

Contributing Factors to Utilization of Infant Prophylactic Antiretroviral Therapy and Early Infant Diagnosis to Prevent Mother to Child Transmission of HIV in Ghana.

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GHANA

50th International Course in Health Development
September 16, 2013 – September 5, 2014

KIT (ROYAL TROPICAL INSTITUTE)

Development Policy & Practice/
Vrije Universiteit Amsterdam

Contributing Factors to Utilization of Infant Prophylactic Antiretroviral Therapy and Early Infant Diagnosis to Prevent Mother to Child Transmission of HIV in Ghana.

A thesis submitted in partial fulfilment of the requirement for the degree of Master of Public Health
by:

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Ghana

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50th International Course in Health Development (ICHHD)
September 16, 2012 – September 5, 2013
KIT (Royal Tropical Institute)/ Vrije Universiteit Amsterdam
Amsterdam, The Netherlands
September 2013

Organised by:

KIT (Royal Tropical Institute), Development Policy & Practice
Amsterdam, The Netherlands

In co-operation with:

Vrije Universiteit Amsterdam/ Free University of Amsterdam (VU)
Amsterdam, The Netherlands.

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Acknowledgements

I am very grateful to the government of Netherlands for the opportunity to study at the Royal Tropical Institute through the Netherlands Fellowship Program (NFP) sponsorship.

My sincere gratitude to the lecturers and the administrative staff of the Royal Tropical Institute for the knowledge and skills given to me. The wealth of experience that you shared with me will guide me in my future endeavours.

Thank you to my thesis advisor and my back stopper for their time, patience and the wealth of knowledge that they shared with me during the whole process of writing my thesis. I will forever be grateful and God bless you.

To the students of the 50th group of ICHD, I am lucky to be a member of this group. Thank you for the show of friendliness and for sharing your knowledge and experiences with me.

Thank you to Dr. Koku Awoonor-Williams, the regional director of health for the Upper East region of Ghana for your support and guidance.

Finally I say "thank you" to my family, especially my mother, for all the guidance and support throughout my life.

Thank you.

Abbreviations and Acronyms

ANC	Antenatal Care
ARV	Antiretroviral
CHAG	Christian Health Association of Ghana
CHAM	Christian Health Association of Malawi
CHPS	Community Health Planning Services
CSO	Civil Society Organization
DBS	Dry Blood Spot
DHS	Demographic and Health Survey
EGPAF	Elizabeth Glaser Paediatric AIDS Foundation
EID	Early Infant Diagnosis
FDA	Food and Drug Authority
FSW	Female Sex Workers
GAC	Ghana AIDS Commission
GDP	Gross Domestic Product
GHS	Ghana Health Service
GOG	Government of Ghana
GSS	Ghana Statistical Service
HAART	Highly Active Antiretroviral Therapy
HIV	Human Immunodeficiency Virus
HTC	HIV testing and Counselling
IDU	Injection Drug Users
IOM	International Organization for Migration
MARPS	Most at Risk Populations
MCH	Maternal and Child Health
MDC	Medical and Dental Council

MDG	Millennium Development Goal
MMR	Maternal Mortality Ratio
MOH	Ministry of Health
MSM	Men who have Sex with Men
MTCT	Mother to Child Transmission
NACP	National AIDS Control Program
NGOs	Non Governmental Organizations
NHIA	National Health Insurance Authority
NMC	Nurses and Midwifery Council
NSS	National Sentinel Survey
PC	Pharmacy Council
PHC	Population and Housing Censures
PLHIV	People Living With Human Immunodeficiency Virus
PMTCT	Prevention of Mother to Child Transmission
PNC	Postnatal Care
SBA	Skilled Birth Attendant
SHARP	Strengthening HIV/AIDS Responds Partnership
TFR	Total Fertility Rate
UNGASS	United Nations General Assembly Special Session
UNAIDS	United Nations Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

Definition of Key Words and Phrases

Antiretroviral drugs: Antiretroviral drugs are medications for treatment of infection by retroviruses, primarily HIV.

Community Health Planning Service centre (CHPS): It is the lowest tier of the formal health system in Ghana in charge of community health delivery services.

Dry Blood Spot: Blood sample taken from infants to perform virological early infant diagnosis of HIV.

Early Infant Diagnosis of HIV (EID): "It's a centralized laboratory and facility-based programme that uses dried blood spot (DBS) specimens, processed at a limited number of national and regional reference laboratories, to determine the HIV status of exposed infants at a young age ideally, by eight weeks" (WHO, 2012).

Ghana Free Maternal Health Policy: It's a policy where antenatal care, peripartum and post natal care are delivered to women and their babies without financial cost to the patients at the point of care. The cost is paid by the National Health Insurance Authority.

Highly Active Antiretroviral Therapy (HAART): Consists of the combination of at least three antiretroviral (ARV) drugs to maximally suppress the HIV virus and stop the progression of HIV disease (WHO).

Infant: An infant refers to a child who is less than 1 year old (WHO, 2013).

Infant Prophylactic antiretroviral therapy: Antiretroviral treatment given to infants who are born to HIV infected mothers from delivery until 4-6 weeks old to prevent them from acquiring HIV infection.

Mother to child transmission of HIV or vertical transmission of HIV: The transmission of HIV virus from an infected pregnant woman to her child during pregnancy, child birth or through breast feeding

Pentavalent Vaccine: It's a single **vaccine** that protects children against five potentially lethal diseases: tetanus, diphtheria, pertussis (whooping cough), Hepatitis B and Haemophilus Influenza B (which causes meningitis and pneumonia).

Rotarix Vaccine: Vaccine that protects children against the rotavirus that causes diarrhoea.

ABSTRACT

Background

Infant prophylactic antiretroviral therapy (ART) for prevention of mother to child transmission (PMTCT) of HIV was introduced in Ghana in 2003. However, in 2012, only 20% of HIV exposed infants received ART.

Objective: This thesis explores the factors that influence utilization of infant prophylactic ART and early infant diagnosis (EID) and make recommendations to address the challenges.

Method: Literature review was conducted on infant prophylactic ART in Ghana using a conceptual framework of David H. Peters.

Findings: The organizational structure of PMTCT program in Ghana encourages integration of infant prophylactic ARV and maternal and child health services. However, the inability of service providers to provide service to the 45% of women who are not attended by skilled birth attendants (SBA) during delivery, the lack of antiretroviral drugs (ARV) in community health planning services (CHPS) centres are barriers to timely utilization of the service.

Conclusions: Factors influencing utilization of Infant prophylactic ARV in Ghana are the inability of service providers to reach infants born to HIV infected mothers who are not attended by SBA, lack of ARV at CHPS centres, long turnover time for virological results for EID.

Recommendations: The NACP should consider to offer "take home infant dose" of newborn prophylactic ARV to HIV infected pregnant women during the third trimester at the ANC clinics. The program should also scale up ART services for PMTCT to CHPS and health centres especially those that are conducting deliveries and equip more health facilities to perform virological test for EID.

Key words: infant, prophylactic, Antiretroviral, PMTCT, Ghana

Word Count: 12,548.

INTRODUCTION

One of the major global health concerns over the last three decades is the Human Immunodeficiency Virus (HIV) pandemic. The World Health Organization (WHO) estimates that there were approximately 35.3 million people living with HIV (PLHIV) worldwide in 2012 (WHO, 2013a). Sub Saharan Africa has the highest number of people infected with nearly 1 in every 20 adults living with the virus, representing about 69% of global burden of HIV. The disease affects, men, women and children in different proportions (WHO, 2013b). The economic effects of HIV infection to the highly affected nations are estimated to be around 2-4% of GDP of these countries (UK Essays, 2013). These are the reasons why there are global health initiatives to control and reverse the spread of HIV. One of such initiatives is the Prevention of Mother to Child transmission (PMTCT).

Mother to child transmission of HIV (MTCT) also known as vertical transmission is important mode of transmission of the virus. Mother to child transmission of HIV can be reduced significantly by giving prophylactic antiretroviral therapy (ART) to pregnant women who are infected with HIV and their newborns. However, vertical transmission of HIV remains a challenge because a significant proportion of HIV infected mothers are not able to fully utilize the complete package of services under PMTCT programs including prophylactic administration of Antiretroviral drugs (ARVs) for newborns. In Ghana, the results of the 2012 National Sentinel Survey (NSS), show a reduction of national HIV prevalence from 3.6% in 2003 to 1.3% and vertical transmission also reduced from 31% in 2009 to 9% in 2012 (GAC, 2012; GAC, 2014) . This indication of progress has been lauded by partners who are supporting the National Aids Control Program (NACP). The Ghana Aids Commission through the NACP has a national target of reducing vertical transmission to below 5% by 2015.

As an obstetrician in Ghana, I have attended to families and shared their grief of having lost their child to HIV through vertical transmission. I remember my early days in medical school in early 1990s when HIV infected women were advised to use contraceptives and avoid pregnancy even if they wanted to have their own children due to the believe that the virus would be transmitted to their foetus and eventually lead to neonatal or infant death. In African culture where women who did not have children are often stigmatized, this was extremely very difficult to live with. Therefore, PMTCT programs and especially antiretroviral therapy have brought a new sense of hope and meaning to life for people living

with HIV especially among couples who want to have children. It is therefore important that all efforts are made to ensure that infants who are born to HIV infected mothers receive prophylactic ARV as recommended by WHO to prevent mother to child transmission.

These are the main reasons that motivate me to chose this topic to find out the factors that influence utilization of prophylactic antiretroviral therapy for infants who are born to HIV infected mothers. I believe that addressing the barriers to enhance utilization of these services will reduce vertical transmission of HIV and achieve the ultimate aim of PMTCT.

CHAPTER 1: BACKGROUND INFORMATION

To understand the general context of the health system in Ghana, this chapter briefly describes the geographical location, governance system, key demographic and health indicators and the organization of health services delivery and financing in Ghana.

1.1. Geographical Location

Ghana is located on the coast of West Africa and shares borders with Ivory Coast on the west, Togo to the east, Burkina Faso to the north and the Gulf of Guinea (Atlantic ocean) in the south. The country has a total surface area of 239,460 square kilometres and is divided into ten political administrative regions (Index Mundi, 2013b). Figure 8 at annex 1 show the map of Ghana and the major cities.

1.2. Demography

According to the population and housing census (PHC) of 2010, the population of Ghana in September 2010 was about 24.6 million people. Given the annual growth rate of 2.5%, the population of Ghana is estimated at 27.1 million people by September 2014. Females constitute 51.2% of the population as against males population of 48.8% and a ratio of 100 females to 95 males. The population density is 103 people per square kilometre. Urban dwellers represent 50.9% of the population as against 49.1% of rural population. The population of Ghana has a youthful structure with 38% below 15 years, 20% is between 15-24 years, 35% is between 25-59 years and 11% is above 59 years. This data shows that about 50% of the population is in the reproductive age (15-49 years). Literacy rate is 74.1% with variation in males versus females (80.2% versus 58.5%) and urban against rural settlers (84.1% versus 62.8%) (GSS, 2013a).

The total fertility rate (TFR) in Ghana is 4.03 and under 5 mortality is 72 deaths per 1000 live births whilst infant mortality is estimated at 50 deaths per 1000 live births (GSS 2013a, WHO 2012d). Maternal mortality ratio (MMR) in Ghana was estimated 350 deaths per 100000 live births in 2010 showing a modest decline from the 550 in the year 2000. A careful analysis of maternal mortality in Ghana shows an average annual reduction of MMR of about 3% per year since the year 2000. Ghana is therefore making modest progress in reducing maternal mortality but it's unlikely to achieve the MDG 5 target of 185 deaths per 100000 live births by 2015 (WHO 2012c).

1.3.Socio-economic Profile

Ghana's economy is hugely dependent on agriculture and mining especially exportation of cocoa and gold. The agricultural sector contributed about 21% of gross domestic products (GDP) in 2013 and employs about 56% of the workforce. The industrial sector contributes about 28% of GDP whilst the services sector contributes about 50% (GSS, 2013b; Index Mundi, 2013a). 28.5% of the population live below the poverty line (World Bank, 2013a).

