a rapid decline of HBV among children and its chronic sequelae
8. Advocacy by all health agencies either governmental or all non-government for all women in their reproductive ages born before the introduction of vaccination to go for voluntary testing and vaccination.

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APPENDICES

APPENDIX A: QUESTIONNAIRE:

An Assessment of Prevention of Mother to Child Transmission of Hepatitis B Practices among Mothers and Newborns Delivered at Health Facilities in the Ashanti region

This research seeks to assess the current practices of prevention of mother to child transmission of Hepatitis B Virus (HBV) amongst mothers and their newborn. I am undertaking it in partial fulfillment of my master's program. I will ask questions about you, the antenatal care you received, labour and delivery, breastfeeding and new born practices. This may take about 30mins to complete.

Section 1: Identity	
1.1Name:	1.5 Identity Number:
1.2Name of interviewer	1.6. Name of facility:
1.3Date of interview (dd/mm/yy):	
1.4. Time of interview(hh/mm)	1.7 Start time: 1.8 Completion time:
SECTION 2: Socio demographic Characteristics	
2.1 Age in completed years(yrs.)	2.2 Date of Birth: dd.mm. yy
2.3 Marital status:	SINGLE……..1 MARRIED…….2 Living-together…….....3 DIVORCED……...4 WIDOW…….5 Separated…….. ……6
2.4 Education: Highest formal education	No formal education……1 Primary…….2 Middle……...3 JSS/JHS……4 SHS/ SSS……5 Higher …….6
2.5 Employment status:	FORMAL…….1 INFORMAL…….2 SELF-EMPLOYED……..3 UNEMPLOYED……...4

2.6 Occupation	Farmer ……1 Artisan……..2 Trader……..3 Driver……...4 Clerk/ clerk related……..5
	Professional, ……..6 State:……. Other ……..99
2.7 Religion	Christian……1 Muslim……..2 Traditional…….3 No religion…….4 Other…….99
2.8 Ethnicity	Akan……..1 Ga/ Dangme……2 Ewe……3 Mole Dagbani……4 Guan……..5 Grusi……..6 Other…….99
2.9 Residence: permanent living place	Kumasi……..1 State place of residence: Outside Kumasi.....2 State place of residence
2.10 Nationality	Ghanaian……1 Other……...99 Please state……..
2.11 Total Household Income	Less than 1, 150 Ghc 1, 150 – 2, 160 Ghc……..1 2, 161 - 3, 360ghs……2 3, 360- 4, 840ghs…….3 4, 841- 10, 492ghs……...4 Greater than 10, 492…….5

2.12 Partner's occupation	Farmer ……1 Artisan……..2 Trader……..3 Driver……...4 Clerk/ clerk related……..5 Professional, ……..6 State:……. Other ……..7
2.13 Partner's educational status	No formal education…….1 Primary…….2 Middle……..3 JSS/JHS……4
	SHS/ SSS…….5 Higher …….6

Section 3: Mothers Knowledge

1. Have you heard about HBV……1. [YES] 2. [NO] 3. [Don't Know]
2. What causes HBV…1? [Pathogen] 2. [Dirt] 3. [Spiritual] 4. [Bad blood] 5. [Don't Know]
3. How can it spread? (tick all that apply)

a. Contaminated blood []
b. Sexual intercourse with an infected person []
c. Saliva []
d. Living closing with someone with the infection []
e. From an infected mother to her baby []
f. Other:

4. Can you deliver normally if you have the infection? 1 [YES] 2. [NO] 3. [Don't Know]
5. Can you exclusively breastfeed your child? … 1 [YES] 2. [NO] 3. [Don't Know]
6. Can an infected mother prevent their unborn child from getting the infection? 1. [YES] 2. [NO] 3. [Don't Know]

If yes: how……

7. Vaccination of the mother prevents the child from HBV…1. [YES] 2. [NO] 3. [Don't Know]
8. Can a pregnant mother be vaccinated against HBV? 1. [YES] 2. [NO] 3. [Don't Know]

