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FACTORS INFLUENCING USE OF EARLY INFANT DIAGNOSIS OF HIV SERVICES WITHIN THE ACCRA METROPOLITAN AND LEDZOKUKU KROWOR MUNICIPAL AREA

BY

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DECLARATION

I, Antoinette Kailey Ankrah, do hereby declare that except for references made to other people's work which I have duly acknowledged, this proposal is the result of my own research done under supervision and that it has neither in part nor in whole or concurrently been presented for another degree elsewhere.

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(Student)

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Dr. Phyllis Dako-Gyeke Date

(Supervisor)

DEDICATION

I dedicate this study to my mother, Madam Georgina Edzie, for her unflinching support and prayers throughout the course of my study. To my family and friends who assisted me in diverse ways, I say thank you and God bless you all.

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ABSTRACT

Introduction: It is estimated that over 90% of HIV infections in children is acquired through mother to child transmission (MTCT). Transmission can however be prevented if infected mothers have access to antiretroviral therapy (ART) during pregnancy, delivery and breast feeding. According to WHO, the absence of ART can increase MTCT rates by 15% to 45% however, transmission rates can reduce to below 5% with the availability of ART.

It is therefore imperative that all infants born to HIV positive mothers are promptly diagnosed and initiated on ART if found to be reactive. Providing HIV infected infants with timely HIV interventions and treatment could increase their survival rate by 75%.

Irrespective of the benefits obtained from early infant testing, the use of Early Infant Diagnosis (EID) of HIV services is unacceptably low in Sub-Saharan Africa, including Ghana. It is critical that the factors attributing to low coverage of EID services are immediately identified and addressed.

Objective: The purpose of the study was to ascertain the knowledge of health workers and HIV positive mothers on EID services. It also sought to identify the health system factors that influenced delivery of EID services, the barriers to the use of EID services among HIV positive mothers and also their perceptions on the use of the service.

Methods: The study was an exploratory qualitative research conducted at the Greater Accra Regional Hospital and the LEKMA Hospital. A criterion purposive sampling technique was utilised in selecting study participants. Fifty respondents comprising 20 health workers and 30 HIV positive mothers were engaged in in-depth interviews. Braun and Clarke's stages of thematic analysis were employed in analysing data.

Results: Both health workers and HIV positive mothers were adequately knowledgeable of EID of HIV services. Health system factors such as inadequate staff, transportation challenges, long turnaround time for the return of PCR results, inadequate and frequent breakdown of PCR machine were identified as inhibitors to EID service delivery. Availability of DBS cards, adoption of task shifting strategies and positive attitudes of health workers served as facilitators. Maternal factors such as denial of HIV status, lost to follow up in the EID process, dependency on significant others and consequences after disclosure of HIV status were factors that served as barriers to mother's utilization of EID services for their exposed infants.

Conclusion: The study concludes that maternal and health system factors influence the utilization of EID services. It is important that the identified hindering factors are urgently addressed to improve service use.

Keywords: HIV, early infant diagnosis, utilisation, delivery, services health workers, HIV positive mothers, facilitators, barriers, Ghana

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AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Care
ART	Anti-Retroviral Therapy
CHER	Children with HIV Antiretroviral Therapy
DBS	Dried Blood Spots
EID	Early Infant Diagnosis
HIV	Human Immunodeficiency Virus
HSS	HIV Sentinel Survey
IDIs	In-depth Interviews
MTCT	Mother-to-Child Transmission
NACP	National AIDS/STI Control Programme
PEPFAR	President Emergency Plan for AIDS Relief
PLHIV	People Living with HIV
PMTCT	Prevention of Mother-to-Child Transmission
POC	Point-of-Care Technologies
PCR	Polymerase Chain Reaction
SMS	Short Message Service
TAT	Turnaround Time

UNAIDS	Joint United Nations Programme on HIV/AIDS
WHO	World Health Organisation

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Globally, HIV remains a major public health concern, having claimed more than 35 million lives since its inception and 1 million lives in 2016. Currently, the number of people living with HIV is 36.9 million with an estimated 1.8 million being newly infected with the virus (UNAIDS, 2018). Although HIV is mainly transmitted through unprotected anal and vaginal sexual intercourse with an infected person, other modes of transmission include transfusion of contaminated blood, sharing of contaminated needles, syringes and other sharp equipment and vertical transmission from an HIV infected mother to her child during pregnancy, labour and delivery or post-natally via breastfeeding (Pinsky & Paul, 2009)

Mother-to-Child Transmission (MTCT) of HIV accounts for over 90% of all HIV infections in infants, the majority of which occurs in sub Saharan Africa (Anoje et al., 2012a; Sirengo et al., 2014). The risk of MTCT can be as high as 45% with no interventions and as low as 5% with availability and access to comprehensive interventions (Kyaw et al., 2017).

In 2011, the UNAIDS and the United States President's Emergency Plan for AIDS Relief (PEPFAR) launched the Global Plan initiative to eliminate new HIV infections among children by 2015 whiles keeping their mothers alive . This initiative was geared towards eliminating new HIV infections in HIV prevalent countries where about 90% of pregnant women were infected. The 22 high burden countries referred to as priority countries in sub-Saharan Africa and Asia were committed to scaling up PMTCT interventions in their respective countries to ensure 90% reduction of new HIV infections among children and 50% reduction of AIDS-related maternal deaths (UNAIDS, 2011; Sirengo et al., 2014).

Through these and other interventions, mother to child transmission rates have fallen globally, from 26% in 2009 to 16% in 2013 and 10% in 2015 (Kyaw et al., 2017), with new paediatric HIV infections declining from 300,000 in 2010 to 170,000 in 2015 (UNAIDS, 2017). Despite these tremendous gains, not all pregnant women have access to life saving treatments to prevent transmission of HIV infections to their infants. In 2013, 54% of pregnant women in sub Saharan Africa had no access to routine HIV testing services during antenatal care (ANC), an essential step to accessing HIV prevention, treatment and care (Kyaw et al., 2017).

In 2015, 300,000 HIV infected pregnant women had no access to life-saving treatments to MTCT (UNAIDS, 2016d). Seventy-six percent of pregnant women living with HIV however had access to antiretroviral medicines to prevent transmission of HIV to their babies in 2016, pointing out that 24% of HIV infected pregnant women have an unmet need for Anti-Retroviral Therapy (ART) (UNAIDS, 2017). In the same year, 160,000 infants acquired HIV worldwide with an estimated 60,000 in Western and Central Africa (UNAIDS, 2017).

According to UNAIDS (2016), 320,000 infants were living with HIV in Ghana in 2015 whiles 3,000 of these infants became newly infected. It is critical that all these HIV infected infants are identified and promptly linked to treatment and care as this will go a long way to avert mortality and reduce disease progression thus increasing their chances of surviving childhood and living healthy longer lives (Adeniyi & Oyero, 2015). Further studies by Hassan et al. (2012a) indicates that without access to cotrimoxazole prophylaxis, antiretroviral therapy (ART) and supportive care, about a third of infants die before they turn one and 50% will die before their second birthday.

1.2 Statement of the Problem

Early Infant Diagnosis of HIV (EID) is a critical component of the Prevention of Mother- to-Child Transmission (PMTCT) cascade. The goal of EID is to promptly link HIV infected

infants to treatment and care whiles mothers of HIV uninfected infants are counselled on appropriate interventions, to continually prevent infections in their infants (Hassan et al., 2012). In 2016, about 120,000 children died worldwide due to AIDS-related illness, most of these deaths could have been averted if these children have been identified early enough, diagnosed, and initiated on treatment (UNAIDS, 2017). It is therefore imperative that HIV infected children are immediately identified and linked to sustainable treatment and care, otherwise approximately 50% of these infected children will die before age two and the remaining 50% who survive will die before age 5 (Somi et al., 2017).

Studies revealed that early initiation of infants on ART would reduce infant mortality and HIV progression by 76% and 75% respectively (Davies & Pinto, 2015; Goggin et al., 2016). Recognising the gains of immediate linkage of all HIV infected children to treatment, the new World Health Organisation (WHO) guidelines recommends that all HIV exposed infants receive virological tests using dried blood spots (DBS) for polymerase chain reaction (PCR) within 4 to 6 weeks after birth or at any opportune time (WHO, 2010; Anoje et al., 2012).

Access to virological testing for infants below 18 months remains a challenge in sub-Saharan Africa, impeding scale-up of treatment in children. In 2015, only 54% of HIV exposed infants in the 21 Global Plan priority countries were tested within the first two months of life as recommended by WHO (UNAIDS, 2016). Unfortunately, EID coverage is still low in Global Plan priority countries.

The situation is same in Ghana, having a total of 2,748 PMCT sites nationwide, each serving as entry points for testing HIV exposed infants, only 5,551 and 3,733 HIV exposed infants received DNA PCR test in 2016 and 2015 respectively as compared to a number of pregnant women who tested positive for HIV (18,116 and 12,583) in 2016 and 2015 respectively (NACP & GHS, 2016). In Greater Accra Region, however, only 2,013 exposed infants were screened

for HIV out of 3,570 HIV exposed infants (NACP, 2016b). According to UNAIDS (2016), only 15% of infants in Ghana had access to ART in 2015, showing an 85% unmet need of lifesaving treatments for HIV infected infants.

It has been acknowledged that, institutional and maternal factors have been attributed to low coverage of EID services in many sub-Saharan Africa countries (Bwana et al., 2016; Beima-Sofie et al., 2017). Available data indicate low coverage of EID services in HIV exposed infants in Ghana. Despite the low coverage of EID services, there is no sufficient published literature in Ghana with regards to delivery and utilisation of the EID services.

This study therefore sought to ascertain the knowledge of health workers and HIV positive mothers about EID of HIV services. It further probed into health system and maternal factors that facilitated or obstructed the use of EID services and well as mother's perception of the service.