1.4.Governance

Ghana is governed by a multiparty democratic system since the promulgation of the 1992 constitution. There are ten political administrative regions that are further divided into 216 administrative districts. The political administration goes from the cabinet through to the regional, district and metropolitan assemblies and ultimately to the unit committees (Parliament of Ghana, 1992).

1.5.Ethnic and Religious Profile

There are several ethnic groups in Ghana but the predominant ones are the Akans who constitute 47% of the population followed by the Mole Dagbani 16%, the Ewes 14% and the Ga-Dangbes 7%. Ghana is a secular country with different religious groups. According to the 2010 HPC, 71% of the population are Christians, 17% are Muslims and 5% are Traditionalists (GSS, 2013a).

1.6.1 Organizational Structure of the Health Sector

The largest health service provider in Ghana is the Ghana Health Service (GHS) which is the main implementing agency of the ministry of health. This public health agency provides about 60% of health service delivery in Ghana followed by private health providers mainly Christian Health Association of Ghana (CHAG) and the private for profit health providers including NGOs. The Ministry of Health is responsible for policy direction and regulation of the sector through its regulatory agencies such as the Medical and Dental Council (MDC), the Nurses and Midwifery Council (NMC), Pharmacy Council (PC), Private Hospitals and Maternity Homes Board, Food and Drugs Authority (FDA) and the National Health Insurance Authority (NHIA).

1.6.2. Health Financing

The National Health Insurance Scheme which was started in 2004 is a very important source of provider payment for health care in Ghana. The 2011 annual report of the National Health Insurance Authority indicate that 33% of Ghanaians were active subscribers to the scheme as the end of 2011. The two main sources of funding for the scheme are 2.5% of social security of all employers and 2.5% of health insurance levy on goods and services which constitute 90% of funding. Subscribers in the informal sector pay yearly premiums to register with the scheme (NHIA, 2011; Mensah SA, 2013). There are also out of pocket payment for some services and private health insurance schemes. The total expenditure on health per capita in 2012 was 106 US dollars and total expenditure on health as percentage of GDP for the same year was 5.2% according to World Health Organization (WHO, 2013d). Figures from the national health accounts indicate that public funding rose from 201.41 million Dollars in 2005 to 6662.92 million dollars in 2010 whilst international funding reduced from 360.48 million dollars to 178.93 million dollars over the same period. Nonetheless, this public funding in 2010 represented 12% of government budget which is still below the 15% that was promised in Abuja declaration in 2001 (WHO, 2013g). Figure 9, annex 4 shows sources of funding for the health sector between 2005 and 2010.

1.6.3. Human Resource for Health.

Human resource for health in Ghana is woefully inadequate. According to WHO health profile on Ghana 2010 and updated on May 2013, Ghana's doctor-patient ratio is about 1:11000 and 1 nurse or midwife for 950 people (WHO, 2013e; IOM, 2011). The situation is worse if the inequities in the distribution of health staff is taken into consideration. For example, whilst the Greater Accra region had doctor-patient ratio of about 1:3700, Upper West region and Upper East region of Northern Ghana had a ratio of 1:38000 in 2011. About 80% of health workers in Ghana are engaged by the public sector (GHS, 2012).

1.6.4. Disease Burden

Even though non communicable diseases are on the ascendancy, infectious diseases continue to be the leading causes of morbidity and mortality in Ghana. Malaria accounts for about 40% of outpatient attendance. Other causes of morbidity are respiratory tract infection, skin diseases diarrhoea and hypertension (IOM, 2013).

1.6.5. Child Health

The main causes of child mortality in Ghana are prematurity, pneumonia, birth asphyxia among neonates whilst Malaria, diarrhoea diseases and malnutrition account for high proportion of deaths among children below the age of 5 years (WHO, 2013e; IOM, 2011). According to UNICEF, 28% of deaths among children below the age of 5 years is related to malnutrition (UNICEF 2008)

In 2013, it was estimated that about 2500 children (0-14 years) were infected with HIV with 95% of these attributed to vertical transmission. In total about 34500 children were living with HIV in Ghana by the end of the year 2013 (NACP, 2014).

1.6.6. HIV Situation in Ghana

HIV infection was diagnosed for the first time in Ghana in 1986. The government of Ghana responded and started the National Aids Control Program (NACP) under the ministry of health to develop and implement policies as well as coordinate activities to Control HIV. However the HIV infection continued to spread into a generalized epidemic proportion which got to a peak of 3.6% as national prevalence in 2003. Various control measures were instituted which contributed to a gradual decline of the epidemic to 1.9% in 2007 and 1.3% in 2013 (GAC 2014).

The main sources of HIV transmission in Ghana are through unprotected sex accounting for about 80% of HIV cases followed by mother to child transmission (MTCT) accounting for about 15% whilst other forms of transmission such as needle pricks, blood and blood products account for about 5% (GSS, 2009a). Most at risk population (MARPs) groups in Ghana are mainly female sex workers (FSW), Men who have sex with men (MSM), people who inject drugs and prisoners. Among children (below 14 years old) in Ghana about 95% of HIV infections are attributed to MTCT (GAC, 2011).

1.6.7. Financing HIV Control Programs in Ghana

Financing HIV control programs in Ghana is hugely dependant on external sources. In 2011 funds from international organizations accounted for 74% of total expenditure on HIV control programs amounting to about 60.81 million Dollars whilst funds from the public sector amounted to 14.85 million Dollars. The private sector in Ghana, mainly cooperate organizations, contributed about 6.0 million Dollars. This over dependency on external sources of funding represent a threat to the program with

regards to future sustainability (GAC, 2014). Figure 10 at annex 4 shows the sources of funding for HIV control program for 2010 and 2011.

CHAPTER 2: PROBLEM STATEMENT AND JUSTIFICATION, OBJECTIVES AND METHODOLOGY

This chapter explains the extent of the problem, justification, the objectives and methodology for this review. The chapter also explains the conceptual framework and the limitations of the study.

2.1. Problem Statement and Justification

Mother to Child Transmission of HIV (MTCT), also known as vertical transmission of HIV, is the transmission of HIV virus from an infected pregnant woman to her child during pregnancy, child birth or through breast feeding. In the absence of interventions, vertical transmission of HIV is estimated between 15% and 45% among pregnant women who are infected with the virus (annex 2 table 3 show the risk of vertical transmission of HIV). However, MTCT of HIV can be reduced below 5% with the administration of effective antiretroviral medicines to both the mother and the newborn throughout the period when transmission could occur. The WHO estimates that nearly 62% of 1.5 million pregnant women infected with HIV received antiretroviral therapy (ART) through PMTCT in 2012 (WHO, 2013a). However, only 45% of infants born to HIV infected mothers received ART with significant regional differences ranging from as high as above 95% in Europe and some countries in Latin and South America such as Cuba, Suriname, Argentina and Guyana to as low as 10% in West Africa as of 2012 (UNAIDS, 2013) .

To achieve maximum benefit of PMTCT program, it's very important that a continuum of care is maintained to ensure that pregnant women and their babies receive the full package of services that are provided under the program; testing and counselling for HIV for pregnant women, ART for mother during pregnancy and for mother and neonate after delivery, safe delivery and appropriate feeding practices (UNICEF, 2013b).

There is evidence to support prophylactic ART for newborns if their mothers have HIV. According to WHO, 86% of people receiving ART in Rwanda had viral suppression 18 months after starting treatment (WHO, 2013c). This means that HIV infected pregnant women who receive ART during pregnancy may not achieve viral load suppression during pregnancy. A study conducted by Taha et al in Malawi showed that prophylactic antiretroviral therapy for newborns of HIV infected mothers significantly reduced vertical transmission not only for babies born to women who had ART during antenatal period but also for babies who were born to mothers who did not have ART during pregnancy (Taha et al, 2011). Prophylactic ARV for newborns is even more important for infants born to HIV infected mothers who are not on ARV or started ARV

very late at pregnancy. These mothers may have high viral loads and therefore have higher risk of transmitting HIV to their infants. Therefore, prophylactic ARV to the exposed infant constitute an important component of PMTCT services. The current WHO consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection strongly recommend prophylactic ARV for infants born to HIV infected mothers irrespective of whether their mothers are receiving antiretroviral therapy or not (WHO, 2013c).

In the specific context of Ghana, the main objective of PMTCT program within the national strategic plan 2011-2015 of the Ghana Aids Commission (GAC) is to reduce vertical transmission below 5% among women who are infected with HIV. The commission intends to achieve this by providing ART to at least 90% of pregnant women who are infected with HIV and 90% of their newborns in addition to all the other interventions under the PMTCT program by 2015 (GAC 2010). Two and half years through the implementation of this plan, the mid-term evaluation report shows that 70% of pregnant women who are infected with HIV received ART and the National Aids Control Program (NACP) is on course to attain the 2014 target of 80%. However, only 20% of babies born to HIV infected women received prophylactic antiretroviral therapy in 2012 and by the end of June 2013, only 14% of eligible infants had received ART for PMTCT. The report recognized that the HIV/AIDS control program did not achieve its target to provide prophylactic antiretroviral therapy for newborns between 2011 and 2013 (GAC 2014). This situation is a reflection of PMTCT programs in many West African countries (UNAIDS,2013).

The overall effect of the aforementioned situation is that a proportion of children born to mothers who utilized PMTCT services are still infected with HIV through vertical transmission which could have been prevented. If the main objective of PMTCT is to protect babies from acquiring HIV infection, then it's essential that utmost importance is given not only to the mother during pregnancy but also to the infant to maximize the benefit of the program during pregnancy and post deliver period.

It's therefore very important to find out the factors that influence the up-take of prophylactic antiretroviral therapy for HIV exposed infants since it is the weakest link of the PMTCT program in Ghana. Whilst there are several studies in Ghana on the factors that influence up-take of PMTCT services, these studies focused attention on the pre-delivery and delivery (antenatal and peripartum) components of the program to the neglect of

prophylactic antiretroviral therapy for the newborn. This review therefore asks the questions:

1- What is the organizational structure of PMTCT and prophylactic ART service for infants born to HIV positive mothers?

2-What are the factors that influence the utilization of these services and the opportunities that exist to address these factors?

3-What are the experiences and the best practices within the Sub Saharan African region that can be adopted or adapted to enhance uptake of prophylactic ART for newborns exposed to HIV within the context of PMTCT program in Ghana.

The answers to these pertinent questions will offer opportunity for recommendations to address the identified barriers.

2.2.1. Overall Objective

To analyze the organization of prophylactic antiretroviral therapy services for infants whose mothers are HIV positive and explore the factors that influence the up-take of these services as well as review best practices in Sub Saharan Africa in order to make recommendations to the Ghana AIDS Commission and the National AIDS Control Program to address the identified barriers.

2.2.2. Specific Objectives

1-To describe and analyze the organization of prophylactic antiretroviral therapy services for infants within PMTCT program in Ghana and the trend of up-take of this service for infants whose mothers are HIV positive between 2011 and 2013

2-To explore the factors that influence the utilization of infant Prophylactic ART and early infant diagnosis (EID) for PMTCT in Ghana.

3-To review best practices in Sub Saharan Africa on prophylactic ART for HIV exposed infants within PMTCT programs.

4-Make appropriate recommendations to GAC and NACP to address identified barriers to utilization of prophylactic ART services to HIV exposed infants in Ghana.

2.3. Method

To achieve the objectives of this study, a literature review of published and unpublished documents on prophylactic ART for newborns as part of PMTCT of HIV was conducted. The review was limited to literature that was written in English language.

2.4. Search Strategy

Search Engines used are Pudmed, Google Scholar and Google. Online search was also conducted on Cochrane library and the Vu university library websites. Further search was conducted on the websites of Ghana Ministry of Health (MOH), GAC, Ghana Health Services (GHS), NACP, WHO, UNICEF and LINKAGES. Some literature were also searched manually.