9. Vaccination of exposed newborn at birth prevents the child from HBV1? [YES] 2. [NO]

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Section 4: Antenatal Practices

4.1 First ANC visit: date (dd/mm/yy) …….	4.4 Number of pregnancies ever had ……
4.2 Gestation at first visit: (weeks)……	4.5 Number of live births …….
	4.6 Number of still births…….
	4.7 Number of miscarriages……
4.3 Expected date of delivery:	4.8 Number of terminations of pregnancy (TOP)…….
	4.9 Types of TOP: 1. [medical] 2. [instrumentation] 3. [both]
Booking labs: Booking RESULTS]	If HBV positive, other labs
4.10 Hb (g/dl) ……	4.17 HBV Serological profile 1. [YES] 2. [NO]
4.11 Syphilis: 1. [POS] 2. [NEG]	

4.12 HBV: 1. [POS] 2. [NEG] 4.13 HCV: 1. [POS] 2. [NEG] 4.14 HIV: 1. [POS] 2. [NEG] 4.15 BLOOD GROUP…….1. [POS] 2. [NEG] 4.16 SICKLING: 1. [POS] 2. [NEG]	4.18 HBeAg……1. [POS] 2. [NEG] 4.19 HBV VIRAL LOAD 1. [YES] 2. [NO] 4.20 LFTS: 1. [YES] 2. [NO] 4.21 If yes, how often: 4.22 HBV Serological profile 4.23 HBV VIRAL LOAD……. 4.24 State Viral Load…… 4.25 LFTS: 4.26 Serum ALT …….
If high viral load: 4.27 Antiviral prophylaxis 1. [YES] 2. [NO] 4.28 If yes which regimen, state below: …….	4.29 Date Started dd/mm/yy: 4.30 Date Ended dd/mm/yy: (if not ended kindly state: ongoing)
4.31 Maternal vaccinations 1. [YES] 2. [NO] If yes vaccination: 4.32 Anti-tetanus: 1. [YES] 2. [NO] 4.33 HBV vaccination: 1. [YES] 2. [NO] 4.34 Others:	4.35 Antimalarial prophylaxis 1. [YES] 2. [NO] 4.36 If yes, How many times
4.37 Total number of ANC CONTACTS: …….	4.37 Repeat HIV TESTING: 1. [YES] 2. [NO] 4.38 IF yes: 1. [POS] 2. [NEG]

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Medical Conditions in Pregnancy	**Past Medical History**
4.39 hypertension……1. [YES] 2. [NO] 4.40 diabetes……1. [YES] 2. [NO] 4.41 hepatitis B…….. 1. [YES] 2. [NO] 4.42 Sickle cell disease…… 1. [YES] 2. [NO] 4.43 Malaria……. 1.[YES] 2. [NO] 4.44 Anemia…….1. [YES] 2. [NO] 4.45 UTI……. 1.[YES] 2. [NO] 4.46 Other ……	4.47. Haemotransfusion…….1. [YES] 2. [NO] 4.48Previous surgery ……1. [YES] 2. [NO] 4.49 scarifications……1. [YES] 2. [NO] 4.50 diabetes……..…1. [YES] 2. [NO] 4.51 Hepatitis B…… 1. [YES] 2. [NO] 4.52 HIV…….……...1. [YES] 2. [NO] 4.53 Vaccination against HBV1. [YES] 2. [NO] 4.54 Family history of HBV…1. [YES] 2. [NO]

Current Obstetric History	**Previous Obstetrics and Gynecology Hx**
4.55 Vaginal bleeding 1. [YES] 2. [NO] If yes tick all that apply: 4.56 First trimester …… [] 4.57 Second trimester…… [] 4.58 Third trimester…….[ ] 4.59 Preterm labour……1. [YES] 2. [NO] 4.60 PROM……1. [YES] 2. [NO]	4.61 Previous C/S……1. [YES] 2. [NO] 4.62 Previous ectopic pregnancy 1. [YES] 2. [NO] 4.63 Previous PPH……. 1.[YES] 2. [NO] 4.64 Contraceptive use…… 1.[YES] 2. [NO] 4.65 Type of contraceptive……. 4.66 Pap smear…….1. [YES] 2. [NO]