1.3 Conceptual Framework

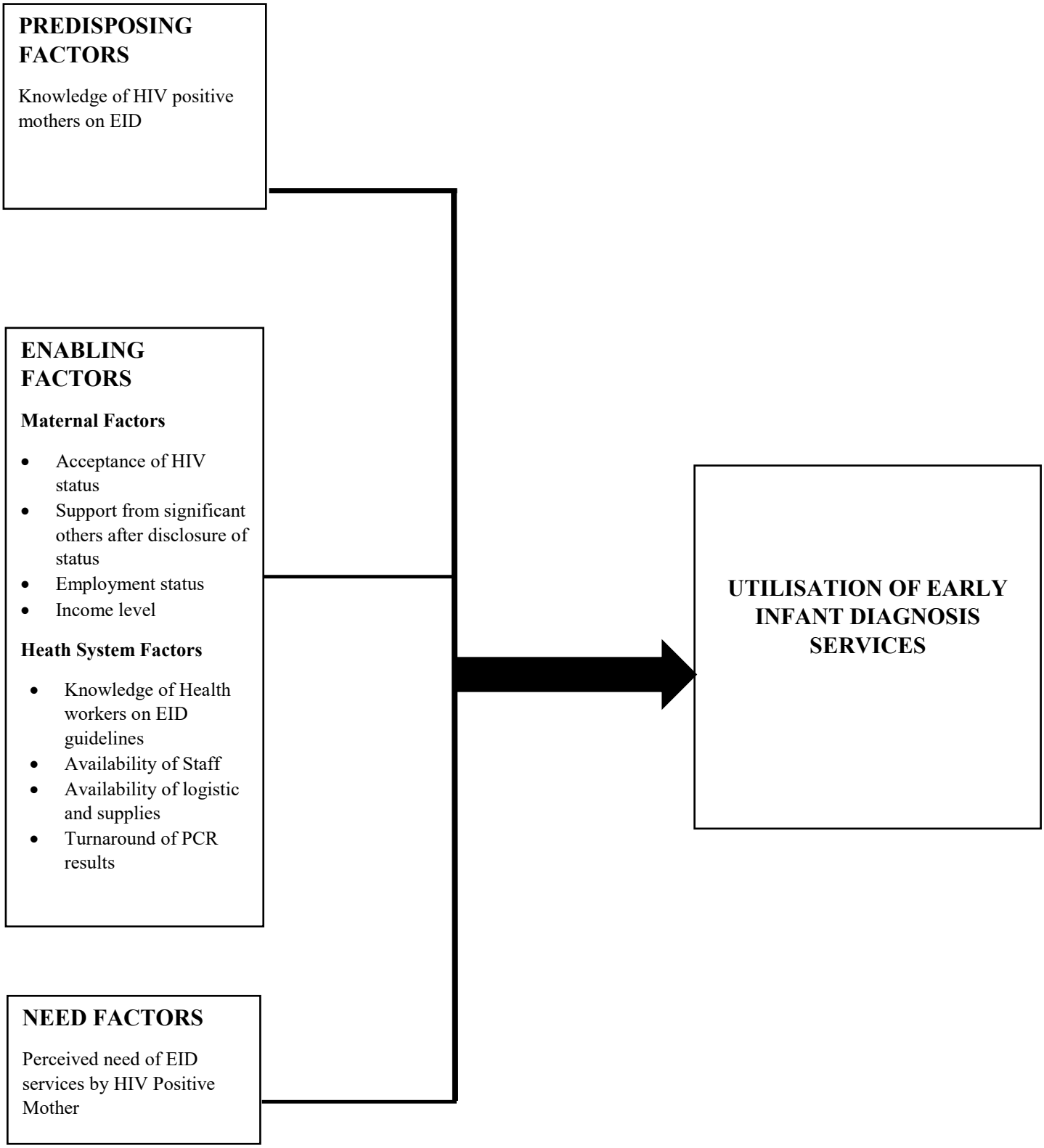

Figure 1: Conceptual Framework on utilisation of EID Services adapted from Andersen (1995)

1.3.1 Narrative of Conceptual Framework

The conceptual framework adapted for this study is the Andersen behavioural model for health services utilization. This model was developed by Ronald M. Andersen to ascertain factors that either facilitate or impede the utilisation of health services by individuals (Andersen, 1995). The Anderson Behavioural Model is extensively recognized as a reliable tool for the study of health service utilization (Azfredrick, 2016).This framework was selected because it is in line with the study's overarching objective which is to identify factors influencing the use of early infant diagnosis of HIV services by mothers of exposed infants.

According to Andersen, a series of factors; predisposing, enabling and need factors influence utilisation of health services by individuals (Andersen, 1995). The framework defines predisposing factors as the basic characteristics of individuals such as demographic factors, social status, attitude and health belief. Enabling factors on the other hand are factors that expedites an individual's utilisation of health services whiles need factors are those elements that necessitate the use of health service by individuals (Babitsch et al., 2012; Azfredrick, 2016).

In this present study, knowledge of HIV positive mothers on EID was examined as a predisposing factor. The study examined enabling factors from the perspectives of mothers and health systems. Maternal factors examined included acceptance of her HIV status, support (monetary or encouragement) from significant others after disclosure of her HIV status, employment status and income level. Health workers knowledge on EID guidelines, attitudes of health workers towards HIV positive mothers during antenatal and PMTCT sessions, availability of logistic and supplies, availability of staff with requisite skills in DBS sample collection and turnaround time of PCR results were health system factors examined. Mothers perception of EID was examined as a need factor.

The framework was adapted by asking study participants questions based on the elements of predisposing, enabling and need factors outlined in the model to explain the factors influencing use of EID services by HIV positive mothers.

1.4 Justification of Study

Ghana like other sub-Saharan Africa countries have committed to achieving an AIDS free generation and are rallying behind UNAIDS to expedite its ambitious fast-track targets called the "90–90–90", to help end AIDS epidemic by 2030. This fast-track targets seeks to diagnose 90% of people living with HIV by 2020, provide sustained antiretroviral therapy (ART) for 90% of those diagnosed and ensure 90% viral suppression in those on ART (Davies & Pinto, 2015). It is imperative that all HIV infected infants are identified, initiated on treatment and sustained in care to reduce the morbidity and mortality associated with HIV infection which aggravates within the first few months and approaches 50% by two years of age (Lowenthal et al., 2014).

Unfortunately, achieving this fast track target for children in Ghana is far from being reached. In 2016, only 31% of HIV exposed infants were virologically tested showing a discouraging EID coverage in the country (GHS, 2017).

It is hoped that, findings from this study will assist the National AIDS/STI Control Programme (NACP) and other relevant stakeholders in addressing the factors that have led to challenges in EID service delivery and utilisation by health workers and HIV positive mothers respectively. Addressing these challenges will go a long way to scale up the use of EID services in the country thus reducing HIV related morbidity and mortality in infants.

1.5 Objectives

1.5.1 General Objective

To identify factors influencing the use of Early Infant Diagnosis of HIV services within the Accra Metropolitan and Ledzokuku Krowor Municipal Area.

1.5.2 Specific Objectives

a. To assess the knowledge of health workers about delivery of EID services.

b. To ascertain the knowledge and perceptions of HIV positive mothers on EID of HIV.

c. To identify health system factors influencing EID of HIV services use.

d. To explore barriers to the use of EID services among HIV positive mothers.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Stages and Modes of Transmission of Human Immunodeficiency Virus (HIV)

HIV is an abbreviation for Human Immunodeficiency Virus (HIV), a virus that infects certain types of white blood cells of the immune system, specifically the CD4 cells, impairing their function and rendering them incapable of fighting off infections and diseases in the body (WHO, 2017). Progressive deterioration of the immune system due to lack of treatment can lead to a state of immune deficiency referred to as Acquired Immunodeficiency Syndrome (AIDS). This state is characterised by the manifestation of opportunistic infections and other HIV related cancers resulting from the deterioration of their immune system (Pinsk et al., 2009; WHO, 2017)

Acute HIV Infection is the earliest stage of infection which occurs within 2 to 4 weeks after a person is infected. It is characterised by flu-like symptoms, such as fever, headache, rash sore throat, stomach upsets, joint and muscle pains (Avert, 2017). Several changes occur in the immune system during at this stage, including rapid deterioration of CD4 cells, production of anti-HIV antibodies, and cytotoxic CD8+ lymphocytes destroy HIV-infected cells (Carpenter, 2017). HIV progresses faster at this stage, thus early diagnosis and treatment is critical at this stage to limit viral replication in the body. The risk of HIV transmission is also at its greatest during this period, especially in pregnant mothers and accounts for vertical transmission (Padian et al., 2011).

The second stage of HIV infection is Chronic HIV infection also called Asymptomatic HIV infection. There is continual viral replication and HIV decease progression with CD4 cell counts declining rapidly at an average rate of approximately 50 cells/µL/y. Often, people at this stage may show no signs of HIV-related symptoms up to about 10 to 15 years. The absence

of treatment and appropriate interventions during this stage will lead to acquisition of AIDS (Avert, 2017; Carpenter, 2017).

AIDS is the most advanced stage of HIV infection (WHO, 2017). The infected person exhibits symptoms such as weight loss, chronic diarrhoea, feverishness, persistent cough and severe illnesses. This stage is also characterised by an absolute CD4 cell count of less than 200 cells/μL, the presence of over 20 opportunistic infections and other HIV-related cancers in infected persons. In the absence of treatment, people living with HIV will survive for 3 years (Carpenter, 2017).

HIV cannot be transmitted via casual contact, the virus is present in blood, semen, vaginal fluid, pre-seminal fluid, breast milk and other fluids of the infected person, thus can only be transmitted through direct contact of mucous membranes with these fluids (Wilton, 2011; CATIE, 2014). Modes of transmission includes having unprotected anal and vaginal sexual intercourse with an infected person, receiving blood from an infected person through blood transfusion, sharing of contaminated needles, syringes, surgical and other sharp equipment. The virus may also be transmitted vertically from an infected mother to her baby during pregnancy, at the point of labour, delivery and also during breastfeeding (WHO, 2017). Mother to child transmission (MTCT) accounts for the majority of HIV infections in children, particularly in sub-Saharan African (Ubesie, 2012; Kharsany et al., 2016).

2.2 Prevention of Mother to Child Transmission (PMTCT)

The transmission of HIV from an infected mother to her infant in the course of pregnancy, labour, delivery or breastfeeding is termed Mother-to-Child-Transmission (WHO, 2017). Eliminating new HIV infections among children can be realized through Prevention of Mother to-Child-Transmission (PMTCT), a set of interventions designed to ensure that infants delivered by HIV positive mothers do not become infected (UNICEF, 2016). It is estimated

that over 90% of HIV infections in children is via MTCT. Transmission can however be prevented when infected mothers have access to appropriate treatments and interventions during pregnancy, delivery and breastfeeding (Sirengo et al., 2014; Anígilájé et al., 2016). According to WHO (2017) the absence of intervention may increase MTCT rates by 15% to 45%, however, transmission rates can reduce to below 5% amongst nursing mothers and to 2% or less amongst non-nursing mothers with the availability of comprehensive interventions.

To have an effective PMTCT program, it is imperative that pregnant women commence and complete a sequence of cascades of interventions (Avert, 2017; Hamilton et al., 2017). All Pregnant women must therefore have access to improved antenatal services and take up HIV testing. Counselling services and ART should also be made available to HIV positive pregnant women. Furthermore, HIV infected pregnant women must be educated on safe delivery practices and appropriate infant feeding practices. Infant testing services and other post-natal healthcare services must also be provided for HIV positive mothers and their babies (Hamilton et al., 2017; Kakisingi, 2017).

2.2.1 PMTCT Efforts

Several efforts have been put in place to scale up PMTCT interventions globally. In 2011, the UNAIDS and PEPFAR launched the Global Plan Initiative geared towards eliminating new HIV infections in children by 2015 and keeping mothers alive. This initiative focused on India and 21 other countries in sub-Saharan African countries, including Ghana. These countries referred to as priority countries were considered in 2009 as HIV prevalent countries with about 90% of HIV pregnant women in need of HIV prevention services (UNAIDS, 2016c). It was envisaged that scaling up PMTCT interventions in these countries will prevent over 250,000 new infections each year (UNAIDS, 2011a). These countries, committed to achieving this

ambiguous target, put measures in place within their respective countries to reduce MTCT of HIV by 90% and the number of AIDS-related maternal deaths by 50%.