2.5. Key Words and phrases Search

Key words that were used in the search are: Ghana, HIV, ART, prophylaxis, services, up-take, vertical, transmission, newborns, infant, perinatal, postnatal, PMTCT, WHO, UNICEF, mother to child, Sub Sahara Africa, access, antiretroviral, therapy, policy and macro environment availability, geographical accessibility, affordability, household and individual, characteristics, acceptability, quality of care, community initiatives, participation, best practices, perinatal, postnatal and MESH terms. These words and phrases were either used alone or in different combinations.

The literature researched included research and program reports, national and global guidelines, strategic plans, policy documents, peer review articles from print and electronic journals, conference documents on vertical transmission of HIV and its prevention in Ghana and Sub Saharan Africa.

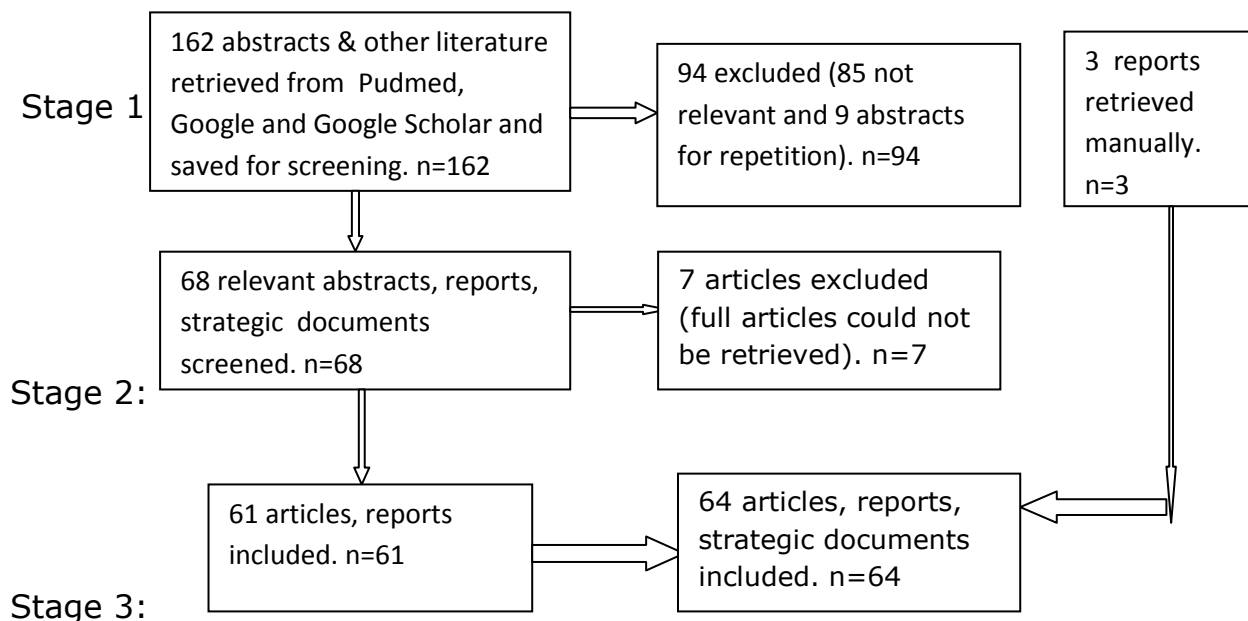
2.6. Inclusion Criteria, Exclusion and Screening Process

Only literature that were written in English addressing directly or indirectly PMTCT and or prophylactic ART for infants who were born to HIV infected mothers with focus on Ghana or Sub Sahara African countries were considered. Literature in English language were chosen for easy understanding by the writer. The articles were not limited to any

time period, however, the articles that were found to be relevant to the study were published between 2007 and 2014.

- The first stage of the search found initial 162 abstracts, reports and strategic documents retrieved from Pudmed, Google and Google Scholar. These documents were saved and screened. After screening, 85 abstracts were not relevant to the study and full 9 articles were repeated. A total of 94 articles were therefore excluded from the study at this stage and the remaining 68 articles were subjected to further screening in stage 2. At stage 2, full articles for 7 abstracts could not be retrieved and therefore excluded from the study leaving a total of 61 articles and reports. Other 3 documents were manually searched and added to the 61 articles at stage 3 and. A total of 64 articles, reports and strategic documents were finally included in the study. Personal experiences of the writer were taken into consideration.

Fig. 1



Stages of the literature search and screening process for this review.

2.7. Limitations of the study

The limitations of this study are:

- only few articles were focused on infant prophylactic ARV to prevent MTCT of HIV in Ghana. Most of the articles on PMTCT in Ghana were focused on HIV testing and counselling and ARV for pregnant women to the neglect of prophylactic ARV to HIV exposed infants

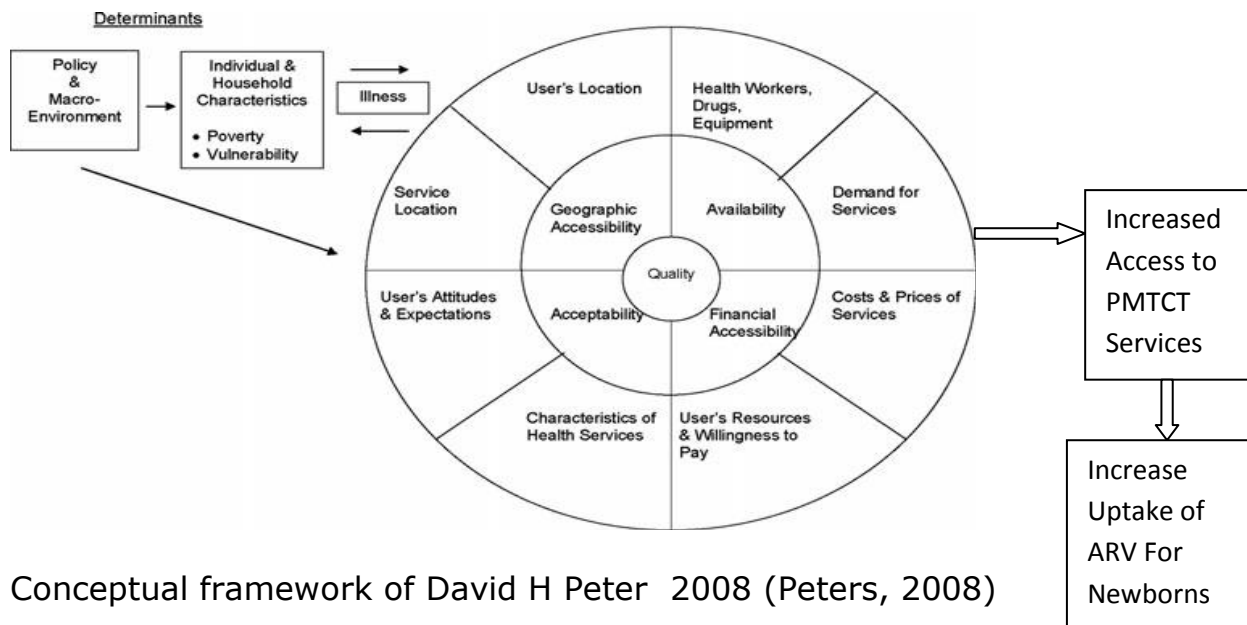
and early infant diagnosis (EID). However, some articles were found from South and East African countries.

- The writer could not speak to key people such as couples who have utilized PMTCT services, service providers, health administrators and program managers of the NACP. First hand information from these people could give more insight into the subject.

2.8. Conceptual Framework

To analyze and understand the search findings, a conceptual framework of David H. Peters (2008) was used. In their paper "Poverty and Access to Health Care in Developing Countries", Peters et al explain how several determinants, acting in isolation or in combination, influence access to health services in middle and lower income countries. Access to health care is defined as "timely use of services according to need". Although some researchers distinguish between the supply and opportunity for use of services and the actual using of health services, most view access to health services as including realized need. This framework relates the realization of need for services and access to those services as well as the actual utilization of those services. Figure 2 below is the conceptual framework of David H. Peters.

Fig. 2



Conceptual framework of David H Peter 2008 (Peters, 2008)

This framework illustrates that people will access and utilize services if these services are available at the right times according to their needs, within a distance which they can easily reach and delivered with respect to their cultural norms and individual expectations at a cost which they are able and willing to pay. The ability and willingness to pay for services

differ from individuals and households, therefore utilization of these services are also linked with economic status and vulnerability of individuals and households. All these are directly and indirectly linked with national policies and macroeconomic environment. Peters et al explains that these factors acting either in isolation or in some combinations influence utilization of health services (Peters, 2008).

This framework has been chosen because of the clarity and the linkages that it establishes right from policy and macro environment through to individual and household characteristics and all the other factors that could influence utilization of health services.

For the purpose of this review, the framework was modified to include increase access to PMTCT and utilization of infant prophylactic ARV and EID.

CHAPTER 3: Study Findings and ANALYSIS

This chapter reviews the literature that were found and closely analyze the findings using the framework of David H. Peters. The analysis will focus on factors that influence utilization of health services such as policy and macro environment, individual and household characteristics, geographical accessibility, availability, financial accessibility, acceptability and quality of health service. For the purpose of this review, these factors will be analyzed with reference to prophylactic ART for infants born to HIV positive mothers to prevent mother to child transmission of HIV and early infant diagnosis of HIV in Ghana. The chapter will also analyze PMTCT program targets and program performance with emphasis on the five years strategic plan 2011-2015 and the PMTCT scale up plan 2011-2012.

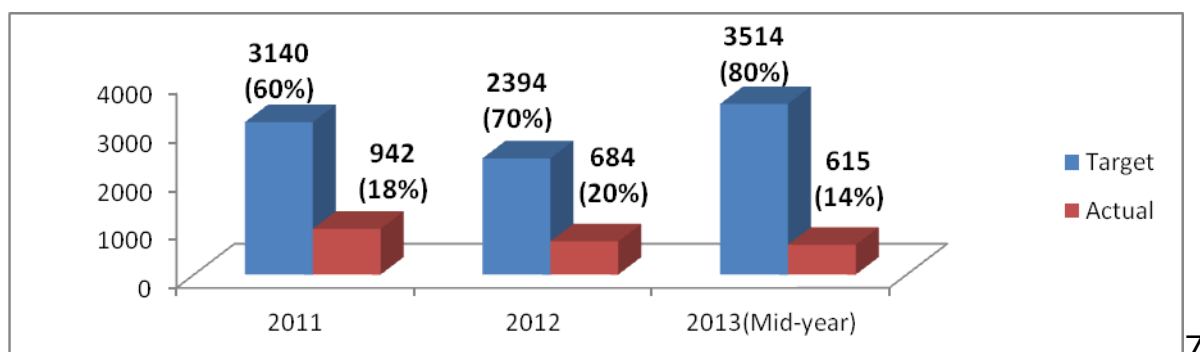
Due to the linkages between policy and macro environment and the health system related factors, the findings on health system related factors will be analysed after Policy and macro environment followed by individual and household characteristics.

3.1. Utilization of Infant Prophylactic ARV and Early Infant Diagnosis EID.

The data available from 2011 to 2013 gives the trend of utilization of this services over the last three years. The end of 2013 marks three years of implementing both the national strategic plan for HIV control 2011-2015 and the five year PMTCT scale up plan 2011-2015.

The mid-term evaluation report of the five year strategic plan of GAC indicates that only 18% and 20% of HIV exposed newborns received prophylactic ARV for 2011 and 2012 respectively. At the end of June 2013, only 14% of eligible infants had received prophylactic treatment. These figures are way behind schedule to achieve the 70% target for 2013 and 90% by 2015 as indicated in the national strategic plan and the PMTCT scale up plan respectively (GAC,2010). Figure 3 shows the trend in a graph.