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Section 5: Labour and Delivery **Labour** 5.1 Time of admission to labour (hh: mm) ……. 5.2 Time of delivery (hh: mm) …… 5.3 Duration from labour to delivery (mins) …… **5.4 Mode of delivery** Spontaneous vaginal delivery……...1 Vacuum extraction……2 Forceps delivery……3 Vacuum extraction……4 Caesarean section ……5	**IF mother not screened for HBV at ANC,** 5.5 Screening at labour: 1. [YES] 2. [NO] 5.6 HBsAg……..1. [POS] 2. [NEG] **Outcome of labour** 5.7 Birth weight (kg)……. 5.8 APGAR SCORE (1ST MIN) ……. 5.9 APGAR SCORE (2ND MIN) …… 5.10 Admitted to NICU ……1. [YES] 2. [NO] 5.11 Indication for admission…….
5.12 Complication at Labour/ Delivery Prolonged labour……1 Post-partum hemorrhage……2 Fetal distress……3 Sepsis……4 Obstructed labour……5 Haemotransfusion……6	**Section 6: Breastfeeding and Newborn Care** **New born care** 5.13 Eye care…….1. [YES] 2. [NO] 5.14 Cord care……...1. [YES] 2. [NO] 5.15 Vitamin K……. 1.[YES] 2. [NO] **Vaccinations within 24hrs of birth** 5.16 OPV……1. [YES] 2. [NO] 5.18 BCG……1. [YES] 2. [NO] 5.19 Monovalent HBV……1. [YES] 2. [NO]
	5.20 HBIG……1. [YES] 2. [NO]
5.21 Breastfeeding Time to establishing breastfeeding: Within 30mins of delivery……1 Within 1 hr. of delivery……2 Within 6 hrs. of delivery……3 Within 12hrs of delivery……4 Within 24hrs of delivery……5	**5.22 Bathing Practices Choose all that apply** Bathing within 12hr……1 Bathing within 24hr……2 Bathing after 24hrs……3 Bathing with mild soap……4 Bathing without soap……5

5.23 Facility where ANC was given…… 5.24 Level of facility: Maternity home……1 Health center……2 District hospital……3 Regional hospital……4 Tertiary hospital……5 No ANC……7 Other ……99	5.25 Facility where delivery took place…… 5.26 Level of facility: Maternity home……1 Health center……2 District hospital……3 Regional hospital……4 Tertiary hospital……5 Other ……99
Check to make sure all questions have been answered	

APPENDIX B: PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

Participant Information Leaflet and Consent Form

This leaflet must be given to all prospective participants to enable them know enough about the research before deciding to or not to participate

Title of Research:
An assessment of mother to child transmission of hepatitis B virus infection among mothers and newborns in the Kumasi metropolis in the Ashanti Region of Ghana.

Name(s) and affiliation(s) of researcher(s):
This survey is being undertaken by Dr. Aisha Ali Issaka, a student being supervised by Dr. Yeetey Enuameh of Kwame Nkrumah University of Science and Technology, School of Public Health, Department of Population and Reproductive Health)

Background (Please explain simply and briefly what the study is about):
Studies in Ghana have shown an extremely high prevalence of HBV among pregnant women (Adade Bempong, 2016; Ofori-Asenso and Agyeman, 2016). However, the strategies for the national control of HBV are limited to surveillance of acute viral hepatitis, education and three completed HBV vaccine doses in the infant (GHS, 2016). Little is done to reduce MTCT of HBV There is therefore the need to assess the current practices of PMTCT of HBV to identify the gaps in current practices and propose recommendations that may help improve the current situation.