In 2015, six priority countries met the global plan target by attaining 90% reduction in MTCT. These countries were Botswana, Mozambique, Namibia, South Africa, Swaziland and Uganda (UNAIDS, 2016c). Unfortunately, Angola, Côte d'Ivoire and Nigeria achieved below 40% reductions in new HIV infections among children. Ghana on the other hand reduced new HIV infections among children by 46% (UNAIDS, 2016c). Impressively, at the end of 2015, the 21 affected countries in sub Saharan African saw a 60% reduction in new HIV infections, a reduction from 270 000 to 110 000 in 2009 and 2015 respectively.

2.2.2 Proportion of Infants Infected with HIV

The scale up of PMTCT interventions globally has resulted in a 70% decline in the number of new HIV infections among children from 2000 to 2015 (UNAIDS, 2016d). It is estimated that since 1995, approximately 1.6 million new HIV infections among children have been averted through the provision of ARVs to HIV infected women, during pregnancy and breastfeeding (UNAIDS, 2016d).

In spite of these tremendous gains, a number of HIV infected pregnant women still have unmet needs for ART and have resulted in transmission of HIV to their infants. In 2015 and 2016, only 76 and 77% of pregnant women respectively, had access to ARVs for PMTCT globally. This however resulted in an estimated 150 000 children becoming infected with HIV in 2015, 110 000 of these infants lived in sub-Sahara Africa (UNAIDS, 2016). An estimated 160, 0000 infants also became newly infected with HIV in 2016 (UNAIDS, 2017). In Ghana, 17000 pregnant women were in need of ART to prevent transmission of infections to their children, in 2015. In the same year, it was estimated that 3000 children were newly infected with HIV of these 1.3 million were averted between 2010 and 2015 (UNAIDS, 2016b).

It is imperative that measures are put in place to ensure virtual elimination of mother to child transmission of HIV through provision of appropriate PMTCT interventions. It is also critical that all HIV infected infants are promptly identified and linked to treatment and care.

2.3 Early Infant Diagnosis of HIV (EID)

Providing HIV testing services to infants born to HIV infected mothers within four to six weeks after birth is referred to as Early Infant Diagnosis (UNAIDS, 2016a; Avert, 2017). The WHO suggests that further HIV test is performed on these infants at 18 months and/or when breast feeding ceases to provide the final infant diagnosis (WHO, 2010; Avert, 2017).

Identifying all infants infected with HIV promptly through the provision of timely HIV testing services is essential in ensuring child survival (Donahue et al., 2012). Disease advances rapidly in HIV infected infants within the first few weeks after birth, thus it is important that all infected infants are immediately initiated on antiretroviral prophylaxis soon after birth (Hampanda et al, 2017a). According to UNAIDS, (2014), in the absence of treatment, about one-third of children living with HIV will die by the time they reach one, and 50 percent of those who survive will die by age two. However, if infants are promptly initiated on treatment, the likelihood of they dying from AIDS related illness will decline by 75%.

Initiating infected infants on treatment however is possible only through early infant diagnosis, it is for this reason why the WHO revised its guidelines recommending that all HIV exposed infants be tested within 4 to 6 weeks after birth (WHO, 2010).

To ensure that all infants are successfully diagnosed and linked to treatment and care, a series of interventions must be completed, these steps entail health facilities offering EID testing services, mothers of HIV exposed infants accepting to take up testing services for their exposed infants, accurately collecting specimen, transporting collected specimen to laboratory for processing, returning test results to both health facility and mother or guardian of HIV exposed

infant and linkage to care, cotrimoxazole prophylaxis, and antiretroviral therapy (ART) for infants identified as HIV infected.

Exposed infants who have initially tested negative must be re-tested 6 weeks after mothers have stopped breastfeeding to confirm that HIV infection have not been transmitted postnatally via breastfeeding (Ciaranello et al., 2011). It is critical that no step along the cascade is overlooked.

2.3.1 Specific Test Conducted on Infants below 18 Months

Diagnosing HIV in infants below 18 months can be challenging due to the presence of maternal antibodies in the blood stream of the exposed infant, which persists until after 18 months. These antibodies may have found its way into the child's system during the time of pregnancy or through breastfeeding (UNAIDS, 2016). It is important to note that serologic assays used in detecting HIV status in older infants and adults will not be the appropriate in detecting HIV infections in infants below 18 months (Abdollahi et al., 2016). This is because any antibody detected during this period using an Antibody test will only represent exposure to maternal HIV rather than true infant HIV infection (Ciaranello et al., 2011).

To accurately detect the HIV status of infants below 18 months, an assays based on HIV DNA or RNA must be used to identify viral components in the blood of the infant (virological testing) (WHO, 2010). The Polymerase Chain Reaction (PCR) based assay detects both RNA and DNA. The DNA PCR assays often provide qualitative results whiles the RNA PCR assays provides quantitative results and further monitors viral load after HIV positive status of infant has been detected (WHO, 2008; Ciaranello et al., 2011).

Among the technologies available for diagnosis of HIV in infants, PCR on DNA in blood is the most widely used and is generally considered to be the standard method. Although both DNA PCR and RNA PCR assays have been recommended for use in limited resource settings,

the DNA PCR is more the preferred option for diagnosing infants below 18 months and have been considered as the standardised method (WHO, 2008).

The DNA PCR assay detects viral components in infants using two methods namely whole blood sample (WBS) and dried blood spot (DBS) method. The WBS method requires expensive equipment and trained personnel to carry out the test. Specimen collected must also be transported to the laboratory within 24 hours under specific temperature and conditions. The DBS however, can be preserved and transported to central laboratories without refrigeration within 15 days. This implies that DBS is easy to use and less costly (Jain et al., 2011).

Irrespective of the importance of testing all HIV exposed infants virologically within the first two months of their lives, access to HIV testing services for infants have been a hurdle, particularly in sub-Saharan African countries (UNAIDS, 2016). In 2007, only 8% of infants born to women with HIV infection were tested within the first 2 months of life (Ahmed et al., 2013a). The number increased slightly in 2009, with only 15% of infants having access to timely testing (WHO, 2010). In 2012, only 39% of infants received HIV testing by 2 months after birth (UNICEF, 2013). The number of infants increased to 42% in 2013 (UNAIDS, 2014).

Only four countries out of the 21 priority countries provided virological testing to more than 50% of HIV-exposed infants in the first 2 months of life in 2015, three other priority countries however provided timely testing to less than 10% of HIV-exposed infants (UNAIDS, 2016c). In all, only 54% of children exposed to HIV in the 21 highest-burden countries were test within the recommended two months in the same year (UNAIDS, 2016a).

The coverage of access to EID services in sub-Saharan Africa is still low, with a small proportion of HIV exposed infants accessing testing and diagnostic facilities. Individual and institutional factors have been identified as barriers to access EID services.

2.4 Health System Factors Influencing EID

DNA-PCR testing is generally used for detecting HIV viral components in the blood of infants in limited resource settings. This test is highly technological and requires trained personnel to man it, unfortunately, studies have revealed that there are limited health workers in sub-Saharan Africa with the requisite skills (Stevens et al., 2008; Ciaranello et al., 2011). Also, PCR machines used for testing are limited in sub-Saharan Africa and often situated in centralised laboratories. Unfortunately, many HIV exposed infants are located in rural settings, thus centralisation of HIV infant testing may result in only few mothers accessing EID services (Sutcliffe et al., 2014; Hampanda et al., 2017a). This is as a result of long distance and lack of transportation to such laboratories.

Apart from infants being directly tested at these central laboratories, blood samples of infants are taken on dried blood spots cards and transported from health facilities to centralised laboratories for testing. Studies have pointed out that factors such as intermittent stock of DBS cards, delay in specimen transport serve as barriers to EID delivery (Hassan et al., 2012b; Sutcliffe et al., 2014).

Other studies revealed that reagent stock-outs, breakdown of PCR machines, limited staff to handle large volumes of samples contribute to delay in specimen processing at laboratories (Ciaranello et al., 2011; Hassan et al., 2012b). Ciaranello et al. (2011) further indicated that inaccuracies during sample collection, improper labelling and packaging, as well as damage of specimens may result in a number of unevaluated specimen.

The long Turnaround Time (TAT) for PCR results to reach the health facility and mother of HIV exposed infant is a major barrier to accessing EID interventions (Diallo et al., 2016). Although the WHO recommends that results be returned to mothers within four weeks of specimen collection (WHO, 2010), PCR results are returned to the health facility and subsequently to mother of HIV exposed infant at a later time, often after several months (Sutcliffe et al., 2014).

According to Ciaranello et al. (2011) and Bailey (2015), the modes of transporting these PCR results back to the health facilities is often via commercial courier which results in slow delivery thus leading to loss to follow up of infants and missed opportunities for immediate initiation of treatment. Essajee et al. (2015 and Audu et al. (2015) suggests the use of short message services (SMS) technology by laboratories to notify health facilities of readiness of test results to improve EID turnaround times. Also, Bailey (2015) and Anticona et al. (2015) proposed the intiation of Point-of-Care (POC) testing as this will increase the number of HIV-exposed infants who have access to testing. These studies further pointed out that on-site infant screening will enable mothers receive infant results within two hours after specimen collection.

Bitnun et al. (2014) reported that limited healthworkers, coupled with huge workload also affected delivery of EID services. Ahmed et al. (2013b) indicated that task shifting (delegation of task to less specialized health workers) have been introduced in some health facilities to address such issues.

2.5 Knowledge of Health workers and HIV Positive mothers on EID Interventions

Knowledge of health workers on EID in some settings have proven to be inadequate (Nguyen et al., 2009; Coulibaly et al., 2014). A Kenyan study carried out to explore health workers knowledge on EID discovered that some health workers were not sure of the number and type of tests to be conducted in the EID continuum, neither were they aware of the exact timelines

for such tests (Hassan et al., 2012). Inadequate PMTCT training programs have been attributed to minimal knowledge of EID among health workers (Hassan et al., 2012).

Similar studies conducted in Ghana found that health workers involved in EID do not have adequate knowledge on infant feeding, and as such, they are unable to adequately counsel their clients in that regard (Laar et al., 2014). Adetokunboh et al. (2016) found that health workers were unaware of the content of international and national EID testing guidelines. The testing guidelines were also not available at health facilities upon request neither did these facilities have facility-based EID guidelines, thus most health workers provided EID services without adhering to recommended procedures (Adetokunboh et al., 2016).

Previous study findings have mentioned that mothers of HIV-exposed infants have very little knowledge on the need for EID (Boender et al., 2012; Adeniyi et al., 2013). The lack of maternal understanding of the benefits of early infant testing may deter her from testing her HIV exposed infants (Aliyu et al., 2014; Adeniyi et al., 2015). Hassan et al. (2012) revealed that some mothers had not heard of EID until their infants were enrolled. For the few of such mothers who had some knowledge, they did not know the types of tests available and the timelines for conducting such tests. Woldesenbet et al. (2015) established that the lack of awareness about EID among mother in their various communities could explain the reason for no or low utilisation of EID services by HIV positive mothers.