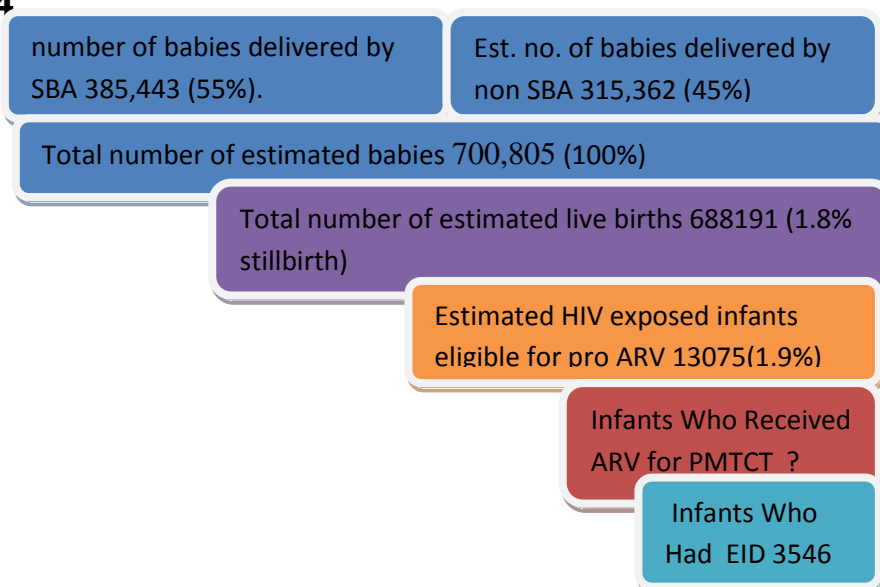
Fig. 3



Number and percentage of newborn infants who received prophylactic ARV for PMTCT in Ghana from January 2011 to June 2013. Mid-Term Evaluation Report. (GAC, 2014)

Moreover, it's not very clear why the NACP set a target to reach only 2394 and 3514 HIV exposed infants for 2012 and 2013 respectively when the Ghana health service, with 90% antenatal coverage, registered more than 9000 HIV infected pregnant women and gave HAART to more than 7000 pregnant women for PMTCT in 2013 alone (GHS, 2014).

Fig. 4



Estimated number of babies delivered and babies expected to receive ARV and EID services in Ghana for the year 2013. (GHS, 2014).

Further analysis based on the 2013 annual performance report of the family health division of Ghana Health Service is shown in figure 4. The data shows that 385,443 babies were delivered by skilled birth attendants for the year 2013 representing 55% of expected deliveries. This means an estimated 315,362 (45%) of births were attended by non SBA. The report estimates that stillbirth for the year was 1.8% for an estimated total live births of 688,191. Giving that HIV prevalence among ANC attendance for the year was 1.9% (NACP, 2014), an estimated 13075 infants were expected to be born to HIV infected mothers and should receive prophylactic ARV. Therefore, the target that was set by the NACP to reach 3514 infants in 2013 was grossly underestimated comparing to the GHS report. Considering that neonatal mortality at the period was 60 per 1000 live births, an estimated 12,291 should be followed up to receive EID of HIV but only 29% (3546) of these HIV exposed infants got EID services.

Even though the GHS report does not provide the data on Infants who received prophylactic ARV in 2013, we are already aware from the GAC mid-term evaluation report (figure 3) that as at the end of June 2013, only 14% of HIV exposed infants had received prophylactic ARV. These figures show that at least some ten thousand HIV exposed infants did not receive prophylactic ARV in 2013. These are indications that the program is not likely to achieve the 90% target for 2015 unless there is a change of approach to offer this service.

3.2. Policy and Macro Environment for HIV Prevention in Ghana

Ghana officially started PMTCT program in 2002 as a response to the declaration by United Nations General Assembly Special Session (UNGASS) on HIV/AIDS in 2001 to among other things, reduce MTCT of HIV by 20% by 2005 and by 50% by 2010 using the level of infections at the end of 2000 as baseline (UNGASS, 2001). Since then there have been mayor policy decisions with implications to availability and utilization of prophylactic ARV in Ghana.

3.2.1. Establishment of the Ghana AIDS Commission

One of the most important policy decisions with significant consequences for prophylactic ARV is the establishment of the Ghana AIDS Commission

(GAC). In 2002, the government of Ghana, realizing the enormity of the HIV epidemic constituted the GAC through the parliamentary Act 613. The mandate of the commission is to "formulate a national HIV/AIDS policy; to develop programmes for the implementation of the policy and direct and co-ordinate the programmes and activities in the fight against HIV/AIDS and mobilize resources for related purposes" (Parliament of Ghana, 2002). This is important because the supra ministerial nature of the commission allowed for:

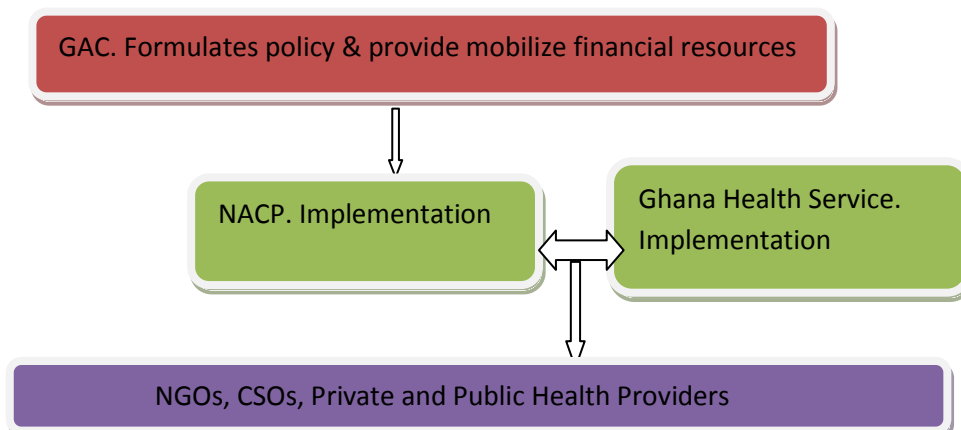
(a)-Better collaboration with other ministries and stakeholder involvement unlike the NACP which was seen as a program under the ministry of health.

(b)-Higher political influence and a wider reach to mobilize financial resources both locally and internationally.

With this structure, the NACP in collaboration with Ghana health service is dedicated to implementing policies formulated by GAC.

The unique position of the GAC is important for mobilizing financial resources needed to procure ARV drugs and to mobilize civil society organizations (CSOs) to assist in HIV control programs including PMTCT. Figure 5 below shows the relations among the organizations in charge of PMTCT program within which prophylactic ARV for HIV exposed newborns is offered.

Fig. 5



Working relations among the relevant organizations for PMTCT in Ghana.

Under this structure, the program manager of NACP and the divisional director of family health division of the Ghana Health Service are the co chairpersons of PMTCT program within which prophylactic ARV is given to

HIV exposed infants. Policy decisions that are taken by the GAC are explained to GHS through the program manager of NACP. These policies are then implemented by the GHS in collaboration with NACP. At the same time, the GHS assists the NACP to monitor HIV control activities that are implemented by private health providers, NGOs and CSOs. This arrangement allows the use of GHS staff who are present in all the districts and sub-districts in the country and also facilitates integration of newborn prophylactic ARV into the overall maternal and child health services.

However, the arrangement increases bureaucracy in the sense that the ministry of health and the Ghana health service depends on decisions from GAC when it comes to major policies. Secondly, the arrangement promotes a tendency where service providers always expect the NACP and GAC to finance every HIV prevention activity.

3.2.2. The Adoption and Implementation of "Option B+" for Antiretroviral Therapy for PMTCT in Ghana

Prophylactic antiretroviral drugs were incorporated into PMTCT program in Ghana in 2003 (NACP, 2008). It was first piloted at Atua and Saint Martin de Porres hospital, the same hospitals where PMTCT started a year earlier. This initial policy which was based on monotherapy Nevirapine tablets to HIV infected pregnant women has gone through several changes such as the option A, option B to the current option B+. In 2013, the Ghana Aids Control Program changed from option B to option B+. Training on "option B+" was conducted and implementation started by late 2013. With this approach, all HIV infected pregnant women are given Highly Active Antiretroviral Therapy (HAART) for life and the HIV exposed newborns, are given prophylactic ARV for 4-6 weeks (UNICEF, 2012). The ARVs that are used as prophylaxis for these infants are daily dose Nevirapine syrup or twice daily Zidovudine for 6 weeks (NACP, 2008). Box 1 at annex 5 shows different protocols of ARV for PMTCT purpose.

Experience from Malawi indicates that "option B+" is easier to implement as compared to option B and facilitates scale-up of the service to lower level health facilities at community level (WHO, 2014). This will make it easier for the Ghana NACP in collaboration with both private and public health providers to further decentralize ART to HIV infected pregnant women and provide prophylaxis for the infants at all levels of care including CHPS centres. This is because, there is no longer the need to

test for CD4 count before deciding to continue antiretroviral treatment for a patient in PMTCT program after delivery. This will offer better protection for the breastfeeding infant. These change is in line with the current WHO recommendations (WHO, 2013c).

Despite the benefits of the policy, the financial implications could be a challenge for a successful implementation and sustainability. This is because the number of pregnant women that will continue HAART after delivery will increase. For example, in 2013, almost 6000 of the total of 7000 pregnant women who received HAART had CD4 count above 350. This means that all these women were going to discontinue HAART after delivery if Ghana had not adopted option B+. Moreover, the time and resources needed to train all PMTCT staff on option B+ is also a challenge (NACP, 2014). This are some of the reasons that delayed the implementation of the policy and should be taken into consideration for sustainability.

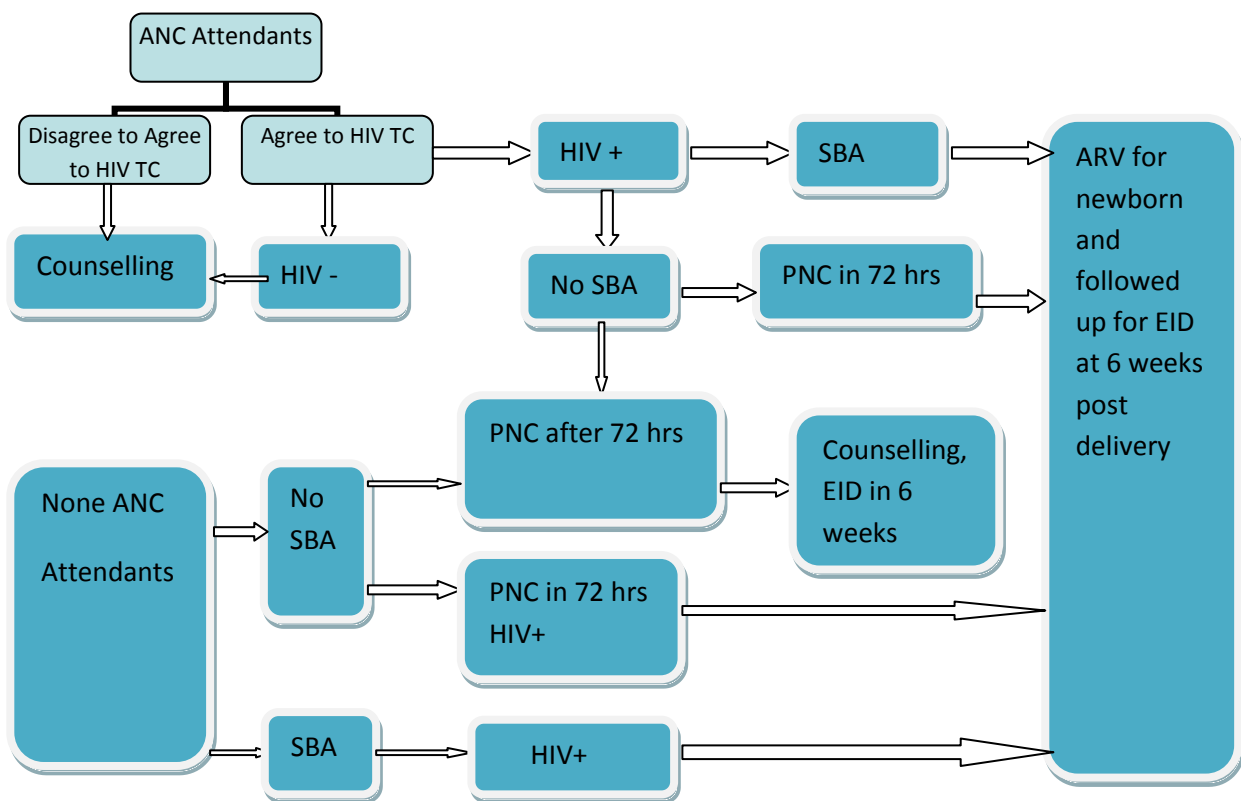
3.2.3. Integrating Prophylactic ARVs for HIV Exposed Infants into Maternal and Child Health (MCH) Services and Adoption of "Opt out" policy.