General objective: To assess current practices of PMTCT of HBV among mothers and their newborns during antenatal to the early neonatal period within health facilities in the Ashanti Region of Ghana

Specific objectives:

1. To assess the knowledge and attitude of pregnant women of PMTCT of HBV 2. To describe practices of PMTCT of HBV from the antenatal to the early neonatal period

3. To determine proportion of the following:

a. Pregnant women screened for HBV over the antenatal – early neonatal period

b. Neonates who receive the birth dose of vaccination against HBV

4. To determine the prevalence of maternal HBV infection and co infection with HIV.

5. To assess the influence of maternal factors on PMTCT of HBV

Purpose(s) of research:

The survey is assessing current practices of prevention of mother to child transmission of hepatitis B virus infection amongst mothers and their newborns at health facilities in the Kumasi metropolis. The survey assesses maternal knowledge of HBV pertaining to the spread of the disease to the child, and its prevention. It will also assess the managed of mothers who have hepatitis and the newborn practices of prevention of HBV which included vaccination practices at birth.

Procedure of the research, what shall be required of each participant and approximate total number of participants that would be involved in the research:

A semi-structured questionnaire will be administered to you at the health facility that you delivered. The questionnaire will be administered via tablet. The questions will request information about your knowledge about hepatitis B virus infection, practices that you underwent during antenatal and delivery and practices that your newborn undertook to prevent HBV. Your antenatal, labour and delivery records and the newborn's record will be used to answer some of the questions. The interview may last for 30 minutes. We expect to interview 191 mothers in total at the Komfo Anokye Teaching Hospital

Risk(s):

There are no perceived risks to the mother or baby, except for some unknown emotional disturbance that may occur during the interview of the mother. In the event that this occurs, the interview may be suspended until the mother gives permission to continue or it may be stopped.

Benefit(s):

You and your baby may not have direct material benefits when you undertake the survey. However, you will provide important information with respect to the prevention of mother to child transmission of HBV. This information may inform policy and cause a change in the current practices of PMTCT towards the eradication of HBV in Ghana

Confidentiality:
All information which is collected about you and your newborn during the course of the study will be kept strictly confidential. No names will be recorded, and there will be no direct link to you in the report of the survey.

Voluntariness:
Your participation in this study is strictly voluntary.

Alternatives to participation:
If you choose not to participate in this study, it will not have any bearing on the services you and your baby receive in the hospital

Withdrawal from the research:
You may choose to withdraw from the study at any point. There is no obligation for you to complete an interview.

Consequence of Withdrawal:
There is no consequence of loss of care when you choose to withdraw from being interviewed or at any point in the interview. However, data that have already been collected will be in the analysis. We hope that, this will be acceptable to you.

Costs/Compensation:
Dr. Aisha Ali Issaka, a student of the School of Public Health of the Kwame Nkrumah University of Science and Technology is undertaking and funding this research. Verbal appreciation of your time and patience will be given at the end of the interview. No monetary compensation has been allocated to participants of the study

Contacts:
Please do not hesitate to contact Dr Aisha Ali Isaak on 0202536160 or 0246661928 if you have any questions about the study.

Further, if you have any concern about the conduct of this study, your welfare or your rights as a research participant, you may contact:

The Office of the Chairman
Committee on Human Research and Publication Ethics
Kumasi
Tel: 03220 63248 or 020 5453785

KNUST

CONSENT FORM

Statement of person obtaining informed consent:
I have fully explained this research to _____ and have given sufficient information about the study, including that on procedures, risks and benefits, to enable the prospective participant make an informed decision to or not to participate.

DATE: _____ NAME: _____

Statement of person giving consent:
I have read the information on this study/research or have had it translated into a language I understand. I have also talked it over with the interviewer to my satisfaction.

I understand that my participation is voluntary (not compulsory).

I know enough about the purpose, methods, risks and benefits of the research study to decide that I want to take part in it.

I understand that I may freely stop being part of this study at any time without having to explain myself.

I have received a copy of this information leaflet and consent form to keep for myself.

NAME: _____

DATE: _____ SIGNATURE/THUMB PRINT: _____

Statement of person witnessing consent (Process for Non-Literate Participants):

I _____(Name of Witness) certify that information given to (Name of Participant), in the local language, is a true reflection of what l have read from the study Participant Information Leaflet, attached.