2.6 Barriers to Utilising EID by HIV Positive Mother

2.6.1 Non-Disclosure of Status due to fear of Stigma

Findings from previous studies have pointed out that an HIV positive mother's inability to voluntarily disclose her HIV status to her husband gravely affected uptake of EID services (Ayuo et al., 2013; Hampanda et al., 2017). Walcott et al. (2013) and Nkuoh et al. (2013) reported that a mother's fear of rejection by spouse and significant others, perceived conflict and prospect of divorce upon disclosing her HIV status to her partner prevented her from

taking up HIV testing services for her infant. Similarly, Ahmed et al. (2013b) mentioned that some mothers were unwilling to send their infant for testing because doing that was going to reveal their own status. This is particularly dominant among mothers who feared to be stigmatised by health workers (Goggin et al., 2016). The fear of stigma, blame, rejection, feeling of guilt of having transmitted the virus to an innocent child prevented mothers from accessing HIV services for their infants (Bwirire et al., 2008; Adeniyi et al., 2015).

Bitnun et al. (2014) reported that a mother's anxiety to know the HIV status of her exposed infant contributed to her uptake of EID services. Other studies also mentioned that mothers who perceived less stigma from health facilities accessed early infant testing services (Goggin et al., 2016). Walcott et al. (2013) revealed that caregivers where not comfortable with the negative consequences associated with taking care of an infected child. Most of caregivers felt humiliated parenting an HIV infected infant and this deterred them from accessing early infant HIV testing services.

2.6.2 Financial Constraints

Although assessing infant HIV testing at facilities was at no cost, other related factors such as cost of transportation to facility affected uptake of EID services (Hassan et al., 2012; Coulibaly et al., 2014), majority of these factors are seen in rural settings. Mothers frequenting facility due to multiple appointments and the number of hours spent at facilities were all regarded as indirect cost. This is because it resulted in wages lost when mothers forfeited work for clinic appointments (Ciaranello et al., 2011).

Precious study findings revealed that referral of mothers to other facilities due to unavailability of testing commodities at the primary facility, deterred some mothers from further seeking the service, mainly due to cost involved in traveling to other facilities (Chatterjee et al., 2011). Merten et al. (2016) reported that women who solely depended on their spouses for livelihood

were likely to access EID only if their partners consented to that and provided them with money for that purpose.

Similarly, Cook et al. (2011) pointed out that a mother's patronage of EID was ascribed to the type of work she engaged in and her level of income, thus mothers earning income were likely to take up EID services for their infants as compared to those who had no source of income. Migration of mothers to farming communities during farming seasons for source of livelihood gravely resulted in attrition of mother-baby pairs from the EID care programmes (Hassan et al., 2012).

2.6.3 Distance to Health Facility

The distance of health facility from the resident of the HIV positive mother has been reported as a barrier to utilization of EID services (Bwana et al., 2016). This issue is mostly predominant in rural areas, where testing services are not available at the local clinics. Mothers are therefore required to travel to district capitals to access these services. The inability of mothers to afford transport costs due to long distances to health facilities deter them from utilising EID services (Bwirire et al., 2008; Boender et al., 2012). Chatterjee et al. (2011) suggests decentralisation of EID services as the best way to improve accessibility of EID services to mothers. Bailey (2015) believes the integration of Point-of-Care (POC) testing in health facilities will emmensly alleviate the challenge of geographical access to services. According to Buser (2017) and Anticona et al. (2015), POC testing makes it possible for exposed infants screeened on-site to receive their test results few hours after their specimen are collected so that HIV infected infants can be rapidly enrolled on lifesaving antiretroviral treatment.

2.6.4 Other Barriers to Accessing EID

Coulibaly et al. (2014) have highlighted low levels of education as a barrier to accessing EID services by mothers, similar studies conducted by Hassan et al. (2012) and Woldesenbet et al. (2015) all pointed out the critical role education played in utilising EID services.

Anígilájé et al. (2016b) reported that poor attitudes of health workers towards clients served as a barrier to successful PMTCT interventions. Similarly, Hassan et al. (2012) also found that interpersonal relationships between health workers and clients contributed to mothers testing their HIV exposed infants. Goggin et al. (2016) highlights that poor attitudes of health workers coupled with perceived stigma from health workers deterred HIV positive mothers from disclosing their HIV status and accessing HIV testing services for their exposed infants.

The availability of support from significant others even after disclosure of HIV status greatly contributed to accessing HIV testing services by mothers of HIV exposed infants. Hassan et al. (2012) indicated how some mothers tested their exposed infants for HIV after they were encouraged by their support groups and spouses to do so. Studies by Bwana et al. (2016) and Hampanda et al. (2017a) showed similar findings.

Previous study findings reported that most infants were only enrolled into EID programs after developing ill health conditions and referred from acute and chronic care services. On the other hand, Hassan et al. (2012) reported that some mothers returned to the health facility to ascertain the general health condition of their infants including accessing HIV testing services for exposed infants irrespective of their health conditions.

CHAPTER THREE

3.0 METHODS

3.1 Introduction

This chapter outlines the methods utilised in conducting the study. It describes the study design, study areas, study population, sampling techniques, data collection methods, quality control measures, modes of data analysis and ethical considerations employed.

3.2 Study Design

According to Polit & Beck (2010), research design is the researcher's overarching plan for responding to the research question. In an effort to provide answers to the research question, a researcher may utilise either a qualitative and quantitative research design (Abosede, 2016).

According to Walia (2015) qualitative research focuses on words rather than numbers and seeks to understand the meaning people attribute to their daily experiences. Mohajan & Mohajan (2018) also states that the purpose of qualitative research is to interpret a phenomenon of interest from the perspective of the respondents or target population being studied. This research approach employed, assisted the PI to obtain in-depth understanding of the research question from the perspective and experience of health workers and HIV positive mothers who provided and utilised EID services respectively. Unlike quantitative studies, qualitative research approach requires a small number of respondents (Slevitch, 2011). This is because qualitative studies do not seek to generalize findings rather, it seeks to provide a rich, contextualized understanding of some aspect of human experience through the in-depth study of topic of interest (Polit & Beck, 2010).

Qualitative research utilises a number of data collection methods including observations, interviews (individuals and groups) and document reviews (Gill et al., 2008). The qualitative data collection method used for this study is individual interviews, specifically in-depth

interviews to explore the perspectives of participants on a phenomenon of interest (Gill et al., 2008).

3.3 Study Area

The Greater Accra Region which is one of the ten administrative regions in Ghana served as study area. The region is divided into 10 administrative areas namely Ga South Municipal, Ga West Municipal, GA East Municipal, Accra Metropolis, Adenta Municipal, Ledzokuku Krowor Municipal, Ashiaman Municipal, Tema Metropolis, Dangme West District and Dangme East District (Ghana Statistical Service, 2013).

The Greater Accra Region is regarded as the second most populated region, after the Ashanti Region, with a population of 4,010,054 (1,938,225 Males and 2,071,829 Females) per the 2010 Population and Housing Census, accounting for 15.4 per cent of the country's total population. (Ghana Statistical Service, 2013). The reason for this situation is not farfetched. Greater Accra has the highest growth rate of 3.1%. This is partly because the region has the highest immigration rate in the country. The attraction of Accra as the capital of Ghana continues to put the capital at the receiving end of a steady migration of people from other parts of the country, neighbouring African Countries and European Countries.

In 2016, per the HIV Sentinel Survey (HSS) Report, the HIV prevalence of the region was 2.4% showing a decline from 3.2% in 2015. (NACP, 2016). The Greater Accra Region has a number of health facilities with 274 PMTCT Centres all serving as entry points for testing HIV exposed infants (NACP, 2016)

The Greater Accra Regional Hospital and the LEKMA Hospital within the Accra Metropolitan and Ledzokuku Krowor Municipal areas respectively were the two health facilities selected for the study.

3.3.1 Greater Accra Regional Hospital

The Greater Accra Regional Hospital, formerly known as the Ridge hospital was established in 1929 to provide healthcare to British nationals during the colonel era. It falls within the Osu Klottey Sub Metro of the Accra Metropolitan Area. Being a Regional Hospital, the 420 bed capacity hospital provides health care services for the entire Region, however the immediate catchment area it serves includes Nima, Maamobi, Kanda, Accra New Town, Kotobabi, Osu, La, Adabraka and Accra Central.

The facility is national health insurance (NHIS) accredited and provides specialist service such as Obstetrics and Gynaecology, Paediatrics, Neurosurgery, Electrocardiogram, Mammography, CT scan, Radiology, Critical and Emergency, Laboratory and Pharmaceutical services. The facility also runs specialized clinics for conditions such as HIV and AIDS, Anaesthesia, Diabetes, Spine, Eye and Ear Nose and Throat (ENT). The hospital runs ART Clinics from Monday to Friday, however, special days for mother-infant-pair is on Friday.

3.3.2 LEKMA Hospital

The Ledzokuku Krowor Municpal Assembly (LEKMA) Hospital is a Government of Ghana health facility constructed by the Chinese Government in 2010. It is situated in Teshie and serves as the municipal hospital for inhabitants within the Ledzokuku Krowor Municpal area and beyond. The municipality is made up of 82 communities with an estimated population of 320,000 inhabitants.

The 100- bed capacity health facility has other facilities such as laboratory and radiology, CT scan, Dental, Ear Nose and Throat (ENT) clinics. In addition it has a Malaria Research Centre and Herbal Medicine Unit. The ART Centres run from Mondays to Friday.

3.4 Study Population

The study population was made up of two set of respondents, these were health workers and HIV positive mothers. These health workers included Midwives, Nurses, Pharmacist, Biomedical Scientist, Data Managers, Data Officer, Models of Hope and Psychologist directly involved in EID services at the Antenatal, Postnatal and ART Centres within the selected facilities. The HIV positive mothers on the other hand comprised of mothers who had enrolled in PMTCT at the selected facilities and had infants who were at most a year-old.

3.4.1 Sample Size

The study consisted of a total of 50 participants comprising 20 health workers and 30 HIV positive mothers. The choice of number of respondents is in line with Green & Thorogood (2009) and Baker & Edwards (2012) which suggests that the sample size for a qualitative study should range between 12 and 60.

3.4.2 Sampling Technique

A purposive sampling technique was employed in selecting study participants. In purposive sampling, the PI specifies the characteristics of the population of interest and identifies those who fit the desired characteristics (Christensen et al., 2014). According to Creswell & Plano Clark (2011), purposive sampling entails identifying and choosing participants who are knowledgeable and experienced with a subject of interest.

Criterion purposive sampling technique was further adapted in selecting eligible mothers and health workers for the study. The Matron at the ART Centre assisted with the recruitment of eligible mothers for the study. HIV positive mothers who utilized the ART Centre during the data collection period, satisfied the inclusion criteria and willing to participate in the study were selected for the interview.

To ensure participating health workers were experienced, supervisor's at the antenatal, postnatal and ART units assisted with the selection of health workers. Permanently employed health workers who were directly involved in the provision of EID services for more than a year were selected. Eligible health workers who were available and willing to participate in the study were interviewed. Eligible mothers and health workers were engaged until no new data was obtained, at which point interviews were terminated (Fusch & Ness, 2015).