One of the cardinal principles of PMTCT program in Ghana in the national guidelines is "Integrated delivery of interventions for PMTCT within maternal and child health services including links between the services". To this regard, prophylactic ARV for newborns are given to infants within the routine MCH services. The treatment is started within 72 hours of post delivery period and monitored through the children clinics known as child welfare clinics (CWC) in Ghana which are done between the fifth and the seventh day post delivery. Further follow up is done at six weeks post delivery which coincides with another child welfare clinic and immunization for pentavalent and rotarix (MOH, 2009). This integrated approach is consistent with WHO recommendations (Suthar AB et al. 2012). This means that HIV exposed infants may receive prophylactic ARV only if they are in contact with the formal health system within the first 3 days of life. These reviews could be at facility level or during outreach services by community health nurses (NACP, 2008; WHO, 2008).

To increase the uptake of HIV testing for pregnant women, the Ghana NACP adopted the provider initiated testing and counselling also known as "opt out" policy to ensure that every pregnant woman who attended ANC will be offered HIV test as part of the routine antenatal services. This

policy is intended to test all pregnant women for HIV and offer PMTCT services including prophylactic ARV for HIV exposed infants accordingly. Figure 6 below shows the entry points for infant prophylactic ARV for PMTCT in Ghana described in this paragraph. The first entry point of attending ANC and opting for testing and counselling is crucial because that is the opportunity to diagnose HIV infection so that counselling and education on prophylactic ARV for HIV exposed newborns can be offered to the mother. Women who disagree to test for HIV are offered repeated counselling throughout the pregnancy with the aim that they may change their decision and accept HTC at some point. Those who are tested HIV negative receive counselling on safe sexual practices for HIV prevention. Those who are tested HIV positive will be counselled and given ARV for both mother and infant. The infant will be followed up for EID at 6 weeks post delivery.

Fig. 6



Entry points for Prophylactic ARV for HIV exposed infants in Ghana (GAC, 2010).

On the other hand, the patients who did not attend ANC will be offered testing and counselling at the labour room if they deliver with a skilled birth attendant. Those who agree to testing and are HIV positive will be

offered ART for both mother and infant and the infant will be followed up for EID in six weeks. Those who disagree to test for HIV and those who test HIV negative will receive counselling.

Whilst this integration of prophylactic ARV into the MCH services is convenient for mothers to receive a comprehensive PMTCT service at a single service delivery point, newborns who do not get into contact with the formal health system within 3 days of delivery are denied Prophylactic ARV. This is because evidence show that prophylactic ARV for HIV exposed infants should be initiated within the first 3 days after birth in order to achieve better protection against HIV infection (WHO, 2013c).

3.3. Geographical Accessibility of Antiretroviral Therapy

The importance of geographical accessibility of ART services to PMTC program has been demonstrated in different countries. According to the Malawian Aids Commission, between 2005 and 2011, facilities offering ART services for PMTCT purposes increased from 36 to 595, consequently, the number of pregnant women who accessed ART within the PMTCT program increased from less than 5000 to over 30000 within the same period. The Malawian PMTCT program ensured that by 2011 more than 80% of all health facilities offered ART services (Malawi Aids Commission 2012).

Even though antenatal care, postnatal care and PMTCT services are offered at all levels of the healthcare system in Ghana, only selected health facilities are designated as ART centres. These are the health facilities that offer antiretroviral therapy services. The implication of this arrangement is that, women who deliver at community level health facilities especially the CHPS and health centres that are not designated as ART centres may have to travel to other ART designated facilities or a district hospital for ARV for the infant. This situation limits geographical access to ARV for the rural dwellers. This is the reason why the NACP considered "proportion of health facilities that provide PMTCT service including ART" as a key indicator within the PMTCT scale up plan 2011-2015 to bridge the gap and inequities in geographical access to PMTCT including ARVs.

In line with the strategic direction of the MOH and GHS to improve geographical accessibility of primary health care through the scale-up of CHPS centres, the NACP also focused on increasing HTC and PMTCT sites by supporting the CHPS centres with logistic and supplies to provide

comprehensive PMTCT services. This is because the Community Health Planning and Services (CHPS) centres, being the lowest tier of the formal health care system, have community health nurse, community health officer and a midwife who offer services at the centre and also conduct outreach services at the communities where they serve. By the end of 2012 there were 2226 CHPS centres in Ghana and 1629 of these provided HIV testing and counselling and other PMTCT services but only 164 of these provided antiretroviral services and designated as ART sites (GAC, 2014)

As can be seen from table 1, only 44% of health facilities in Ghana are providing a complete package of PMTCT. Upper West and the Brong Ahafo regions have only 30% of health facilities providing comprehensive PMTCT services (GHS, 2015).

Tab. 1

Region	Total facilities	No. of PMTCT sites	Coverage of Health facilities
Ashanti	448	306	68%
Brong Ahafo	396	117	30%
Central region	313	103	33%
Eastern	632	323	51%
Greater Accra	421	122	29%
Northern	244	175	72%
Upper East	273	114	41%
Upper West	251	75	30%
Volta	403	153	38%
Western	384	168	44%
Total	3765	1656	44%

Health facilities including CHPS centres that are providing PMTCT services by region in Ghana 2013, (GHS, 2014).

In rural Ghana, the average distance that patients travel to access the nearest health facility is 3-5 kilometres (GOG, 2014). The patient may travel a longer distance if she has to go to a district hospital in a situation where the particular service is not available at the nearest CHPS centre. This patient may not be able to access this service due to the distance and the cost of transport.

In his review of 'Ghana's Free Delivery Care Policy', David Ofori-Adjei concluded that despite the free delivery policy, cost of long distance travels to access some services was a limitation to access reproductive health services (Ofori-Adjei, 2007). Awoonor-Williams in an article entitled "Transportation and Referral for Maternal Health within the CHPS System" emphasized on the need to render reproductive health services at the CHPS centres to reduce travel inconveniencies on patients (Awoonor-Williams, 2010). However, these studies do not provide the average cost of transport to seek reproductive health care in rural Ghana.

Even though the reports from NACP and the GAC do not indicate the difference in uptake of infant prophylactic ARV between rural and urban areas, the challenges of geographical access to infant prophylactic ARV are likely to affect the rural population more than the urban population.

3.4: Availability of Prophylactic ARV Therapy Service for Newborns

For the sake of this review, availability refers to the presence of health workers, equipments and antiretroviral drugs at all times to provide services to for PMTCT.

3.4.1: Human Resource for Prophylactic Antiretroviral Therapy for PMTCT.

Prophylactic ARV for newborns within PMTCT program is mainly led by midwives and community health nurses. As mentioned in chapter one, there are challenges with human resource for health in Ghana in terms of the number of different cadres of health workers and skewed distribution. The Ghana PMTCT scale up plan of 2010 cited inadequate number of trained staff, attrition and lack of motivation as challenges that needed to be addressed (GAC, 2010). The human resource situation also has implications for skilled birth attendance in Ghana especially the rural areas. The national average of SBA is estimated at 55% for 2013.

This means that almost half of all deliveries are not attended by skilled personnel and may not be able to access ARV within three days after delivery. The situation is worse in rural communities as compared to urban areas. Table 2 in page 23 shows examples of differences in skill births in the five districts with the lowest skill birth as compared to the five districts with the highest SBA in Ghana in 2013.

Tab. 2

Districts with lowest % of SBA		Districts with highest % of SBA	
District	% of SBA	District	% of SBA
Akatsi North	10%	Tamale Metropolis	135%
Afadjato South	7%	Sunyani Municipal	128%
Sene East	11%	Techiman Municipal	151%
Techiman North	14%	Offinso Municipal	148%
Sekyere Afram	11%	Nsawam Adoagyire	168

Five rural districts had the lowest SBA and the five major urban districts had the highest SBA in Ghana for 2013, (GHS, 2014).

The five districts with the lowest SBA are mostly rural districts as compared to the five districts with the highest SBA which are major urban centres. Whilst the rural districts had SBA of 7% to 14%, all the urban districts recorded above 100%. The human resource available in these rural districts could not be accessed during this review. However, from my working experience in Ghana, district and regional hospitals have better human resource as compared to the rural areas. Rural communities may not have health facilities that are geographically accessible or the health facilities may not have trained human resource especially midwives to offer timely responsive quality care. As a result of these, some women prefer to travel from rural communities to give birth in district and regional hospitals in urban centres. Women from Techiman North may have travelled to Techiman municipal which is the nearest urban centre with a district hospital. Some women may deliver in their homes because of transport challenges described in the previous section.

It is therefore difficult for these babies who are not delivered in health facilities by skilled personnel to receive prophylactic ARVs considering that prophylactic ARV to newborns begins at health facility level after delivery.

Therefore, the inadequate human resource for health is a barrier to infant prophylactic ARV for PMTCT.

3.4.2. Availability of Prophylactic Antiretroviral Drugs for Newborns

Antiretroviral drugs in Ghana are mainly funded from international sources (multilateral and bilateral sources). The antiretroviral drugs of choice for infant prophylaxis against MTCT of HIV in Ghana are Nevirapine and Zidovudine. The ARV is centrally procured and transported from Central Medical Stores to Regional Medical Stores (RMS) from where its distributed to health facilities. A report of the GAC in January 2014 concluded that shortage of antiretroviral drugs was one of the challenges of PMTCT that contributed to the poor performance of prophylactic ARV to HIV exposed newborns. This was partly due to the fact that ARV is extremely dependant on donor funding mainly from Global fund (GAC, 2014).

Distribution challenge is another problem to consider eventhough the report does not mention it. This is because, the regions travel to the central medical stores in Accra to collect their allocation of ARVs. This is easier for regions which are nearer to Accra as compared to regions that are very far away from Accra. Similar situations may happen among health facilities within the same region. Consequently, some health facilities may have ARV whilst there is shortage in others due to distance.

3.4.3. Availability of Early Infant Diagnosis of HIV

Early infant diagnosis (EID) is the use of virological testing to diagnose HIV status of an infant within 2 months of age. The UNAIDS recommend that EID be performed to infants who are exposed to HIV at 6 weeks after birth. Virological test for HIV within 2 months of birth is one of the core indicators of UNAIDS to monitor the progress of the political declaration on the elimination of new HIV infection among children by 2015 (UNAIDS, 2013; WHO, 2013b). Even though EID does not prevent MTCT, it offers the opportunity for early identification of infants who are actually infected with HIV and early initiation of HAART through the PMTCT continuum of care. It is therefore an important component of the services that are provided for HIV exposed infant under PMTCT. The result of the test may also contribute to reduce the anxiety on the parents who are always anxiously waiting to know the HIV status of their child. It's therefore an opportunity to monitor the

HIV status of HIV exposed infants after they have received prophylactic ARV for 6 weeks.

In 2013, UNICEF reported that only 10% of infants born to HIV infected mothers received EID services in West Africa as against 50% in Eastern and Southern Africa (UNICEF, 2013).

In Ghana EID started in 2011 and the 2013 report from the GHS indicates that out of 3546 HIV exposed infants who had EID, 255 representing 7% were HIV positive (GHS, 2014). The analysis in figure 4 shows an estimated 12,291 infants were expected to be followed up to receive EID test at 6 weeks. However, only 3546 (29%) of eligible infants were tested in 2013.

3.5. Financial Accessibility for Infant Prophylactic ARV Services.

Ghana started the implementation of free maternal health care policy in 2008. Under this policy, all maternal and neonatal health services are free of charge at the point of care until three months post partum. PMTCT services including prophylactic ARV for newborns are covered under this policy. The cost is covered by the NACP with assistance from donor funding and the free maternal and newborn care policy of the government of Ghana. The only cost to patients is travelling expenses and other opportunity cost such as hours lost to work. The implementation of the free maternal care policy has contributed to reduce the financial barrier for maternal and newborn health services including prophylactic ARV for HIV exposed infants. This has contributed to improve utilization of maternal health services especially skilled birth attendance which has increased from 45% in 2009 to 55% in 2013 (HERA and Health Partners Ghana, 2013; GHS, 2014; Daily Graphic, 2008).

Despite the positive impact on SBA, there are implementation challenges that need to be addressed. Service providers are not happy with the tariffs that are paid to them by the National Health Insurance Authority for reproductive health services resulting into co payment especially in private providers (Tinkorang et al. 2013). Even public health providers, who are obliged to comply with the policy have raised concerns that the tariffs could affect the quality of services that they provide.

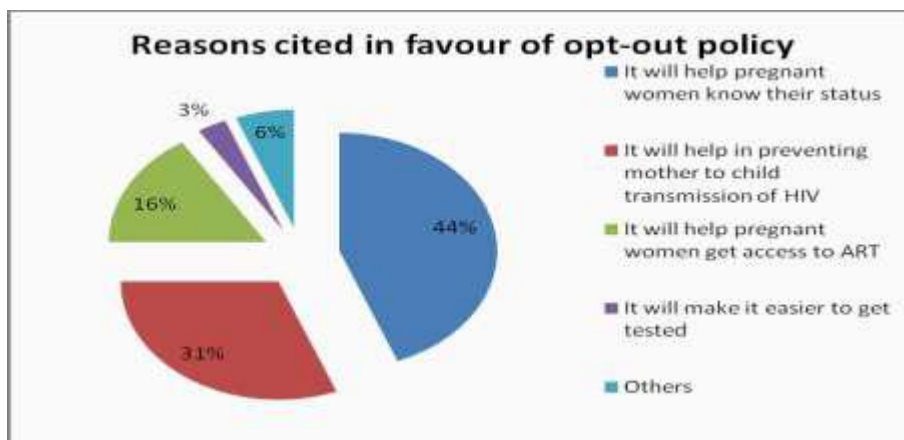
3.6. Acceptability of ARV for Newborns to Prevent Mother to Child Transmission of HIV in Ghana.

User acceptability is an important consideration for service utilization. From user perspective, the interpersonal aspects of care which involve social-psychological aspects of service provider-patient interaction as described by Donabedian is paramount for patient satisfaction and continues utilization of services (Cleary Paul D et al. 1988).

Even though the search did not find any study in Ghana that specifically looks at the acceptance of prophylactic antiretroviral therapy to infants for PMTCT, a cross sectional study conducted by Nyuzaghl et al in Wa municipality of the Upper West region in Ghana in 2008 showed that ANC attendants were aware of the "opt out" policy. In this study, 245 women (91%) of the total number of 270 antenatal attendants who were interviewed, were in favour and accepted the policy. Among those who accepted the policy, 44% responded that they accepted it because it will help them know their HIV status and get treatment whilst 31% accepted it because it will help them prevent vertical transmission of HIV. These findings suggest that majority of the women who accepted the policy did not understand the main objective of PMTCT. Among the 25 women (9%) who did not accept the policy, 18 women responded that knowing their HIV status could result in premature death whilst others felt that the policy amounted to forcing them to test for HIV.

Figure 7 below shows the reasons cited by the pregnant women for their acceptance to the policy (Nyuzaghl et al. 2011).

Fig. 7



Acceptability of routine offer of HIV testing among pregnant women in Wa Municipality in Northern Ghana, (Nyuzaghl et al. 2011).

The results thus suggest that majority of pregnant women accept the "opt out" policy in the Upper West region of Ghana. However, it is difficult to generalize this to the whole country. The GHS report of 2013 show that 81% of all ANC attendants opted for HIV testing with the lowest acceptance of 70% in the Volta region (GHS, 2014). This means that there are still 20% to 30% of ANC attendance who do not accept HIV testing and counselling at ANC. This can potentially deny ARV to HIV exposed infants.

3.7. Quality of Care

David H. Peters defines quality of care in his framework as "the technical ability of the health service to affect people's health" (David H. Peters, 2008). Quality of care is at the centre of the four main proximal dimensions of access and at the same time related with the distal dimensions of policy and macro environment as well as individual and household characteristics. Factors such as technical capacity, numerical strength, attitude and motivations of staff, equipment, supplies and infrastructure are important determinants of quality of care. As has been described earlier in chapter 1, the health system in Ghana has serious shortage of trained workforce including midwives (GAC, 2010).

A cross sectional study conducted by Dokua Kwapong et al. among pregnant women who had at least two ANC visits in the Kumasi metropolis in Ghana between August to November 2011 showed that 227 (76%) of the 300 ANC women had gone through HIV testing and counselling for PMTCT. The three most predominant reasons given by the 73 women (24%) who defaulted HTC for PMTCT were as follows:

- ❖ Not told about HTC for PMTCT at ANC 29.5%
- ❖ Felt no risk 22%
- ❖ Had to wait too long for the services 16.4%

Other reasons were fear of testing HIV positive, stigma and lack of privacy in the health facilities (Dokua Kwapong et al. 2014). As can be seen from this results, most of the reasons for default are service provider related which can prevent women from testing for their HIV status so that those who are infected can subsequently access prophylactic ARV for their infants.

The family health division of GHS and the GAC also reported shortage of ARVs, inadequate space in health facilities and EID centres as some of the

challenges affecting quality of PMTCT and infant prophylactic ARV (GHS, 2014; GAC, 2014).

3.8. Individual and Household Characteristics

As described by David H. Peters in the conceptual framework, individual and household characteristics can influence on the ability to utilize health services. Some of these characteristics are:

3.8.1. Economic level

Under the free maternal care policy of the Ministry of Health, antenatal care, delivery, post natal care and PMTCT services are free of charge. However, the implementation challenges mentioned earlier (co payment and travel cost) could deprive the poor from accessing reproductive health services including antiretroviral drugs. In a study conducted by Peltzer et al in a rural community in South Africa, travelling cost was an important barrier to access PMTCT services including antiretroviral services (Peltzer, 2006). Considering 28% of the Ghanaian population live below the poverty line and 50% live in rural areas, the implementation challenges negatively affect the ability of these sections of the population to utilize infant prophylactic ARV and other reproductive health services.

3.8.2. Education

A study published by the world bank in 2013 showed that the level of education of pregnant women can influence their health seeking behaviour to the extent that pregnant women with higher education level may have improved health seeking behaviour as compared to those who have not received formal education (World Bank, 2013b). However, a systematic review by Gourley et al on barriers and facilitating factors to the uptake of antiretroviral drugs for prevention of mother-to-child transmission of HIV in sub-Saharan Africa was inconclusive on the role of level of education on the uptake of antiretroviral therapy for both mothers and newborns for PMTCT purposes (Gourley et al. 2013). In the specific context of Ghana, studies conducted both in rural and urban areas in the Ashanti Region did not establish education level as a factor that influence uptake of services. The level of knowledge on HIV transmission and prevention was very important factor. However both educated and illiterate pregnant women attained a high level of knowledge on HIV

transmission and prevention when counselling was done correctly at the PMTCT clinics. It therefore appears that the quality of ANC and PMTCT counselling has more influence on utilization of PMTCT services including infant prophylactic ART more than maternal education level (Boateng D and Awunyo-Vitor, 2012; Boateng et al. 2013).

3.8.3. Spousal Disclosure and Stigma

There are several reviews about spousal disclosure and Male involvement in PMTCT services including uptake of prophylactic ARVs for both mother and her newborn. A systematic review by Gourlay et al published in 2013 concluded that low spousal disclosure and lack of male participation are some of the barriers affecting the uptake of antiretroviral drugs for prevention of mother-to-child transmission of HIV in sub-Saharan Africa (Gourlay et al. 2013). Whilst several interventions have been used to improve spousal disclosure and male involvement in PMTCT including invitation of male partners to PMTCT clinics, the effectiveness of these interventions to increase male involvement is not very clear. A systematic review by Bursamento et al in 2012 did not find evidence that these interventions increased male participation in PMTCT (Bursamento et al, 2012).

In Ghana a research brief by Strengthening HIV/AIDS Responds Partnership (SHARP) in collaboration with USAID showed that there was low spousal disclosure of HIV status. Out of ninety seven HIV infected respondents, only 30% had disclosed their status to their sexual partners. Both men and women are reluctant to disclose their HIV status due to fear of divorce, stigma and isolation (SHARP, 2005). This could have negative implications on access to prophylactic ARV for exposed newborns, however, there has not been a study in Ghana to assess this situation.

CHAPTER 4: EVIDENCE AND BEST PRACTICES FROM OTHER SUB-SAHARAN AFRICAN COUNTRIES

Prevention of mother to child transmission of HIV is a priority in many HIV control programs in Sub Saharan Africa. Prophylactic ARV to infants born to HIV infected mothers is a key component of PMTCT programs. This chapter will explore some of the best practices that have contributed to enhance utilization of infant prophylactic ARV for PMTCT in Sub Sahara African. For the purpose of this review, interventions that have been successfully implemented and have improved utilization of infant prophylactic ARV for PMTCT in other Sub Sahara Africa countries are considered as best practice:

1- Infant Take Home Dose of Prophylactic ARV

One of the most important challenges facing uptake of prophylactic ARV for newborns is home delivery. Reynolds et al intervened in Kenya in 2010 by giving the 6 weeks infant dose of prophylactic ARV to the HIV infected mothers during ANC visit at third trimester to be administered to their newborns within 72 hours post delivery. Compliance to infant prophylactic ARV was monitored through the child welfare and postnatal visits. Through this intervention, they achieved 93% uptake of prophylactic ARV for newborns who were delivered at home as against only 53% for those newborns whose mothers were not given the "infant take home dose". The intervention did not reduce institutional delivery among women in PMTCT program. The study recommended "infant take home dose" to be adopted to improve uptake of prophylactic ARV to exposed newborns (Reynolds et al. 2010).

Even though the study did not mention disadvantages of this approach, it will be important to know if the women remembered the doses of the drug for the infants since they might have collected the drugs weeks before delivery. However, this can be addressed by continues counselling and education until the patient delivers. Through this approach women who deliver at home can still give prophylactic ARV to the infant.

2-Use of Lay Counsellors to Conduct HIV Counselling and Testing.

To address the inadequate human resources, Botswana, Zambia and South Africa have successfully used lay counsellors to deliver services and improve uptake of ARV for both mothers and their infants. Lay counsellors are people who are not health workers but are trained to perform HTC.

They played a key role for Botswana to achieve 99% in HTC among pregnant women in 2012 and offer ARVs for 95% of HIV positive women from 37% in 2003. They also contributed to improve coverage of ARV for HIV exposed newborns. All these contributed to the reduction of vertical transmission of HIV to below 3% (UNICEF 2013a). Lay counsellors can also be used at community level as shown in South Africa (Doherty et al, 2013). The use of lay counsellors to conduct HIV counselling and testing allowed nurses to concentrate on other technical duties. The practice was recommended by WHO regional office for Africa in Brazzaville in 2010 (WHO, 2010).

Similarly, the Elizabeth Glaser Paediatric AIDS Foundation (EGPAF) has also supported HIV infected mothers and other lay counsellors in Tanzania to offer PMTCT counselling and monitoring services after training them. This initiative did not only fill in the human resource gap but also reduced stigma and improved continuum of care as well as compliance to ARV regimens for both mothers and newborns (EGPAF, 2010). However, the report did not show the extent of improvement in compliance of infant prophylactic ARV.

Notwithstanding these, reports from Mopani district, Limpopo in South Africa indicate some challenges with the use of lay counsellors. Often there are disagreements between lay counsellors and nurses in terms of responsibilities creating disharmony at work and inadequate funding to pay stipend for lay counsellors which often lead to abandonment of work (Maluleka F, 2011).

3-Providing Antiretroviral Therapy at Community Level Facilities Through Public Private Partnership

Geographical accessibility of infant prophylactic ARV was a challenge for most countries during the beginning of PMTCT programs. However, some countries have used different approaches to resolve the challenge mainly by scaling up the number of health facilities that provide this service in different parts of the countries. In Malawi, the number of health facilities offering ART services for PMTCT increased from 36 to 595 between 2005 and 2010. The Malawian PMTCT program ensured that by 2011 more than 80% of all health facilities offered ART services including prophylaxis for infants. This was done by scaling up ART services to lower level facilities including health facilities at community levels and the rural areas (Malawi Aids Commission, 2012). Private health providers such as the Christian

Health Association of Malawi (CHAM) were supported by the government in a partnership that improved geographical access to ARV services. The Malamulo PMTCT program led by the Malamulo Seventh Day Adventist Church is an example of such public private partnership to improve access to PMTCT including prophylactic infant ARV (Kasenga, 2010).

Between the year 2000 and 2010 the Cameroon Baptist Convention Health Services (CBCHS), a faith-based organization in Cameroon with funding from the Elizabeth Glaser Paediatric AIDS Foundation (EGPAF), collaborated with the government of Cameroon and established 458 PMTCT sites including prophylactic ARV for mothers and infants. Whilst the utilization of prophylactic ARV for HIV infected pregnant women increased from 37% to 84% during this period, utilization of ARV prophylaxis for HIV exposed infants also increased from 60 infants representing 37% to 3300 infants representing 46% during the period. Some of the challenges that the program faced were infants lost to follow up, frequent changes in infant prophylactic ARV regimen by the government and shortage of prophylactic ARV drugs from the government (Mboh Khan E, 2012).

4- Male Involvement to Improve Acceptability of Prophylactic ARV to Newborns

There are studies to suggest that Male involvement in PMTCT is an important step to improve acceptability of PMTCT services including prophylactic ARV to HIV exposed newborns (Gourlay et al. 2013). This is one of the reasons why many initiatives have been tried to improve spousal disclosure of HIV status and encourage male involvement in PMTCT activities. One of such initiatives is couple counselling at ANC clinics. While Kalembo et al reported success in increasing male involvement in PMTCT in Kenya and Zambia (Kalembo et al, 2011), they did not report the effect of increasing male involvement on utilization of infant prophylactic ARV. A systematic review by Bursamento et al in 2012 did not find evidence to conclude that male involvement increase utilization of PMTCT services. The review found that there was a decline in second antenatal visit after invitation letters were sent to their male partners to involve them in PMTCT visits (Bursamento et al. 2012). The review had a limitation in the sense that they found only one study that met the selection criteria for the systematic review.

There was no study found from Ghana to evaluate male involvement and infant prophylactic ARV but in men dominated cultures in Ghana, male involvement could be important for infant ARV. Mothers who do not want their husbands to know their HIV status for fear of victimization may not send their children for ARV.

5-Use of PMTCT Checklist in Maternity Units

To improve quality of care and ensure that all aspects of PMTCT including ARV for newborns are offered to patients, Gauteng, Mpumalanga and Western Cape districts of South Africa introduced the labour ward checklist for PMTCT. Through the checklist, they made sure that every component of PMTCT is performed and checked before a patient leaves the labour room. The main aim of this initiative is to ensure that all HIV mothers and their newborns receive prophylactic ARV (South Africa Department of Health, 2010). PMTCT program managers believe that the initiative contributed to the improvement of utilization of prophylactic ARV for HIV exposed infants from 60% in 2010 to 84% in 2012 (UNICEF, 2012b; UNICEF, 2013c).

In Ghana, such initiative can help resolve some of the quality of care issues that were found in section 3.7 such as inadequate information about PMTCT to ANC attendants. If a check list is used, service providers may remember to give all the information on the check list. However, they will have to be trained on the use of these check list.

CHAPTER 5: DISCUSSION

After reviewing different aspects of prophylactic antiretroviral therapy to HIV exposed infants for PMTCT in Ghana at chapter 3 and also the best practices in Sub Saharan Africa under chapter 4, this chapter will discuss the findings within the context of the objectives of this review as stated in chapter 2.

Trend of Utilization of Infant Prophylactic ARV for PMTCT and Early Infant Diagnosis

Figure 4 in chapter 3 show that utilization of infant prophylactic ARV for PMTCT was only 14% as at the end of mid-year 2013, an indication that it might not exceed 30% by the end of 2013. Even though there was an increase in utilization of infant prophylactic ARV from 18% in 2011 to an estimated 30% in 2013, the progress is not enough to achieve the 2015 target of 90% in the PMTCT scale up plan. Early infant diagnosis was performed on only 29% of eligible infants.

Factors Influencing Utilization of Infant Prophylactic ARV for PMTCT

The findings show that there are favourable factors to utilization of prophylactic ARVs for HIV exposed infants in Ghana and factors that constitute barriers:

Favourable Factors

The facilitating factors are mostly related to the adoption of policies derived from WHO recommendations, guidelines and protocols and the "free maternal care" policy:

1-Adoption of Provider Initiated Testing and Counselling

The change from voluntary counselling and testing (VCT) to provider initiated testing and counselling otherwise known as "opt out" policy in 2007 is an important step to identify pregnancies that are at risk of MTCT and improve the chances of prophylactic ARVs for the HIV exposed newborns (Topp et al. 2011). However, there are problems with quality of care as found by Dokua Kwapong et al in 2013 such as lack of information to ANC attendants, stigma at health facilities, long waiting time and lack of privacy that need to be addressed.

2-Free Maternal Care Policy

Even though the main aim of this policy is to increase SBA and reduce maternal mortality, it has also contributed to improve utilization of prophylactic ARV for HIV exposed infants. The increase in SBA from 2008 after the introduction of this policy allows these infants who were delivered in health facilities to receive prophylactic ARV.

It is difficult to determine which of these two policies is more important for infant prophylactic ARV because both policies were initiated almost at the same time (2007 and 2008) and there has not been any study to evaluate their effect on newborn prophylactic ARV.

3-Adoption of Option B+

The adoption of option B+ offers an opportunity to rapidly scale up antiretroviral therapy in lower level facilities such as health centres and CHPs centres as demonstrated by many Sub Saharan African countries like Malawi, Kenya, Uganda, (Besada et. al 2012). The lower facilities will therefore be able to request for ARVs for HIV infected mothers and their HIV exposed infants. This will make prophylactic ARV available for these infants who are delivered in health centres and CHPS centres especially in the rural areas.

Two challenges that need to be addressed in order to achieve the maximum benefit of this policy are training of service providers including those at community level health facilities such as CHPS centres and also improvement on supply and distribution of ARV to health facilities at community levels

Factors that Constitute Barriers

The search findings confirm that prophylactic ARV for HIV exposed infants is an important component for PMTCT. However, about 70% of eligible infants in Ghana are not able to utilize this service due to the following barriers:

1-Inability of Service Providers to provide Timely Prophylactic ARV Services to HIV Exposed Infants Who are Not Delivered in Health Facilities.

The findings in chapter 3 show that almost half of pregnant women in Ghana are not attended by skilled birth attendant during delivery. Table 3.2 shows that in certain rural communities SBA is as low as 10%. In my opinion, this is one of the most important factor contributing to the low utilization of infant prophylactic ARV in Ghana because this service is initiated in health facilities within 3 days after delivery. Even though the reports from NACP and GHS does not compare SBA and utilization of infant prophylactic ARV, it is unlikely for infants who are not delivered in health facilities and are not seen by health personnel within 3 days of delivery to receive ARV. This is why the NACP in Ghana will have to consider giving a "take home infant dose" of newborn prophylactic ARV to HIV infected mothers during the third trimester as shown by Reynolds et al in Kenya. The bottle of Nevirapine given to the mother to be given to the infant twice daily will be enough until the next review. The community health nurses, community health workers and midwives who work at CHPS centres conduct outreach visits for ANC in third trimester and PNC as part of their routine schedules and these visits can be used as monitoring visits to women who have been given infant dose of prophylactic ARV. This will enable HIV infected mothers start prophylactic ARV to the newborns on time irrespective of place of birth.

2-Lack of Antiretroviral Therapy at Lower Level Health Facilities

As shown in Table 1 in chapter 3, only 44% of health facilities are providing complete package of PMTCT services including ART and most of these facilities are the tertiary, regional and district hospitals situated in urban areas. It will be difficult for puerperal woman to travel to a higher level facility to access ARV for the newborn considering the difficult travel conditions in the rural areas. This constitutes a real challenge particularly for the nearly 50% of the population that live in rural areas.

It is therefore important that the lowest tier of health care delivery in Ghana (CHPS centres) are empowered to provide complete PMTCT services including prophylactic ARV. Working in the Upper East region of Ghana over the last seven years, my observation is that the CHPS centres are the most accessible health facilities for many people in the rural areas as stated by Awoonor-William. Moreover, the CHPS centres conduct

skilled delivery and there are midwives and community health nurses working in these facilities to offer ARV services.

3-Shortage of Prophylactic Antiretroviral Drugs

The designation of a health facility as ARV site is not enough to guarantee that the services are available. As shown by the review findings in chapter 3, perennial shortage of ARV for newborns in some health facilities are contributing factors for the low utilization of infant prophylactic ARV to prevent mother to child transmission of HIV. Much as the mid-term evaluation report of the GAC attributed this to over dependency on donor funding for the program, experience from service delivery points also indicates that distribution challenges also exist that need to be addressed as explained in chapter 3.

4. Quality of Care and Acceptability of Prophylactic ARV Services to HIV Exposed Infants

Perceived quality of care from the user perspective is fundamental for a target population to accept and demand the services that are being offered to them. Even though there are no published studies specifically on acceptability of prophylactic ARV to HIV exposed infants to prevent MTCT of HIV in Ghana, the acceptability of other services such as HTC at PMTCT level, institutional delivery by skilled birth attendants and PNC, constitute important entry points for infant prophylactic ARV and therefore can be considered as proxy to the acceptability of ARV for newborns. As indicated in chapter 3, lack of information to ANC attendance, attitude of health workers, long working hours and stigma at health facilities are affecting quality of PMTCT and skilled birth thereby limiting utilization of infant prophylactic ARV for PMTCT. The use of labour room check list as a tool for quality care in Mpumalanga and Western Cape districts of South Africa was useful to ensure that ARV for HIV exposed infants has been given before the mother is discharged after delivery.

However, to be able to successfully implement such a tool, the NACP will have to lead in the preparation of the tool and train service providers to accept the tool. If these are done in collaboration with service providers especially nurses, midwives and maternity unit in charges who are the

direct supervisors of work at the units, it may be possible to implement this in Ghana.

5-Long Turnover Time for Early Infant Diagnosis Results

Long turnover time of the results of EID is a challenge for service providers and users as mentioned in the 2013 annual report of the family health division of Ghana health service. This is mainly due to the highly centralized nature of EID laboratories in Ghana. This situation is an indication of the need to improve turnover time of EID by increasing the number EID laboratories in the country so that proportion of HIV exposed infants who receive EID can improve from the current 29% as shown in figure 4. Currently the whole of the three northern regions send samples to Tamale laboratory which is about 179 kilometres from the capital of Upper East and about 300 kilometres from Upper West region. This is why there is long turn over for test results which must be resolve so that service providers will be encouraged to improve follow up and take dry blood spot samples (DBS) for EID.

6- Inadequate Human Resource

The NACP has the opportunity to study the feasibility of using lay counsellors for HIV testing and counselling for PMTCT purpose as was done in Botswana, Zambia and South Africa. The lay counsellor concept has not been used extensively in Ghana. In the midst of human resource challenges for PMTCT, especially in the rural areas, perhaps lay counsellors could be used for testing and counselling to reduce the burden on nurses, midwives and other category of health workers. In the context of Ghana, the staff at CHPS centres can dedicate themselves more to facility based counselling whilst lay counsellors can assist in community level counselling including couple counselling and home visits. This approach will offer counselling services at different levels and different times and may contribute to improve the understanding of HIV infected pregnant women on the main purpose of PMTCT and the importance of prophylactic ARVs for the HIV exposed newborns since lack of information has been identified by Dokua Kwamong and Nyuzaghl as a challenge.

However, the challenges of supervision, conflicts with community health nurses with regards to their scope of work, financial implications of remunerations and sustainability should be carefully considered. Perhaps, such resources could be used to strengthen the CHPS centres so that they

can perform better. All these options should be considered so that a sustainable option can be implemented.

7-Education, Low Spousal Disclosure and Male Participation

The findings of the review show that the level of education in itself is not an influential factor to the uptake of ARV for PMTCT because both mothers who had formal education and those without formal education could understand PMTCT process and its importance if there is good quality counselling services. Therefore addressing language barriers and clear delivery of information is much more important than the level of education for pregnant women to understand and adhere to prophylactic antiretroviral therapy for HIV exposed infants.

Gourlay et al found in their study that spousal disclosure and male involvement increase utilization of PMTCT service including infant prophylactic ARV, however, Brusamento et al. found in their review that male participation in PMTCT reduced utilization of these services. In Ghana, even though spousal disclosure among a group of HIV infected women attending ANC was only 30%, there are no studies yet to evaluate the influence on infant prophylactic ARV. Sending invitation letters to male partners in Ghana to participate in PMTCT could lead to unintended consequence because if women are not comfortable to disclose their HIV status to their spouses, they may chose to "opt out" of the HIV testing and counselling all together.

Reflections on Conceptual Framework

The conceptual framework of David H. Peters that was used in this review served as a guide to explore factors related to policy and macro environment, individual and household characteristics and health care related factors in an orderly manner. The framework was useful because all the factors that were found to influence utilization of infant prophylactic ARV during the review, could be classified under one of the determinants as described in the framework. However the framework gave more clarity on supply side (health system related factors) more than the demand side of utilization of health services.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

The literature review findings and analysis in chapter 3 show that there are several factors that influence the utilization of infant prophylactic antiretroviral therapy to prevent vertical transmission of HIV in Ghana. These factors range from policy and macro environment, individual and household characteristics, as well as geographical accessibility, financial accessibility, availability, acceptability and quality of care. The findings in chapter 4 also show that there are best practices in other Sub Saharan African countries that have been used to address some of the barriers.

This chapter looks at the findings to draw conclusions and make appropriate recommendations to the relevant authorities to address the barriers found.

6.1. Conclusions

The trend of utilization of newborn prophylactic ARV to prevent mother to child transmission of HIV between 2011 and 2013 is way below the targets set by the GAC.

The organizational structure of PMTCT program in Ghana and the working relations among the relevant organizations facilitate integration of newborn prophylactic Antiretroviral therapy and maternal and child health services. However, this advantage has not been fully utilized to extend infant prophylactic ARV to health centres and community health planning and services centres.

The inability of providers of PMTCT services to reach the 45% (national average) of women who are not attended by SBA during delivery constitutes important barrier to utilization of infant prophylactic ARV for PMTCT and needs to be addressed. This figure could be as high as 90% in some rural farming districts such as Akatsi North, Afadzato South and Sene East.

The lack of ARV drugs at some lower level facilities (CHPS centres and health centres) and the occasional shortage of the drugs in facilities who normally provide ARV therapy deny timely prophylactic ARV to HIV exposed infants who are delivered in these facilities.

The long turnover time for virological results for Early infant diagnosis (EID) is a disincentive to good follow up of infants on prophylactic ARV to prevent MTCT of HIV.

There is low spousal disclosure and male involvement in PMTC that could reduce utilization of infant prophylactic ARV.

There are best practices such as infant take home dose of ARV and use of check list at maternity units that have been used in other Sub Saharan Africa countries to address some of the barriers.

6.2. Recommendations

The NACP in collaboration with service providers should explore the feasibility of giving "infant take home dose" of ARV to HIV infected pregnant women in at the third trimester so that they can start infant prophylactic ARV on time irrespective of where they give birth. This will give opportunity to the HIV infected mothers among the 45% of women who were not attended by skilled birth attendants to give prophylactic ARV to their babies. This can also be done at community level during outreach ANC services by community health nurses.

With the adoption of "option B+", the NACP in collaboration with GHS and other service providers should rapidly scale up ART service to the lower level health facilities (CHPS and health centres) prioritising those that are conducting deliveries and are far away from district and regional hospitals. This will enable HIV infected mothers who deliver in these facilities access prophylactic ARV for the infants in a timely manner.

There is urgent need for more early infant diagnostic facilities in the regions that are far away from diagnostic centres such as Upper East and Upper West to encourage service providers to improve follow up of HIV exposed infants for EID.

Further research should be conducted into alternative ways to increase spousal disclosure and male involvement in PMTCT in Ghana as well as the feasibility of using lay counsellors.

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ANNEXES 1

Fig. 8



Map of Ghana that shows the mayor cities.

Annex 2

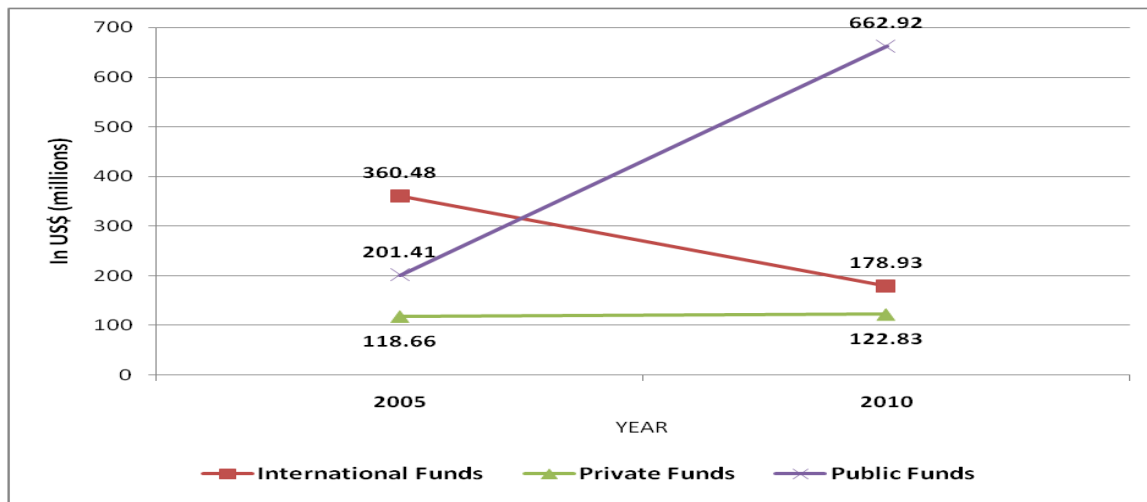
Table: 3

Timing Transmission	Rate
During pregnancy	5–10%
During labour and delivery	10–15%
During breastfeeding	5–20%
Overall without breastfeeding	15–25%
Overall with breastfeeding to 6 months	20–35%
Overall with breastfeeding to 18 to 24 months	30–45%

Probability of vertical transmission of HIV at different stages in the absence of PMTCT, (UNICEF, 2013a).

Annex 3

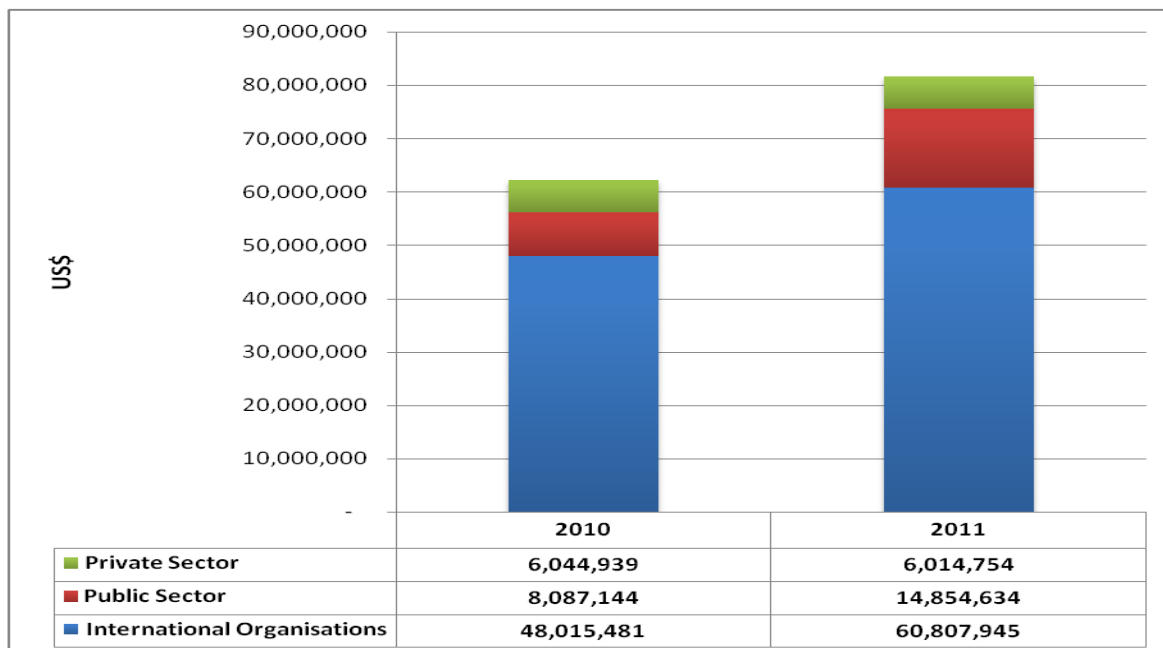
Fig. 9



Sources of funding for the health sector in Ghana between 2005 and 2010 (GAC, 2014)

Annex 4

Fig. 10



Sources of funding for HIV control program in Ghana for 2010 and 2011 (GAC, 2014)

Annex 5

Box 1.

Options of ARV	Treatment (for CD4 count < 350 cells/mm ³)	Prophylaxis (for CD4 count > 350 cells/mm ³)	Infant receives
Option A	Triple ARVs starting as soon as diagnosed, <i>continued for life</i>	<i>Antepartum</i> : AZT starting as early as 14 weeks gestation <i>Intrapartum</i> : at onset of labour, single-dose NVP and first dose of AZT/3TC <i>Postpartum</i> : daily AZT/3TC through 7 days postpartum	Daily NVP from birth until 1 week after cessation of all breastfeeding; or, if not breastfeeding or if mother is on treatment, through age 4–6 weeks
Option B	Triple ARVs starting as soon as diagnosed, <i>continued for life</i>	Triple ARVs starting as early as 14 weeks gestation and <i>continued intrapartum and through childbirth if not breastfeeding or until 1 week after cessation of all breastfeeding</i>	Daily NVP or AZT from birth through age 4–6 weeks regardless of infant feeding method
Option B+	Triple ARVs starting as soon as diagnosed, <i>continued for life</i>	Triple ARVs starting as soon as diagnosed, <i>continued for life</i>	Daily NVP or AZT from birth through age 4–6 weeks regardless of infant feeding method

WHO recommended options for ARV for PMTCT purposes (UNICEF, 2012).