WITNESS' SIGNATURE (maintain if participant is non-literate): _____

MOTHER'S SIGNATURE (maintain if participant is under 18 years): _____

MOTHER'S NAME: _____

FATHER'S SIGNATURE (maintain if participant is under 18 years): _____

FATHER'S NAME: _____

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APPENDIX C: ETHICAL APPROVAL

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF MEDICAL SCIENCES / KOMFO ANOKYE TEACHING HOSPITAL
COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS

Our Ref: CHRPE/AP/020/19 16th January, 2019

Dr. Aisha Ali Issaka
Department of Population
and Reproductive Health
School of Public Health
KNUST-KUMASI

Dear Madam,

LETTER OF APPROVAL

Protocol Title: ***"An Assessment of Practices of Prevention of Mother to Child Transmission of Hepatitis B Virus Infection amongst Mothers and their Newborns at the Kumasi Metropolis in Ashanti Region of Ghana."***

Proposed Site: ***Department of Obstetrics and Gynaecology, Komfo Anokye Teaching Hospital.***

Sponsor: ***Principal Investigator.***

Your submission to the Committee on Human Research, Publications and Ethics on the above-named protocol refers.

The Committee reviewed the following documents:

- A notification letter of 10th July, 2018 from the Komfo Anokye Teaching Hospital (study site) indicating approval for the conduct of the study at the Hospital.
- A Completed CHRPE Application Form.
- Participant Information Leaflet and Consent Form.
- Research Protocol.
- Questionnaire.

The Committee has considered the ethical merit of your submission and approved the protocol. The approval is for a fixed period of one year, beginning 16th January, 2019 to 15th January, 2020 renewable thereafter. The Committee may however, suspend or withdraw ethical approval at any time if your study is found to contravene the approved protocol.

Data gathered for the study should be used for the approved purposes only. Permission should be sought from the Committee if any amendment to the protocol or use, other than submitted, is made of your research data.

The Committee should be notified of the actual start date of the project and would expect a report on your study, annually or at the close of the project, whichever one comes first. It should also be informed of any publication arising from the study.

Yours faithfully,

Osomfo Prof. Sir J. W. Achicanpong MD, FWACP
Chairman

Room 7 Block J, School of Medical Sciences, KNUST, University Post Office, Kumasi, Ghana
Phone: +233 3220 63248 Mobile: +233 20 5453785 Email: chpe-knust.kath@gmail.com / chpe@knust.edu.gh

APPENDIX D: CONDITIONAL APPROVAL

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF MEDICAL SCIENCES / KOMFO ANOKYE TEACHING HOSPITAL
COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS

Ref: CHRPE/RC/123/18 15th August, 2018.

Dr. Aisha Ali Issaka
Department of Population
and Reproductive Health
School of Public Health
KNUST-KUMASI.

Dear Madam,

ETHICS REVIEW COMMENTS – CONDITIONAL APPROVAL

Protocol Title: ***"An Assessment of Practices of Prevention of Mother to Child Transmission of Hepatitis B Virus Infection amongst Mothers and their Newborns at the Kumasi Metropolis in Ashanti Region of Ghana."***

Following an expedited review, your protocol was given a conditional approval subject to you addressing the following concerns/queries:

On the CHRPE Form:

Item 2.2: 1. There is nothing in the narration about how the specific objective 4 would be done.
Item 2.10: 2. We recommend that hard copies should be under lock and key for at least 3-5 years as well upon completion of the research.
Item 2.11: 3. The Ethics Committee should also have access to the study data.

On the Participant Information Leaflet (PIL):

4. Complete the Ethics Committee's Participant Information Leaflet and Consent Form format. Something should be mentioned about HIV.

Kindly make the necessary amendments and submit one copy each of all required documents to the CHRPE (Room 7 Block J, School of Medical Sciences, KNUST), along with a letter explaining the changes you have made to each document. The date and reference number of this letter should be quoted in your letter.