3.4.3 Inclusion Criteria

HIV positive mothers who accessed services at the ART Centre and satisfied the following criteria were eligible for selection

- Enrollment in PMTCT sessions during pregnancy
- Delivered at the selected facilities
- Infant delivered is at most a year old

Health workers within the selected facilities were eligible for selection if they satisfied the following criteria

- Permanently employed
- Directly involved in the delivery of EID services
- Provided EID services for at most a year prior to the data collection

3.5 Data Collection Tools

The data collection tools utilised for the study were interview guides. Two separate interview guides were used, one for the health workers and another for HIV positive mothers. Interview guide for the health workers delved into their knowledge about PMTCT and EID, the eligibility of infants for testing, the number, exact times and types of tests conducted, the health factors influencing delivery of EID services and relevant recommendations.

The interview guide of HIV positive mothers on the other hand inquired into how mothers perceived EID, whether they had accessed EID services for their infants, when the initial testing of their infants were conducted, the number and the specific type of the tests performed, the duration of return of test results, the challenges encountered whiles testing and whether or not they disclosed their HIV status to significant others.

Interview guides were pre-tested at the PMTCT and ART Unit of the Maamobi General Hospital. The purpose of pre-testing was to inquire if questions were clear enough to be understood by study participants, identify the lapses of the interview guides, and determine the average response time required in engaging participants. Interview guides were revised after the pre-testing exercise and the revised interview guides were used for data collection. Other data collection tools employed were digital tape recorder, note pads and pens.

3.6 Data Collection Method

Gill et al. (2008) suggests that in-depth interviews rather than focus group discussions are suitable when studying sensitive subjects such as HIV/AIDS. This is because respondents may feel uncomfortable expressing themselves in a group, thus adopting one-on-one semi-structured interviews will provide respondents particularly HIV positive mothers a sense of trust and confidentiality.

Eligible mothers who accessed routine ART services for themselves or their infants were selected for the interview based on their willingness to participate in the study. This selection was done with the assistance of the Matron at the ART Centre. Mothers were engaged through in-depth interviews to explore their knowledge and perception of early infant testing, their experiences in utilising the service as well as the factors that influenced or impeded their utilisation of EID services.

To ensure that mothers were comfortable and could freely provide responses to questions, interviews were held in private rooms within the selected health facilities. Mothers were further assured that their responses will be treated as confidential. Interviews conducted with each mother spanned for 10 to 15 minutes. Interviews were audio-recorded upon approval of respondents, this enabled the PI to concentrate on the interview so as not to miss any vital information. The Research Assistant aided with note-taking.

Interviews with eligible health workers were conducted at the health facility in the afternoon by which time the number of clients accessing services had reduced. This enabled health workers engage in interviews without interruptions. In-depth interviews were conducted among health workers who were available and willing to participate in the study to ascertain their knowledge on EID and as well as health facility factors influencing delivery of EID services. Interviews conducted with health workers spanned between 15 to 20 minutes. Permission was also sought from health workers to audio record interview sessions and notes were taken by the Research Assistant. All interviews were conducted by the PI, interviews held with health workers were conducted in English whiles some of the interviews with mothers were conducted in local language specifically Twi. The entire data collection period was three weeks, from 4th to 22nd June, 2018.

3.7 Quality Control

To guarantee quality of study outcome, certain measures were put in place throughout the data collection process, these measures are as follows;

- All data collection tools were pre tested at the Maamobi General Hospital.
- The Research Assistant was well trained prior to commencement of study.
- All audio interviews transcribed were cross checked with the written notes taken to ensure that no relevant information was missed out.

3.8 Data Processing and Analysis

All audio recorded interviews were transcribed verbatim and typed into Microsoft Word version 2013 by the PI and Research Assistant. Audio recordings in the local languages were translated verbatim in the local language and translated again into English language for analysis.

All interview transcripts were inputted into NVivo 11 qualitative data analysis software and analysed using Braun & Clarke's stages of thematic analysis (Braun & Clarke, 2006). The initial stage of data analysis entailed repeatedly reading over interview transcripts to become acquainted with its content. Features of the data identified as relevant to the research question were coded with the assistance of the NVivo software. This pointed out that codes emerged from data rather than priori. Codes were then collated into potential themes. All codes under each themes were reviewed to ensure coherency. Themes were also reviewed to inquire if they accurately reflected the entire data set. Finally, appropriate names were assigned to themes.

3.9 Ethical Consideration

Ethical clearance was obtained from the Ghana Health Service Ethics Review Committee of the Research and Development Division in Accra. Approval was further sought from the Greater Accra Regional Health Directorate and the Ledzokuku Municipal Directorate. An Introductory Letter was obtained from the School of Public Health, University of Ghana and presented to heads of the Greater Accra Regional Hospital and the LEKMA Hospital for authorization, before commencement of data collection.

Informed consent forms were given to participants prior to commencement of interview. This informed consent form consisted of a participant information sheet which highlighted Principal Investigator's (PI) background, purpose of the study, procedures, confidentiality, risks, voluntary participation and benefits of participating in the study. Contact details of PI, Academic Supervisor, and Administrator of the Ghana Health Service Ethical Review

Committee were provided for follow up by participants should they need further clarification. The PI also declared she had no conflict of interest in the study.

Informed consent form were given to study participants to read, for those who could not read, the information on the form was read and interpreted to them in a local language which they were conversant with. Participants signed consent forms to indicate voluntary participation after which copies of the forms were given to them.

Study participants were not exposed to any form of risk neither did they incur any cost besides their time. The study was solely funded by the Principal Investigator thus participants were informed that their participating in the study accrued no direct benefits. They were however informed that study findings sought to contribute to the improvement of delivery and utilization of EID of HIV services which could benefit study participants in the long run if they decide to have a child again as well as other HIV positive mothers and their infants. The PI however bore transport cost of participants from their residence to the facility.

Participants were told that their involvement in study was voluntary and withdrawal at any point during the data collection process was permissible stressing that their withdrawal was not going to deprive them access to healthcare services being rendered .They were also informed that they could refuse to answer questions they felt were uncomfortable.

In-depth Interviews were held in private rooms in the selected health facilities. To safeguard identity and ensure anonymity, names of participants were not collected, rather identification numbers were assigned. Only the PI, Research Assistant and Academic Supervisor had access to the data collected. Data was collected using digital tape recorder and note pads, all recorded data were transcribed into English Language. All paper records were safely stored in cabinets under lock and key whiles audio recording were stored in password protected folders.

Paper and electronic records collected will be kept for a period of 3 years, after which they would be destroyed. Paper records will be shredded (IRB-SBS, 2012), whiles electronically data stored on tape recorders and hard drives will be destroyed using a software techniques called overwriting (Kissel et al., 2014).

Findings and recommendations would be available at the School of Public Health and it would also be disseminated to various stakeholders at a meeting at the end of the study.

CHAPTER FOUR

4.0 RESULTS

4.1 Introduction

This chapter presents findings on the socio-demographic characteristics of study participants It also presents findings on how the components (predisposing, enabling and need factors) of the Anderson Behavioural Model adapted for the study influence service utilisation. The study examined knowledge of HIV positive mothers on EID as predisposing factors. Enabling factors were examined based on the perspective of mothers and health systems. Maternal factors examined included acceptance of her HIV status, support (monetary or encouragement) from significant others after disclosure of her HIV status, employment status and income level. Factors such as knowledge of health workers on EID guidelines, attitudes of health workers towards HIV positive mothers during the antenatal and PMTCT sessions, availability of staff, availability of logistics and supplies and turnaround time of PCR results were examined as health system factors. Mother's perception of EID services was observed as a need factor.

4.2 Socio-demographic Characteristics of Study Participants

In all, twenty health workers who were directly involved in the delivery of EID services were interviewed, sixteen were females and the remaining males. They included six Midwives, six Nurses, one Pharmacist, one Biomedical Scientist, two Data Managers, one Data Officer, two Models of Hope and one Psychologist. The sampled health workers have been at post for an average of six years, with the minimum being one year and the maximum, ten years.

A total of thirty HIV positive mothers were also interviewed. The age of the mothers ranged from 20 to 49 years with most (16) in the 30-39 age category. Twenty-two were either married or co-habiting while the remaining had never been married. In terms of educational qualification, only two mothers interviewed had attained higher or tertiary education, eight had

received education to the Secondary/ SHS/ Vocational/ Technical School level, nine had Middle School/ JSS/ JHS certificates, seven had attained primary school education and four had no formal education.

Three of the respondents were unemployed and twenty-one out of the remaining, were traders. All the HIV positive mothers interviewed had infants who were at most one year old with the youngest aged seven weeks.

Table 1: Socio-demographic characteristics of study participants

Characteristics	**Frequencies(N=50)**
Health workers	
Sex	
Male	4
Female	16
Position of health workers	
Midwife	6
Nurse	6
Pharmacist	1
Biomedical Scientist	1
Data Manager	2
Data Officer	1
Model of Hope	2
Psychologist	1
HIV Positive Mothers	
Age (years)	
20 – 29	8

30 – 39	16
40 – 49	6
Marital Status	
Never married	8
Married/cohabiting	22
Education	
No education	4
Primary school	7
Middle/JSS/JHS	9
Secondary/SHS/Technical/Vocational	8
Higher/Tertiary	2
Occupation	
Security Personnel	2
Health worker	1
Banker	1
Trader	21
Beautician	2
Unemployed	3
Age of Exposed Infant	
6weeks – 3 months	3
4 months – 7 months	5
8 months – 12 months	22

4.3 Knowledge of Participants on EID

4.3.1 Health Workers' Knowledge of EID Guidelines

The study found that health workers had adequate knowledge of the EID guidelines. This was evident per their responses to questions on eligibility of testing, exact times and timelines for testing and specific tests performed on HIV exposed infants.

With reference to infants eligible for testing, health workers stated that, rather than testing all infants delivered, infants of HIV positive mothers were eligible for EID.

> *"It is a little bit difficult to refer every born child to undergo testing, so mothers who are positive only are monitored and their children are also tested" (GAR #18, Data Manager)*

> *"Every child born to an HIV positive mother is an exposed infant, so from the beginning an identified target" (LEK #5, Nurse)*

A health worker also pointed out that, apart from infants born to HIV positive mothers, infants found to be abandoned were also eligible for testing.

> *"If a child is identified as in an abandoned child ... if the child is less than 6 weeks, we will do antibody test for that child that very day, if the child tests positive, it means the child is a retro exposed baby" (GAR #11, Nurse)*

In relation to the exact times and timelines for testing HIV exposed infants, some health workers provided responses that were in accordance with the WHO testing requirements, which recommends initial test on exposed infants within four to six weeks after birth.

Some health workers indicated they had adopted a testing practice contrary to the WHO recommendation and were conducting PCR test within the first week of life.

> *"Within the first 3 to 7 days and then at 6 weeks. Initially, they were doing the EID at 6 weeks and it was changed to within the first 3 to 7 days" (LEK #5, Nurse)*

> *"The first tests as at now is within the first week of life, the second one around 6 weeks and the third one at age one, then, at age 18 months" (GAR #11, Nurse)*

> *"They come back at 6 weeks but now there's a new policy so we do 3 days or 1 week and 6 weeks" (LEK #10, Psychologist)*

Although health workers stated that it was an unwritten policy or directive that had been introduced, some of them were however unable to explain the reason for its introduction. One health worker explained that they had adopted this new practice because it was realised over the years that the number of exposed infants tested after postnatal were disproportional to the number of mothers found to be HIV positive during the antenatal period. This was because the four to six weeks testing directive by WHO was too long and it caused several exposed infants to be missed out on testing since a lot of mothers did not frequent the facility at the end of the post-natal period.

> *"With the first week of life testing, mothers will definitely be at the facility for one reason or the other, so that is an opportune time for us to get the infants" (GAR #13, Nurse)*

Health workers were also aware that PCR (virology) and antibody (serology) tests were performed on HIV exposed infants. They were also conversant with the specific times these tests were carried out.

> *"From the 3 days to the 6 weeks we do the PCR and we do the antibody test to 1 ½ years" (GAR # 14, Nurse)*

> *"We do the PCR at 6 weeks and the antibody test at 1 ½ years" (GAR #13, Model of Hope)*

4.3.2 Knowledge and Perception of HIV Positive Mothers on EID

Almost all mothers interviewed were abreast with the exact times and timelines for testing. Like health workers, there were variations in their responses with regard to the times for testing infants, some of the mothers stated that the initial testing was within the first week of life.

Mothers were also aware that an additional test was done when infants turned one and a half years.

> *"After birth and 1 ½ months" (LEK #6, Mother)*

> *"When the infant turns 6 weeks, we bring the child for her to be tested for HIV another one too is done when baby is one and a half years" (LEK #1, Mother)*

Mothers stated that information on EID was made available to them during PMTCT counselling sessions. These assertions were affirmed by health workers who pointed out that mothers were indeed satisfactorily knowledgeable on issues related to EID since they were trained during PMTCT counselling sessions on the benefits of early infant testing and the need to take it upon themselves to demand for EID services after birth.

> *"We always counsel them (mothers) that when they deliver, even when the midwife at the maternity wards forget to tell them to go and test they should also see it as a responsibility for themselves to remind the midwife" (LEK #5, Nurse)*

> *"We take them (mothers) through counselling during the first three months of their pregnancy second six months and eighth month of the pregnancy. So, they come for these counselling and we tell them what to do after delivery" (GAR #13, Nurse)*

Mothers perceived EID as beneficial, they ascribed several reasons for its importance. Some mothers believed that EID helped to ascertain the status of the infants, avert disease progression and assisted in the treatment and prevention of HIV infection.

> *"You need to know whether the child has it or not and that can only be through testing" (#21, Mother)*

> *"To protect them so they do not get the AIDS" (LEK #8, Mother)*

> *"When it is done and the result is positive we can put the child on treatment" (LEK #1, Mother)*

> *"So that you will know how to take care of the child so that you will not transfer the virus to the child" (LEK #7, Mother)*

4.4 Health System Factors influencing delivery of EID Services

4.4.1 Inadequate Staff

Although health workers were informed about EID guidelines, the study showed that health workers with sample collection skills at the LEKMA Hospital were inadequate thus serving as a barrier to timely delivery of EID services.

> *"…at some time, I think we had about just two staff trained at ANC so if one is on leave and one is not available, mothers will come and complain that they said, they are not there so I should go and come another time" (LEK #5, Nurse)*

On the other hand, health workers with sample collection skills at the Greater Accra Regional Hospital were adequate. This was primarily because the facility has devised ways of curbing the issue of staff shortages through the adoption of task shifting and task sharing strategies whereby less specialised health workers were trained to acquire skills in sample collection.

> *"We train people on the job and we are doing task shifting and task sharing, so even my data manager can effectively take sample" (GAR #20, Midwife)*

Health workers alluded to the limited number of lab technicians responsible for processing samples of exposed infants at the reference laboratory. They stated that only one lab technician was responsible for handling the large volumes of samples submitted by all health facilities involved in infant diagnosis in the Greater Accra Region. Further indicating that the heavy workload resulted in back logs, prolonged turnaround time for result processing and significantly stalled the EID process.

> "*The lab technician is working under extreme pressure" (GAR # 11, Nurse)*

> *"The workload is too much for the person at the reference lab" (GAR #14, Nurse)*

4.4.2 Availability of Logistics and Supplies

Health workers in both facilities stated that DBS cards were mostly adequate and available for use. This is apparent in the quotes below.

"We don't run out of the dry blood samples" (LEK #4, Midwife)

"The way we do our work, we are a facility where babies just don't get positive results so NACP always gives us lots of cards, we rather give to other facilities" (GAR #20, Midwife)

After samples were collected, properly dried and packaged, a vehicle is needed to transport samples to the reference laboratory for further processing. Health workers at the Greater Accra Regional Hospital articulated the frustration and difficulty they go through to get an official vehicle to dispatch samples to the reference laboratory. Many health workers expressed the need for them to be assigned a vehicle for such purposes.

"Sometimes we also have challenges with the vehicle, you request for a car and it's like the car has gone somewhere or Director has gone for a meeting" (GAR #12, Model of Hope)

"After taking the sample we need transport to take it to the reference lab, it has been very difficult lately, we don't get vehicle" (GAR #16, Data Officer)

Health workers stated that they have devised other means of transporting the samples to the reference laboratory for PCR testing particularly because they did not want to impede the EID process.

"I have a unique way of doing my work so my people have learnt it. If there is no vehicle we pick a taxi" (GAR #20, Midwife)

At LEKMA Hospital, it was discovered that samples collected were handed over to lab technicians who frequented Korle Bu Blood Bank twice a week for onward delivery to the reference laboratory. A lab technician interviewed indicated that this process was laborious and recommended that a PCR machine should be made available for use in the facility.

"There is an arrangement between the ANC and the lab so when the lab is sending some samples or whatever they have to send to Korle Bu on those designated days, they send the samples" (LEK #5, Nurse)

"When we (lab technicians) are going to the Korle Bu blood bank, we pick it up" (LEK #6, Biomedical Scientist)

Health workers mainly ascribed EID challenges to limited number of PCR machines available for running DNA PCR test of HIV exposed infants. They mentioned that only one PCR machine was available in the Greater Accra Region (sited at Korle Bu) and the large volumes of samples it served led to its frequent breakdown. Health workers stated that these challenges could be averted if laboratories to perform PCR analysis as well as number of PCR machines are be increased.

"The delay comes from Korle Bu, the PCR machine being only one results in the delay of results" (GAR #18, Data Manager)

"Sometimes the machine breaks down" (GAR #14, Nurse)

The challenges encountered at the reference laboratory resulted in the long turnaround time for PCR results to return to the facility and subsequently to mothers of HIV exposed infants, thus delaying the commencement of treatment for HIV infected infants. Like health workers, mothers also reported an average turnaround time of three months from sample collection to receipt of results which was contrary to the WHO recommendation which requires that results be returned to the health facility and caregiver within a maximum of four weeks for prompt initiation of treatment on HIV exposed infants.

"Sometimes it takes up to 4 or 6 months" (LEK #5, Nurse)

"After doing the test I returned after three months for the results" (LEK #12, Mother)

Some mothers stated that they had not received the PCR results of their infants, which was performed at six weeks. They mentioned that upon enquiring several times from the health workers, they were told that another test will be carried out on their infants at one and a half years.

"I have been asked to wait when my baby is 1 ½ years then they will do another one for me" (LEK #11, Mother)

"Whenever I come they say it is not in so now they say when my child is 1 ½ years I should bring her for another test mom" (LEK #10, Mother)

4.5 Barriers to EID utilisation by HIV Positive Mothers

4.5.1 Mother's Non-acceptance of her HIV Status

The study pointed out that denial of HIV status served as a grave barrier to the utilisation of EID services by mothers. Health workers indicated that mothers who had not accepted their HIV status deemed it irrelevant to access HIV services for themselves and their exposed infants.

"Some are not cooperative at all and especially for mothers who have denied the fact that they are positive, it is an issue. The person already doesn't believe she has some and you are telling her to give her child medicines and come for blood tests" (LEK #9, Nurse)

"Sometimes some of the mothers are in denial, they don't want to accept that they have the condition, so they seeking treatment so the baby doesn't get the virus is another problem" (LEK #10, Psychologist)

4.5.2 Mother Lost to Follow-up in the EID Process

Health workers stated that a number of mothers had been lost to follow up in the EID cascade because of multiple unsuccessful visits to the facility to access EID for their exposed infants and particularly delays encountered in obtaining PCR results of their infants after several visits to the facility.

"The mothers are de-motivated because, they will take the sample and send it to Korle Bu when they come for review, paediatricians are on them where are your results they go back its not ready. So, they don't want to be doing it because the results are not coming" (LEK #5, Nurse)

"Sometimes the person to take the sample is not there and they have to come another time and then when finally, the sample are taken the results are not coming and they are frustrated so some go and they don't return" (LEK #5, Nurse)

Health workers further stated that these mothers were likely to return to the facility for EID services when their infants started exhibiting clinical symptoms.

> *"A lot of them come back after sometime when they notice that baby is not well" (LEK #3, Midwife)*

4.5.3 Mother's Dependency on Significant others and Consequences after Disclosure of her HIV status

Some of the mothers interviewed had disclosed their status to either their partner, family members or friends and were receiving support from these persons. Some mothers indicated that though their partners were HIV negative, they were extremely supportive.

> *He (partner) knows and he is very supportive, even if he has time he comes with me to the hospital. (GAR #29, Mother)*

> *"My mother, she is very helpful she encourages me all the time" (LEK #1, Mother)*

There were however some mothers who had not disclosed their status to anyone for fear of stigmatisation, discrimination and fear of losing their partners.

> *"...he (partner) is not understanding so I have not told him" (LEK #9, Mother)*

> *"I haven't told him (partner) because I don't want him to have hatred for me and the baby" (GAR #20, Mother)*

Such fears were confirmed by a mother whose sister avoided her after she disclosed her status to her

> *"...she left me to my fate. Her children used to visit me, since we were very close. Now the children have since stopped visiting me. Unless I call, she never calls me" (LEK #11, Mother)*

Some mothers stated that they did not go through any financial challenges prior to accessing EID services for their exposed infants. This was primarily because they had either disclosed their status to significant others and were obtaining financial support from such persons or they could afford the cost of transportation from their homes to the facility since they were employed and were earning decent income.

> *"My husband is supportive but it all lies on me the mother to take care of my child so it is no cost for me at all to come here all the time" (LEK #5, Mother)*

> *"The day I came to do the test for my baby, they asked me to go home and bring her medicine...I did not have money so I almost stopped coming back but later I collected money from my husband" (GAR #20, Mother)*

The study also found that mothers who had not disclosed their status to anyone and were either unemployed or earning very little money form their jobs could not afford the cost of transportation from their homes to the health facility to access EID services. These mothers who perceived EID as beneficial, did not allow their financial challenges to deter them from accessing EID services, thus they sought financial assistance from others.

> *"Often, I have financial challenges, even today I called the doctor that I don't have money and she sent me money before I came" (GAR #17, Mother)*

4.5.5 Attitude of Health Workers towards HIV Positive Mothers

Mothers stated that health workers relationship with them were cordial and applauded them for their positive attitudes. They however indicated that health workers only exhibited unfriendly attitudes or scolded them when they reported late to the health facility or retuned after defaulting for several months.