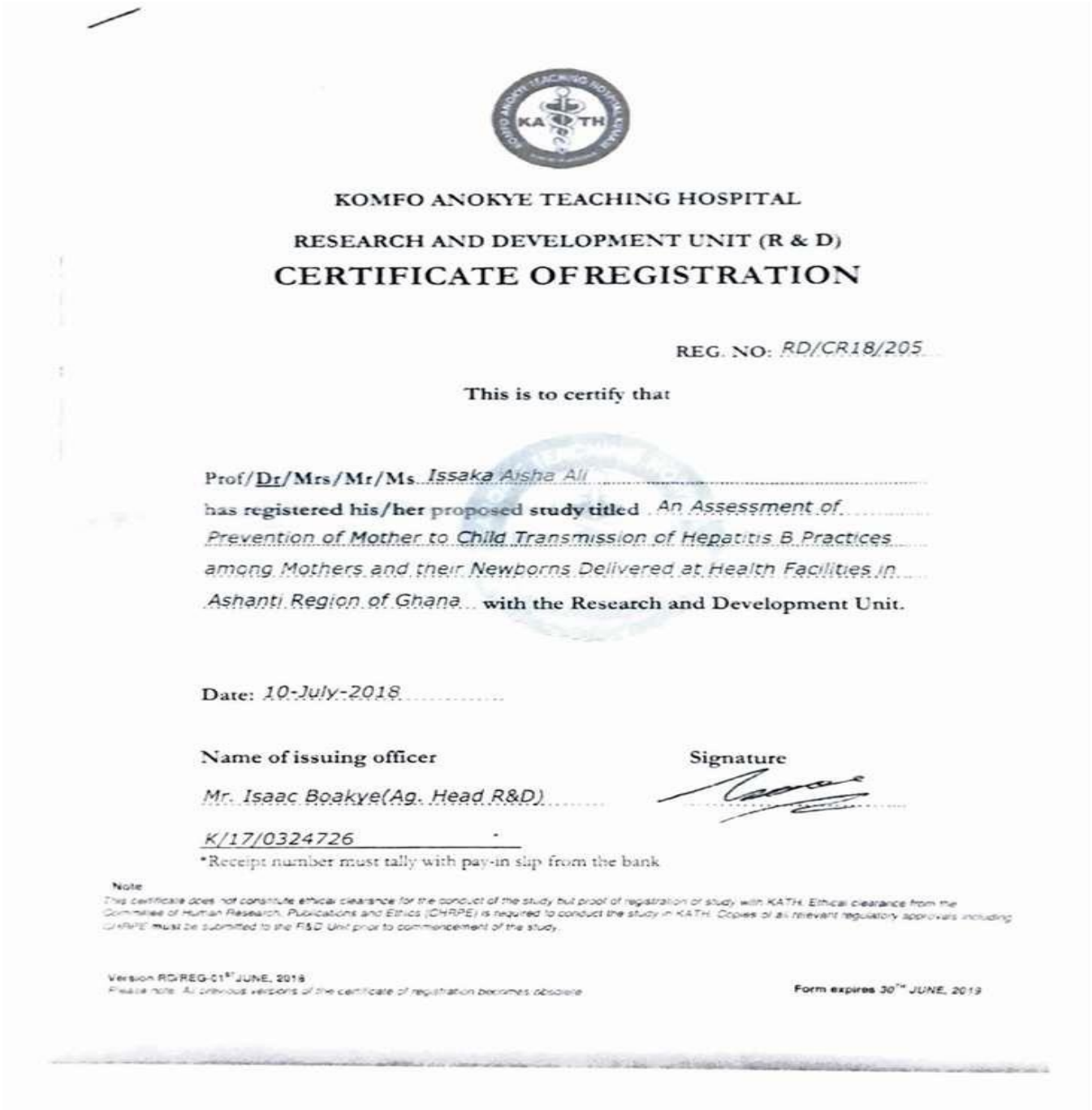
Yours faithfully,

Osomfo Prof. Sir J. W. Acheampong MD, FWACP
Chairman

Room 7 Block J, School of Medical Sciences, KNUST, University Post Office, Kumasi, Ghana
Phone: +233 3220 63248 Mobile: +233 20 5453785 Email: chrpe.knust.kath@gmail.com / chrpe@knust.edu.gh