> *"Nurses are very good, the way they relate with us like we are just like them…if not that they are busy today like they will even come and collect my baby" (GAR # 20, Mother)*

> *"They are fine with us but when you come late they will talk in your face" (GAR #22, Mother)*

Mothers further commended health workers for broadening their knowledge on HIV and EID related issues during PMTCT counselling sessions. Mothers stated that the support, encouragement and information provided to them by health workers during the antenatal period made them appreciate the importance of HIV testing services. This further motivated them to continue accessing HIV services for themselves as well as utilise EID services for their exposed infants after birth.

> *"they (health workers) have been so helpful, when they tested me and I was positive in fact I thought that was the end of my life, but they told me once I take my drugs well I will be fine like every normal person and baby will be fine too…they constantly reminded us during counselling sessions to bring baby for prophylaxis and testing after birth" (GAR #16, Mother)*

CHAPTER FIVE

5.0 DISCUSSIONS

5.1 Introduction

The chapter discusses the findings of the study and compares these findings with existing literature. The discussion in this chapter shows how the components (predisposing, enabling and need factors) of the Anderson Behavioural Model adapted for the study impacts utilisation of EID service.

5.2 Knowledge of Respondents on EID

Findings of this study corroborates with results of a study conducted by Osei (2015) in Ghana which reported that health workers displayed adequate knowledge of EID services and had insights on eligibility of testing, exact times and timelines for testing. This finding is contrary to what was reported by Hassan et al. (2012) and Adetokunboh & Oluwasanu (2016) which indicated that health workers had inadequate knowledge of EID due to their inability to indisputably indicate the number, types of test and exact times and timelines for performing tests for HIV exposed infants.

Like health workers, study results showed that HIV positive mothers were satisfactorily knowledgeable on issues related to EID. They provided suitable responses to questions on specific tests conducted on exposed infants and the exact times these tests were performed. This finding is however at variance with findings of Adeniyi et al. (2015) and Bwana et al. (2016) which pointed out that knowledge about early infant diagnosis was unsatisfactory among mothers as some were oblivious of the appropriate time for testing infants.

Hassan et al. (2012) attributed inadequacy in knowledge of mothers to failure of health workers to provide mothers with sufficient information on EID during ANC and PMTCT trainings. The finding is in disagreement with results of this study as mothers interviewed stated that

information on EID was made available to them during PMCT training sessions. Knowledge of mothers is impressive in this study and shows efforts put in place by health workers to provide mothers with information on EID services. This is a step in the right direction as maternal awareness of EID services increases the chances of uptake of such EID services (Musekura, 2016).

Findings from this study is comparable to what was found by Donahue et al. (2012) which stated that mothers were aware of the availability of EID services. It corroborates with the results of a South African study, which revealed that mothers perceived EID as beneficial (Rollins et al., 2009). Results of studies conducted by Walcott et al. (2013) and Nkuoh et al. (2013) in Mozambique and Zambia respectively, revealed that mothers who were adhering to PMTCT and on ART had prior knowledge of HIV, hence were more likely to utilise EID services. These findings are in accordance with the findings of this study as all mothers interviewed had been enrolled in PMTCT.

Importantly, findings from this study discovered that health workers practiced after birth testing, which contravenes the WHO testing recommendation which requires infants to be initially tested within 4 to 6 weeks after birth or any suitable time after. This finding is also contrary to Ghana's own national testing guidelines as well as that of Kenya, which recommends DNA PCR test for exposed infants at 6 weeks (NASCOP, 2008; MOH, 2014).

The study found that health workers conducted after birth testing because mother-infant pairs were less likely to frequent the health facility after the postnatal period thus the likelihood of infants being missed for testing. Gill et al. (2017) reported that infants infected during pregnancy were likely to have suppressed immunity or die from HIV related factors by 6 weeks. Further stating that, the WHO recommendation is therefore not appropriate as it contributes to delays in diagnosis among exposed infants. Studies carried out in South Africa also reported

that HIV infection had progressed significantly in 62% of infants who tested at 6 weeks prior to commencement of ART at median age 8.4 weeks. Innes et al. (2014) reported that prompt initiation of HIV infected infants on ART increases their chances of survival, thus delaying infant testing until 6 weeks may lead to delay in ART commencement.

Chiu et al. (2016) also showed that infants tested at birth obtained their PCR results earlier and those found to be infected were initiated on ART earlier compared to those who tested at six weeks. The need for prompt initiating of ART might have informed WHO to revise its testing guidelines to include nuclei acid testing (NAT) at birth to the existing infant testing recommendations (WHO, 2015).

5.3 Health System Factors Influencing Delivery of EID Services

Another factor identified by this study to affect the provision of EID services is the limited number of trained health workers with requisite skills in DBS sample collection, which is in line with what was reported by Bitnun et al. (2014) and Bwana et al. (2016).

On the other hand, some health workers in this study indicated that they had devised a method of dealing with the issue of staff shortages through the adoption of task shifting practices where even cleaners and drivers in the facility were trained in sample collection. This finding is in line with what was reported by Ahmed et al. (2013) which suggested task shifting (delegation of task to less specialized health workers) as a means to addressing the issue of limited trained staff and workload.

Findings from this study like others by Ciaranello et al. (2011) and Hassan et al. (2012) reported that the limited number of trained laboratory personnel to carry out the EID tests coupled with heavy workload was a factor for delay in PCR analysis and thence delays in the EID process.

Study results is at variance with findings from previously conducted studies in Kenya, Zambia and Burkina Faso which reported stock out of DBS cards as a constraining factor in delivering EID services (Hassan et al., 2012 ; Sutcliffe et al., 2014; Coulibaly et al., 2014 ; Bwana et al., 2016). The availability of DBS cards reported in this study may be due to adequate allocation of cards to the sampled facilities by Government as well as proactivity on the path of health workers to ensure that DBS cards are restocked before they run out.

Findings is consistent with results of studies conducted in Zambia and other sub-Saharan African countries which reported challenges in obtaining a vehicle at the facility to transport samples collected to the reference laboratory (Bwana et al., 2016; Hampanda et al., 2017). Wondafrash (2016) reported that these challenges encountered may be due to inadequate or the breakdown of vehicles. Adeniyi et al. (2015) proposed that allocating more vehicles and motor cycles at PMTCT and EID centres will greatly expedite delivery of DBS samples to the reference laboratory for onward processing.

This study further disclosed that limited laboratories to perform PCR testing, limited PCR machines and frequent breakdown of these machines contributed to the delay in return of results of HIV exposed infants to the health facility and eventually to mothers. These findings are similar to results of previous studies conducted in sub-Saharan Africa by Ciaranello et al. (2011) and Hassan et al. (2012). This study identified that only one PCR machine is available in the study region and all samples collected from various health facilities that perform EID are sent to the reference laboratory for processing. These large volumes of samples result in the frequent break down of the machine. Once PCR machine was not functioning, sample processing halted until it was repaired resulting in delays in the EID process. Bwana et al. (2016) suggests an increase in the number of laboratories to conduct PCR analysis for optimal EID provision.

The frequent breakdown of PCR machine at the reference laboratory, coupled with limited laboratory technicians to perform PCR analysis resulted in the delay in return of results to the health facility and subsequently to mothers. Although the WHO recommends that PCR results of HIV exposed infants should be returned to the facility and ultimately to mothers at most within four weeks after samples have been collected (WHO, 2010) , this study found out that average turnaround time for receipt of PCR results and onward submission to mothers was within 4 months. Study findings is however in accordance with that of a Zambian study by Sutcliffe et al.(2014), which reported an average of 92 days for receipt of PCR results of exposed infants. The long turnaround time for receipt of results recorded by this study has also been reported by several other studies as an impediment in the EID process and resultant delay in ART initiation amongst infants found to be HIV positive (Diallo et al., 2016; Chiu et al., 2016; Sugama et al., 2017). Bailey (2015) and Anticona et al. (2015) suggests that intiating Point-of-Care (POC) testing services will reduce the turnaround time for receipt of results by mother to two hours after sample collection. This will thence enable prompt initiation of HIV infected infants on ART.

5.4 Barriers to Utilisation of EID Services by HIV Positive Mothers

Factors such as mother's non-acceptance or denial of her HIV status was identified in this study as a barrier to the utilisation of HIV services. This finding is consistent with that of Ndondoki et al. (2013) and Musekura (2016) which reported that mother's non-acceptance of her HIV status prevented her from utilising HIV services for herself as well as her exposed infants. Without early infant diagnosis, infected infants cannot be identified and commencement of ARTs cannot be possible thus decreasing the chances of survival of HIV infected infants (Davies & Pinto, 2015; Goggin et al., 2016).

Findings coincides with that of Chatterjee et al. (2011), which ascribed unsuccessful visits to health facility by mothers to access EID services for their exposed infants as a reason for

mother's loss to follow up in the EID process. The long turnaround time for PCR test results has been identified as another factor that causes mothers to stop utilising EID services. This is because mothers may be discouraged from returning to the facility to collect results of their infants after several fruitless visits (Sutcliffe et al., 2014; Thiha et al., 2017). Bwana et al. (2016) proposes that measures must be put in place to improve timely delivery of PCR results. Similar to findings of Hassan et al. (2012), this present study found that mothers were likely to return to the facility for EID services once infants exhibited clinical symptoms.

Findings from this study indicated that mothers had disclosed their HIV status to either their partner, family members or friends and were receiving support from these persons, it is similar to results of a study carried out in Zambia which reported that 92% of women had disclosed their HIV status to their current partner (Hampanda et al., 2017). This is also in agreement with what was reported by Schacht et al. (2014), which indicated that mothers willingness to access HIV services were based on perceived support from family members.

Findings revealed that although some mothers had partners who were HIV negative, their partners were extremely supportive and accompanied them to the health facility on days they had flexible schedules. This finding reiterates the relevance of male involvement in maternal and neonatal health services (Craymah, 2017) and the influence of the male partner in improving the uptake of HIV services including EID by their female counterparts (Boender et al., 2012).

Study results like that of Walcott et al. (2013) and Nkuoh et al. (2013) revealed that some mothers had not disclosed their status to anyone due to fear of stigmatisation and abandonment by partners. Although the non-disclosure of results in this study did not serve as an impediment to the utilisation of EID services, results of other studies conducted strongly linked poor uptake of EID services to non-disclosure of status particularly among women who depended on their

spouses for financial support (Ayuo et al., 2013; Bwana et al., 2016; Hampanda et al., 2017). Cook et al. (2011) found that mothers utilisation of EID services was dependent on the type of work she was engaged in as well as her level of income. This finding is in agreement with study findings which pointed out that mothers who were employed and were earning decent salaries did not go through any financial hardship in accessing EID services for their exposed infants.

This finding, like several others, places emphasis on the importance for health workers to exhibit positive attitudes to clients during ANC and PMTCT sessions. This is because attitude of health workers towards mothers contributed to mothers decision to return for EID services after delivery or otherwise (Goggin et al., 2016). Hassan et al (2012) also reported that brewing cordial relationships between health workers and clients increased maternal uptake of services for their HIV exposed infants. This finding disputes what was reported by Turan & Nyblade (2013) which revealed abuse and discrimination of mothers by health workers during ANC services because of their HIV status.

5.5 Study Limitations

1. The effect of the PI on the data might be subject to personal biases and poor interviewing skills due to inexperience.
2. The study may be subject to social desirability bias due to the tendency of respondents to provide responses expected by the PI.
3. The number of respondents interviewed made data transcription and data analysis a time consuming exercise
4. The timeframe allotted by the University of Ghana for data collection and analysis was limited this therefore affected the duration of interviews with respondents and did not allow the PI to probe other aspects of the study.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter provides conclusion to the study as well as practical recommendations based on the study findings and feasible suggestions from study participants. It also provides strength and limitations of the research and proposes areas for further studies.

6.2 Conclusion

The study concludes that the components (predisposing, enabling and need factors) of the Anderson Behavioural Model used in the study significantly impacts service utilisation.

It shows that knowledge of HIV positive mothers on EID examined as a predisposing factor predicts EID service use. This is because mother's ample knowledge about EID contributed significantly to their utilisation of EID services for their exposed infants.

Enabling factors examined such as health workers knowledge of EID guidelines, positive attitude of health workers towards HIV positive mothers during the antenatal and PMTCT sessions, availability of DBS cards for sample collection, adoption of task shifting strategies to address staff inadequacy were positively associated with EID service utilisation.

Inadequate staff with DBS sample collection skills, delays in transporting samples to the reference laboratory due to unavailability of vehicles, long turnaround time for the return of results due to limited number of facilities that perform PCR analysis, limited number of PCR machines and the frequent breakdown of PCR machines hindered delivery of EID services and thus were negatively influenced mothers utilisation of the service as most mothers discontinued service use after multiple unsuccessful visit to the health facility for EID service. This is because health systems such as health workers and logistics and supplies but be present for service utilisation to take place.

Support from significant others in terms of encouragement or financial assistance were predictors to EID service use particularly for mothers who were unemployed. Mothers earning income contributed to EID service utilisation since they could afford transport cost to the facility. Mother's non-disclosure of her HIV status to significant others due to fear of stigma and discrimination as well as financial constraints were not hindering factors to service utilisation in this study since mothers perceived EID as beneficial and found means of getting money to access EID services for their exposed infants. Some maternal factors such as denial of HIV status and mothers lost to follow in the EID continuum due to multiple unsuccessful access to HIV services served hindrances to EID service utilisation. Perceived need of EID by HIV positive mother was examined as a need factor. Mothers perceived EID as beneficial and this was a contributing factor for EID service use.

6.3 Recommendations

The following are proposed recommendations based on study findings and practical suggestions from study participants

1. The National AIDS/STI Control Program (NACP) should spearhead the initiation of Point of Care (POC) testing services at various health facilities. This will solve the long turnaround time of return of results and allow for prompt testing of HIV exposed infants and early commencement of ART among infants found to be infected. This is because POC testing services enable mothers to receive the results of their infants a few hours after samples are collected.
2. The LEKMA Hospital should adopt task shifting and task sharing strategies to address the issues of staff inadequacy.
3. Fear of stigma and discrimination deter mothers from accessing EID services. It is therefore prudent that the Ghana AIDS Commission and the Ministry of Health

intensify educational campaigns geared towards reducing stigma against Persons Living with HIV.

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APPENDICES

APPENDIX 1A INTERVIEW GUIDE FOR HEALTHWORKERS

	Unique No:
Date	
Location	
Principal Investigator	

Background Information on participants	
Age	
Sex	
Qualification	
Current Position	
Duration	

1. What do you know about PMTCT?
2. Have you enrolled in any PMTCT training? (how long ago)
3. What is EID?
4. Was EID part of the models in the training?
5. What specific role do you play in the provision of EID services in this facility?
6. How are HIV exposed infants identified for testing in this facility?
7. When exactly are mothers expected to bring their exposed infants back to the facility for testing?

8. When are the specific tests performed on infants? (virological and serological tests)
9. How are the tests carried out? (use of protocols, procedures)
10. Why is it important for mothers to return to the facility after delivery to test their infants?
11. How long does it take for specimen collected to leave the facility to the central laboratory?
12. How long does it take for specimen collected to be returned to the facility?
13. What are the modes of delivery of results to the facility? (transport, sms, email etc)
14. Can you explain how mothers of HIV exposed infants are informed of the return of results?
15. Who is responsible for disclosure of results at the health facility?
16. Is there any follow up mechanism for newly diagnosed HIV infected infants afterwards?
17. What are some health system factors that impede delivery of EID services? (stock out of DBS kits, logistics, long turnaround time, limited staff, inadequate knowledge of staff)
18. Are there any experiences you will want to share with me with respect to EID?
19. Are there any recommendations you will like to propose to improve delivery of services?

APPENDIX 1B INTERVIEW GUIDE FOR HIV POSITIVE MOTHERS

	Unique No:
Date	
Location	
Principal Investigator	

Background Information on participants	
Age	
Marital Status	
Occupation	
Highest educational level	
Age of last child	

1. What do you know about Early Infant Diagnosis? (explore their knowledge on importance and exact age for testing and timelines)
2. How did you hear about this information? (source from facility or from a colleague/ elsewhere
3. Have you tested your exposed infants for HIV?
4. If not why? (explore hindrances)
5. How old was your infant when the test was done?
6. What kind of test was done? (can you describe procedure)
7. Do you know the results of your infant?
8. If No (when was the test done?)

9. If Yes (What was the duration for return of results?)
10. Do you have any other children who are HIV negative?
11. Did you know your status when you gave birth to those children?
12. What was the feeling like during the waiting period?(anxiety/ calmness)
13. What are some challenges faced before, during and after testing (spouse, finance, distance?)
14. Is your partner aware of your HIV status? If yes how supportive has he been with respect to the EID service?
15. Apart from your partner is any other person aware of your status?
16. Are they supportive?
17. Are you part of a support group / how supportive is it?

APPENDIX 2A PARTICIPANT INFORMATION SHEET

General Information

Project Title: Factors Influencing use of Early Infant Diagnosis of HIV Services within the Accra Metropolitan and Ledzokuku Krowor Municipal Area.

I am Antoinette Kailey Ankrah, the Principal Investigator, and a Master of Public Health student in the Department of Social and Behavioural Science of the School of Public Health, University of Ghana. I am here with my Research Assistant to carry out a study aimed at finding out the Factors Influencing the use of Early Infant Diagnosis of HIV services within the Accra Metropolitan and Ledzokuku Krowor Municipal Area. The study is purely for academic purposes and forms part of the requirement for the award of a Master of Public Health Degree. The Principal Investigator has no conflict of interest in this study.

Procedure

Data will be collected from Health workers and HIV Positive Mothers (Study Participants) through interviews. Interviews will span for approximately 20mins and will be held at conducive environments within the selected health facility with the aim of ensuring utmost privacy. This particularly is to ensure that HIV positive mothers are not exposed to other individuals who may not know their status.

Potential Risk

The study will not pose any risk to you. However, in case of emotional trauma, you will be given periodic breaks to pull themselves together. In severe instances where you may require further assistance, you will be referred to a professional psychologist for counselling.

Benefits

Participating in the study will not yield any financial benefits to you, however findings from this study will contribute to improving delivery and utilization of EID of HIV services.

Furthermore, findings will be beneficial to you if you decide to have a child again in future. Finding will also be beneficial to other HIV positive mothers and their infants. HIV Positive mothers found not to have accessed EID services will be educated on its relevance and immediately referred to the appropriate unit for those services.

Compensation

You will not receive any monetary or material compensation for participating in the study. However, the cost of transportation to the facility from your residence will be borne by the Principal Investigator.

Cost

You will not incur any cost if you agree to participate in the study, besides your time.

Confidentiality

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

Right to Refuse

Participation in this study is voluntary. You can choose to withdraw from the study or stop the interview at any time you want. You can also choose not to answer any question(s) you find uncomfortable about. You will not be penalized in any way for your refusal to participate in this study. However, you are encouraged to participate fully in this study to help improve

treatment outcomes and the general health related quality of life lived by hypertensives in Ghana and beyond.

Dissemination of results

Findings and recommendations would be available at the School of Public Health and it will also be disseminated to various stakeholders at a meeting at the end of the study.

Before Taking Consent

Do you have any questions you wish to ask about the study? Yes/No

If yes, please indicate the questions below

……

……

…….....

If you have any question(s) or further clarification concerning this study and/or the conduct of the researcher and research assistants, please do not hesitate to contact the following; Antoinette Kailey Ankrah, School of Public Health, University of Ghana, Legon, missskailey@gmail.com. Tel: +233 (0)20 9595160; Dr. Phyllis Dako-Gyeke, School of Public Health, University of Ghana, Legon, gyekenay@yahoo.com. Tel: +233 (0)20 797 0370; Mrs. Hannah Frimpong (Administrator), Ghana Health Service Ethical Review Committee Secretariat, Accra. Tel: 0507041223/0243235225

APPENDIX 2B INFORMED CONSENT FORM FOR HIV POSITIVE MOTHERS

I have read the information given above, or the information above has been read to me and I have understood the content of the information sheet describing the benefits, risks and procedures regarding the study titled "Factors Influencing use of Early Infant Diagnosis of HIV Services within the Accra Metropolitan and Ledzokuku Krowor Municipal Area. I have been given a chance to ask questions pertaining to this study and questions have been answered to my satisfaction. I hereby voluntarily agree to participate as a subject in this study knowing that I have the right to withdraw at any time without suffering any consequences as a result.

Signature/Thumb print: …… Date: …….

Contact detail: ……..

I, the undersigned, have explained this consent to the respondent in English/Twi/Ga and that he/she understands the purpose of the study, procedures to be followed as well as the risks and benefits of the study. The participant has fully agreed to participate in the study.

Signature of Principal Investigator…… Date: ……

Contact detail: ……

APPENDIX 2C INFORMED CONSENT FORM FOR HEALTHWORKERS

I have read the information given above, or the information above has been read to me and I have understood the content of the information sheet describing the benefits, risks and procedures regarding the study titled "Factors Influencing use of Early Infant Diagnosis of HIV Services within the Accra Metropolitan and Ledzokuku Krowor Municipal Area. I have been given a chance to ask questions pertaining to this study and questions have been answered to my satisfaction. I hereby voluntarily agree to participate as a subject in this study knowing that I have the right to withdraw at any time without suffering any consequences as a result.

Signature/Thumb print: …… Date: …….

Contact detail: ……..

I, the undersigned, have explained this consent to the respondent in English/Twi/Ga and that he/she understands the purpose of the study, procedures to be followed as well as the risks and benefits of the study. The participant has fully agreed to participate in the study.

Signature of Principal Investigator…… Date: ……

Contact detail: ……

APPENDIX 3 ETHICAL APPROVAL

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

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

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MyRef. GHS/RDD/ERC/Admin/App 18/012
Your Ref. No.

16th March, 2018

Antoinette Kailey Ankrah
University of Ghana
School of Public Health
Legon, Accra

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

GHS-ERC Number	**GHS-ERC: 131/12/17**
Project Title	Factors Influencing Use of Early Infant Diagnosis of HIV Services within the Accra Metropolitan and Ledzokuku Krowor Municipal Area
Approval Date	16th March, 2018
Expiry Date	15th March, 2019
GHS-ERC Decision	**Approved**

This approval requires the following from the Principal Investigator

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

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

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

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

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

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