APPENDIX E: REGISTRATION WITH KATH RESEARCH AND

DEVELOPMENT



KOMFO ANOKYE TEACHING HOSPITAL

RESEARCH AND DEVELOPMENT UNIT (R & D)

CERTIFICATE OF REGISTRATION

REG. NO: RD/CR18/205

This is to certify that

Prof/Dr/Mrs/Mr/Ms Issaka Aisha Ali

has registered his/her proposed study titled An Assessment of Prevention of Mother to Child Transmission of Hepatitis B Practices among Mothers and their Newborns Delivered at Health Facilities in Ashanti Region of Ghana with the Research and Development Unit.

Date: 10-July-2018

Name of issuing officer

Mr. Isaac Boakye(Ag. Head R&D)

Signature

K/17/0324726

*Receipt number must tally with pay-in slip from the bank

Note

This certificate does not constitute ethical clearance for the conduct of the study but proof of registration of study with KATH. Ethical clearance from the Committee of Human Research, Publications and Ethics (CHRPE) is required to conduct the study in KATH. Copies of all relevant regulatory approvals including CHRPE must be submitted to the R&D Unit prior to commencement of the study.

Version RD/REG-01 1ST JUNE, 2018

Please note: All previous versions of the certificate of registration becomes obsolete

Form expires 30TH JUNE, 2019

APPENDIX F: LETTER OF APPROVAL DIRECTORATE OF

OBSTETRICS AND GYNECOLOGY, KATH

P. O. Box [illegible]

Adum, Kumasi

The Head of Directorate

Directorate of Obstetrics and Gynecology

Komfo Anokye Teaching Hospital

Kumasi

July 03, 2018

Dear Sir,

REQUEST FOR APPROVAL TO UNDERTAKE MASTER'S THESIS PROJECT AT THE DIRECTORATE OF OBSTETRICS AND GYNAECOLOGY, KATH

I am a student at The Department of Population and Reproductive Health of the School of Public Health of this university. I request for approval to undertake my thesis project at the Directorate of Obstetrics and Gynaecology at the Komfo Anokye Teaching Hospital. This is in fulfilment of part of the requirements for completion of the master's program.

My research is entitled "***An Assessment of Prevention of Mother to Child Transmission of Hepatitis B Practices Among Mothers and Newborns Delivered at Health Facilities in The Ashanti Region of Ghana***".

My student identification number is [illegible]. I have attached my research protocol.

I will be very grateful if my application is accepted and approval granted.

Yours faithfully,

Dr. Aisha Ali Issaka

([illegible])

W J SANE NO

APPENDIX G: GHANA HEALTH SERVICE DATA REQUEST FORM

APPENDIX 6 – DATA REQUEST FORM

GHANA HEALTH SERVICE
DATA REQUEST FORM

NAME: Dr Aisha Ali Issaka

INSTITUTION: Kwame Nkrumah University of Science and Technology

TEL NO: 0202536160 DATE OF REQUEST: May 24, 2018

SPECIFIC DATA REQUIRED:

(1) Number of Deliveries in the government health facilities in the Kumasi Metropolis over the past 3 months. Should include both SVDs and Caesarean Sections

(2) Health facility profile: Kindly include Skilled Attendants at birth and Antenatal Care Providers at the facility level.

PURPOSE OF DATA REQUEST:

For the determination of sample size per facility chosen for the study.

My Master's of Public Health Thesis: An assessment of uptake of malaria in child transmission of Hepatitis B amongst mothers and their newborns.

EMAIL: aisha.issaka@gmail.com

SIGNATURE: AishAli

DR. KWASI YEBOAH-AWUDZI
DEP. DIRECTOR, PUBLIC HEALTH
ASHANTI REGION

FOR OFFICIAL USE ONLY

APPROVED BY: Yeboah-Awudzi OFFICER ASSIGNED:

DATE ASSIGNED: DATE COMPLETED:

REMARKS: