Distribution Agreement

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

Signature:

______________________________ ______________

Andrina M. Mwansambo Date

Moving From Single Dose Nevirapine to Option B+: Big Leap Towards Elimination of Mother To Child Transmission of HIV for Malawi?

By

Andrina M. Mwansambo
Master of Public Health

Hubert Department of Global Health

____

Deborah A. McFarland PhD, MPH

(Committee Chair)

Moving From Single Dose Nevirapine to Option B+: Big Leap Towards Elimination of Mother To Child Transmission of HIV for Malawi?

By

Andrina M. Mwansambo

Bachelor of Medicine Bachelor of Surgery (MBBS)
Malawi College of Medicine
1996

Thesis Committee Chair: Deborah A. McFarland PhD, MPH

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in the Hubert Department of Global Health

2015

Abstract

Moving From Single Dose Niverapine to Option B+: Big Leap Towards Elimination of Mother To Child Transmission of HIV for Malawi
By
Andrina M. Mwansambo

Background
Malawi officially launched its National Prevention of Mother to Child Transmission (PMTCT) of HIV programme in 2003 and used single dose Niverapine as the antiretroviral (ARV) drug given to HIV positive pregnant women and their live birth infants until 2008 when a duo combination of Zidovudine and Lamivudine was used. In July 2011, Malawi adopted a novel approach to the implementation of PMTCT called Option B+ in which pregnant women and lactating mothers who are found HIV+ are initiated on antiretroviral therapy (ART) for life regardless of their CD4 count. This approach is aimed at eliminating the vertical transmission of HIV through MTCT of HIV.

Aims of the Study
The purpose of the study was to assess progress made in implementation of Option B+ in Malawi and to understand the factors which hamper the utilization of the service. The objectives of the study were: 1) to determine trends in PMTCT utilization among pregnant women attending ANC services in Malawi from 2010-2014, a period that encompasses pre Option B+ (1 year) and post-Option B+ implementation; 2) to focus on Mchinji District in central Malawi as an example of district level implementation; and 3) to identify social, behavioural, financial and cultural factors hampering utilization of PMTCT services and uptake of Option B+ in Malawi.

Method
National level PMTCT program data and district specific PMTCT program data for Mchinji was analyzed to determine trends in utilization of PMTCT services and uptake of Option B+. Key national and international documents and relevant peer-reviewed studies conducted during the same period were reviewed to identify factors hampering implementation of PMTCT services and uptake of Option B+ in Malawi.

Results
This study has generally shown that Malawi has made progress in the delivery of Option B+. The implementation of Option B+ has led to a significant increase in the number of pregnant and lactating women on ART both at national level as well as in Mchinji district, up to a seven fold increase in the number of women starting ART for PMTCT in the first year of the programme alone. The programme has also led to the low numbers of children now being born HIV+. However, Option B+ still faces a challenge of high default rates in its Early Infant Diagnosis (EID) program coupled with lower retention of women on Option B+ at 12 months and 24 months than expected.

Conclusion
While results do demonstrate that good progress has been made in the implementation of Option B+ in Malawi, the results also demonstrate that there are still some challenges that need to be addressed as not all HIV+ pregnant and lactating mothers and their children are reached with this service. The eMTCT plan for Malawi expires September 2015, this provides an opportunity to focus the PTMCT program and the Option B+ strategy on specific challenges that will be necessary for the program goals to be achieved.

Moving From Single Dose Nevirapine to Option B+: Big Leap Towards Elimination of Mother To Child Transmission of HIV for Malawi?

By

Andrina M. Mwansambo

Bachelor of Medicine Bachelor of Surgery (MBBS)
Malawi College of Medicine
1996

Thesis Committee Chair: Deborah A. McFarland PhD, MPH

A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of

Master of Public Health
in the Hubert Department of Global Health

2015

Acknowledgements

First and foremost, I would like to thank God for making it possible to complete and submit my thesis despite so many challenges encountered. Whenever I felt, I could not go on; you gave me hope and strength. This thesis is dedicated to you. May glory be to you forever and ever.

Secondly, I owe my special thanks to my husband, Charles, for his patience and moral support and to my 3 lovely kids: Pemphero, my daughter; Charles Junior and Comfort, my sons, for their patience and understanding for being away from home to study

Thirdly, my sincere thanks go to my parents, Mr. and Mrs. Mazingaliwa, for their untiring moral support and prayers. Thank you for everything you have done in my life to get me where I am.

With heartfelt appreciation, I would like to acknowledge in a special way, my thesis advisor and mentor Professor Deborah McFarland for standing by me during my most challenging moments and for guiding and assisting me throughout this process. My ADAP, Theresa Nash, thank you for your patience and understanding to see me through.

I would like also to acknowledge MOH for providing national level data and Mchinji District Health Office for providing district level data for my study.

Lastly but not least, my special thanks go to Dr. William H. Foege and all members of the Foege Fellowship management for awarding me this opportunity.

May the Almighty God bless you all.

Table of Contents

1.0 Introduction 1

2.0 Background Information on Malawi and its Responses to the HIV Epidemic 5

2.1 Geographical, Political and Administrative Structure 5
2.2 Socio –Demographic and Economic Situation 6
2.3 HIV and Socio-economic Characteristics 6
2.4 Health Care Delivery System 9
2.5 Elimination of Mother to Child Transmission of HIV Program (EMTCT) 15
2.6 The Delivery of Option B+ Services in Malawi 16

3.0 Problem Statement and Objectives 19

3.1 Problem statement 19
3.2.1 General Objective 21
The general objective of this study was to identify factors influencing utilization of PMTCT services in Malawi from 2010-2014. 21
3.2.2 Specific Objectives: 21

4.0 Methodology 21

5.0 Results 23

Objective 1: To assess trends in PMTCT utilization among pregnant women attending ANC services in Malawi from 2010-2014, a period that encompasses pre Option B+ (1 year) and post-Option B+ implementation and to concentrate on Mchinji District in central Malawi as an example. 23
5.1 HIV testing and counselling among pregnant women 23
5.2 Access to Option B+ 29
5.3 Trends in ARV coverage in Malawi 31
Objective 2: To identify social, behavioral, financial and cultural factors hampering utilization of PMTCT services and uptake of Option B+ in Malawi 35
5.4 Social, Behavioral, Financial and Cultural Factors affecting implementation of the Option B+ program in Malawi 35

6.0 Discussion 41

7.0 Conclusion and Recommendations 44

References 48

Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
ART	Anti-Retroviral Therapy
ARV	Anti-Retroviral
CHAM	Christian Health Association in Malawi
DHO	District Health Office
EID	Early Infant Diagnosis
eMTCT	Elimination of Mother to Child Transmission
GDP	Gross Domestic Product
HIV	Human Immunodeficiency Virus
HSA	Health Surveillance Assistant
HSSP	Health Sector Strategic Plan
HTC	HIV Testing and Counseling
MDG	Millennium Development Goals
MoH	Ministry of Health
MTCT	Mother to Child Transmission
NAC	National AIDS Commission

NSO	National Statistical Office
PLHIV	People Living with HIV
PMTCT	Prevention of Mother to Child Transmission
RMNCH	Reproductive Maternal Neonatal Child Health
SADC	Southern African Development Community
SLA	Service Level Agreement
TBA	Traditional Birth Attendant
UNAIDS	Joint United Nations Program on AIDS
VMMC	Voluntary Medical Male Circumcision
WHO	World Health Organization

1.0 Introduction

Since the first HIV case was diagnosed in Malawi in 1985, the country continues to suffer a serious generalized epidemic affecting all sectors of society. The HIV prevalence among adults aged 15 – 49 years reached its peak of 16.4% in 1999 but has declined steadily since then, reaching 12.0% in 2004 and 10.6 % in 2010 (National Statistical Office, 2011). The Malawi Demographic and Health Survey (MDHS) is used to determine HIV prevalence among other things. The last MDHS was conducted in 2010 and one such survey is being planned for 2015. HIV prevalence varies considerably by gender, age, and socioeconomic characteristics. HIV prevalence in the 15–49 years age group is higher among women (12.9%) than men (8%). The largest disparity is in the 15–19 years age group where 3.7% of adolescent girls and 0.4% of adolescent boys are HIV positive (NSO 2011).

It is estimated that in 2014 there were 1,100,000 Malawians living with HIV and that 34,000 new infections occurred in 2014, including 7,400 amongst children aged less than 14 years. The new HIV infections in 2014 represent a significant decline from about 66,000 new infections in 2012. There were an estimated 48,000 AIDS-related deaths in 2014 in Malawi and this represented a 50% reduction from an estimated 99,000 deaths reported in 2004. The reduction in the number of AIDS-related deaths has been attributed to increased coverage of antiretroviral therapy (ART) in Malawi (National AIDS Commission, 2015).

The global 90-90-90 initiative says that by 2020, 90% of all people living with HIV will know their HIV status, 90% of all people with diagnosed HIV infection will receive sustained ART and 90% of all people receiving ART will have viral suppression (UNAIDS, 2014).

In line with the global 90-90-90 initiative, Malawi has developed the National HIV Strategic Plan (NSP) for the period 2015-2020 which, among other things, focuses on zero new HIV infections by 2030. The implementation of the Prevention of Mother to Child Transmission (PMTCT) of HIV programs is one way of achieving this ambitious global target to which Malawi has subscribed. Since it was discovered in the 1980s, HIV infection has become a global epidemic. In 2013 there were 35.5 million people in the world who were living with HIV. This represented an increase from previous years as more people are receiving ART. Zidovudine was the first antiretroviral (ARV) drug to be approved for use in patients with advanced HIV in 1987 (Stefano et al., 2012). There were 2.1 million new HIV infections globally in 2013, a 38% decline in the number of new infections from 3.4 million new HIV infections in 2001. There were 240,000 new cases of HIV among children globally in 2013, a 58% decrease since 2001 (UNAIDS, 2014). WHO first issued recommendations for the use of ARV drugs for PMTCT in 2000 (WHO, 2007). The implementation of PMTCT programs has significantly contributed to the reduction of HIV transmission from mothers to their children (UNAIDS, 2014). At the same time the number of AIDS deaths has also been declining with 1.5 million AIDS deaths in 2013 from 2.3 million in 2005 (UNAIDS, 2014). The implementation of the ART program has contributed to the reduction in the number of AIDS related deaths globally.

About 25 million of the 35 million people living with HIV (PLHIV) are in Sub-Saharan Africa. The Southern Africa sub-region, in particular, experiences the most severe HIV epidemics in the world. In this region HIV is mainly transmitted through heterosexual contacts and this is seconded by mother to child transmission of HIV (MTCT). Twelve member states are considered to have a generalized epidemic where the HIV prevalence is well over 1% among pregnant women. Nine countries - Botswana, Lesotho, Malawi, Mozambique, Namibia, South

Africa, Swaziland, Zambia and Zimbabwe - have HIV prevalence rates of over 10 per cent among adults (Table 1).

TABLE 1: HIV PREVALENCE SADC MEMBER STATES

Country	**HIV Prevalence (2013)**
Swaziland	27.4
Botswana	21.9
Malawi	10.3
Zambia	12.5
Mozambique	10.8
Namibia	14.3
South Africa	19.1
Zimbabwe	15.0
Mauritius	1.3
Lesotho	22.9
Angola	2.4
Tanzania	5.0
DRC	1.1
Madagascar	0.4

(Source: UNAIDS, 2014 Page A09)

As shown in Table 1, Swaziland has the highest HIV prevalence in Southern Africa at 27.4% followed by Lesotho (22.9%) and Botswana (21.9%). While South Africa has lower prevalence (19.1%) it still has the largest HIV epidemic in the world (UNAIDS, 2014). In contrast, Madagascar has low level concentrated epidemics with the HIV prevalence in the adult population being less than 1% while Mauritius has an HIV prevalence of 1.3%. In these 2 countries the heterosexual transmission of HIV is low. In Mauritius, prevalence among prisoners, sex workers and injecting drug users has been estimated to be 15 to 25%. In this country the sharing of needles and inconsistent condom use in high-risk groups are key drivers of the epidemic (SADC, 2009).

Despite the high prevalence of HIV in the Southern African region, efforts to respond to the HIV epidemic in the last 10 years have borne some fruit. UNAIDS reports increased access to ARVs, declines in AIDS related deaths and decreases in mother to child transmission (MTCT) of HIV in all countries in the region. UNAIDS further reports significant decreases in HIV infections (UNAIDS, 2013). In terms of ARV coverage Botswana, Swaziland and Zambia achieved more than 80% coverage by 2011 while Zimbabwe, Malawi and South Africa achieved more than 60%. Countries in the region with less than 60% coverage include Angola, Lesotho, Madagascar, Mauritius and the United Republic of Tanzania. HIV infections among children and adults aged 15-49 years declined by 50% and 33%, respectively, between 2001 and 2011 in the region. Botswana, Malawi, Namibia, Zambia and Zimbabwe reported more than 50% reduction of new infections among adults (UNAIDS, 2013). HIV vulnerability among young women aged 15-24 years in the region is still a challenge.

Southern African countries, including Malawi, are implementing HIV prevention interventions such as HIV testing and counselling (HTC), the promotion of condom use, voluntary medical male circumcision (VMMC) and the prevention of MTCT of HIV. The PMTCT of HIV involves the provision of ARVs to pregnant and lactating women which reduces the transmission of HIV from mother to child. Malawi has been implementing PMTCT programs since 2002 and in July 2011 Malawi became the first country in the world to implement Option B+ in which pregnant women who are diagnosed HIV positive are put on ART for the rest of their lives. This thesis explores Malawi's progress in the implementation of Option B+ including the impact of this intervention and the challenges being experienced.

2.0 Background Information on Malawi and its responses to the HIV epidemic

2.1 Geographical, Political and Administrative Structure

Malawi is a landlocked country and lies along the Great African Rift Valley. It shares boundaries with Mozambique in the east, south and south west; Zambia in the west and Tanzania in the north and north east. The country is 901 km long, 80 to 161 km wide and has a total surface area of 118,484 sq km. One fifth of the country is covered by Africa's third largest lake, Lake Malawi. Figure 1 below shows the map of Malawi.

FIGURE 1: MAP OF MALAWI

(SOURCE: HTTP://WWW.NATIONSONLINE.ORG)

Malawi became a one party state soon after independence in 1964. In 1994 it adopted a multi-party system of government after a referendum which demonstrated that Malawians

aspired for political pluralism. The President is the head of state and government and he appoints his cabinet. Legislative powers are vested in both the government and the National Assembly. The judiciary is independent of the Executive and the Legislature. Malawi is divided into 3 regions (namely the northern, central and southern regions) and 28 administrative districts. Lilongwe is the capital city of Malawi and is located in the central region.

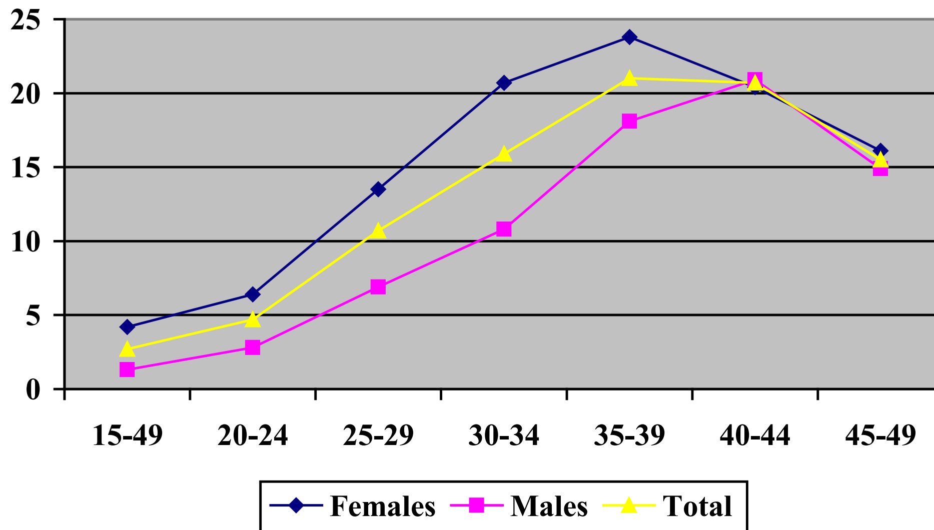
2.2 Socio –Demographic and Economic Situation

Malawi has a population of 15.9 million people (NSO, 2011). At 139 persons per square kilometer, Malawi is one of the most densely populated countries in Africa. Most (84.3%) people in Malawi live in rural areas, and about half (51.5%) are aged between 15 and 64 years. The median age in Malawi is estimated at 17 years (UNFPA Malawi, undated). An estimated 50.7% of Malawians live below the poverty line (NSO, 2012). The prevalence of poverty in Malawi is higher in rural (57%) than in urban areas at 17% (NSO, 2012). Malawi's economy is agro-based with 30% of its Gross Domestic Product (GDP) contributed by agricultural products (NSO, 2010). In 2012, expenditure for health was 9.2% of the GDP, US$83 per capita (WHO 2014). This represents funds from all sources including from development partners.

2.3 HIV and socio-economic characteristics

Malawi's HIV prevalence, as mentioned earlier, is estimated at 10.3% among persons aged 15-49. HIV prevalence is higher among females (12.9%) than males (8%). Figure 2 below shows HIV prevalence by aged group.

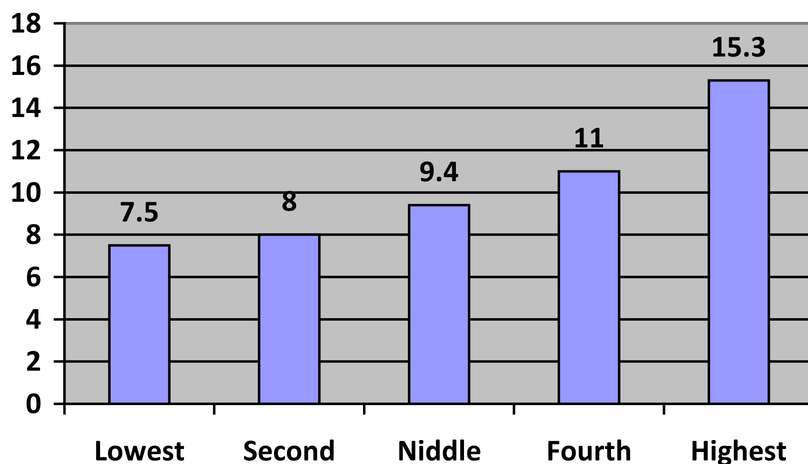
FIGURE 2: HIV PREVALENCE BY AGE GROUP AND SEX



(Source: NSO, 2011)

In all age groups HIV prevalence is higher among females than males with an exception of those aged 40-44. In general HIV prevalence is higher in urban areas at 17.4% compared to rural areas at 8.9%. The Southern Region has the highest prevalence of HIV in Malawi at 14.5% and this is followed by the central region at 7.6% and then the northern region at 6.6%. Figure 3 below shows that HIV increases with economic status.

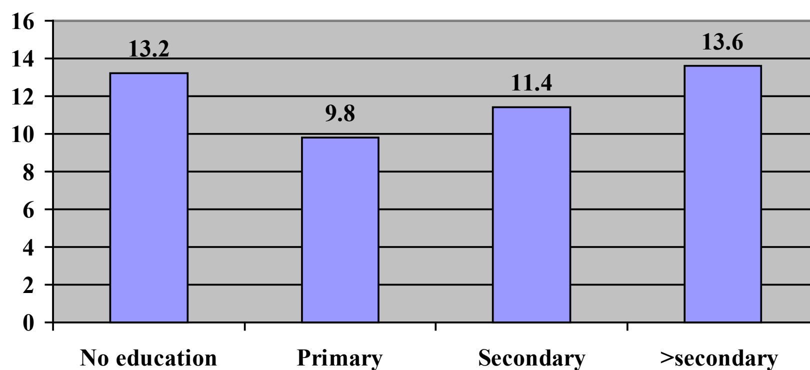
FIGURE 3: HIV PREVALENCE BY ECONOMIC STATUS



(SOURCE: NSO, 2011)

Figure 3 above shows that HIV prevalence increases the higher the socio-economic status. Figure 4 below shows the prevalence of HIV by educational attainment.

FIGURE 4: HIV PREVALENCE BY EDUCATIONAL ATTAINMENT



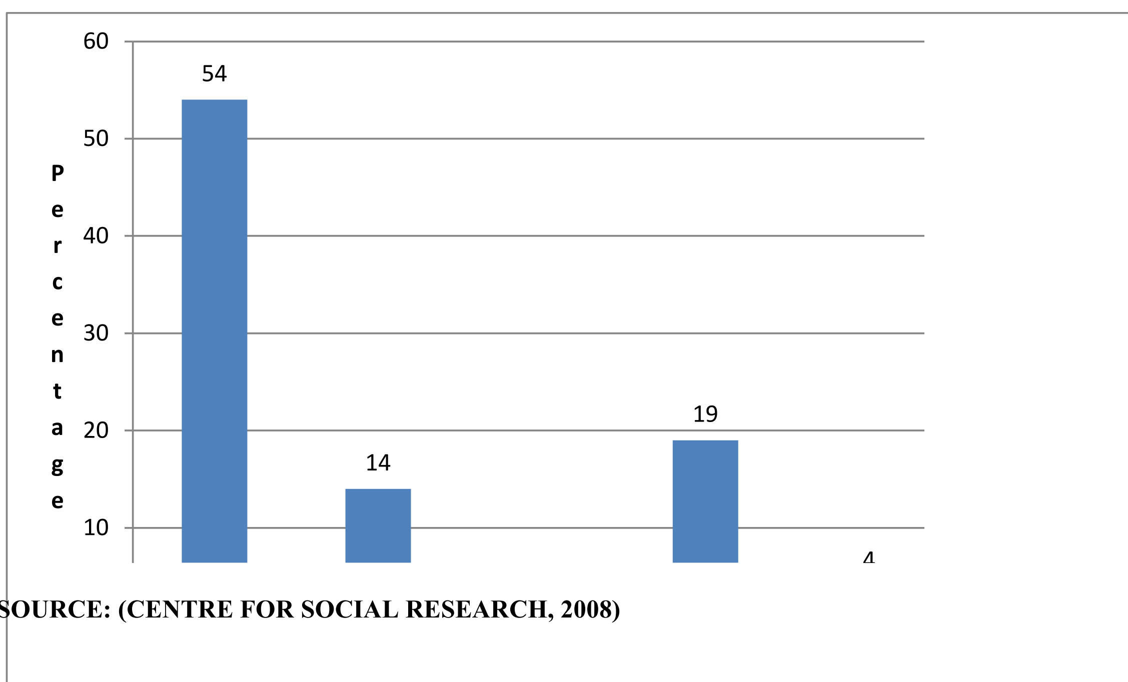
(SOURCE: NSO, 2011)

The prevalence of HIV among those with no education is at 13.2%. For those who have ever gone to school the prevalence of HIV increases the higher the educational level (NSO, 2011). The 2004 MDHS also showed that HIV prevalence increases the higher the socio-economic status and the higher the educational level (NSO, 2005).

2.4 Health Care Delivery System

The delivery of health services in Malawi is conducted by both the public and the private sectors. A 2008 survey found that there are 1,059 health facilities in Malawi with the Ministry of Health (MoH) owning 54% of these facilities as can be seen in Figure 5 below.

FIGURE 5: OWNERSHIP OF HEALTH FACILITIES IN MALAWI



SOURCE: (CENTRE FOR SOCIAL RESEARCH, 2008)

In terms of ownership of health facilities, the MoH is followed by the private for profit sector at 19%. The Christian Health Association of Malawi (CHAM) owns 14% of health

facilities (Centre for Social Research, 2008). Table 2 below shows the distribution of health facilities by level of care and ownership.

TABLE 2: DISTRIBUTION OF HEALTH FACILITIES BY LEVEL OF CARE AND OWNERSHIP, MALAWI

Level of health care	**Ownership of health facility**						
	Government	**CHAM**	**NGO**	**Private**	**Statutory**	**Company**	**Total**
Primary	84.7	69.3	57.1	93.8	69.6	100.0	82.5
Secondary	9.9	24.7	1.4	2.4	0.0	0.0	9.5
Tertiary	1.0	0.6	0.0	0.0	0.0	0.0	0.6
Other	4.5	5.4	41.4	3.8	30.4	0.0	7.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(SOURCE: CENTRE FOR SOCIAL RESEARCH, 2007)

Among facilities which are run by Government, Table 2 shows that 84.7% provide primary care, 9.9% provide secondary care, 1% provide tertiary care while 4.5% were administration, project offices and training institutions. Nearly 70% of the health facilities owned by CHAM were primary facilities while about a quarter (24.7%) was secondary facilities. For NGOs 57.1% of the facilities were primary health care facilities while 41% were either HIV testing and counselling (HTC) sites or were providing home-based care services to patients. Most of the facilities owned by private sector, statutory corporations and companies are primary health care facilities. A comprehensive network of health facilities therefore exist which provide a wide range of services

including HIV and related services. By the end of December, 2014 there were 706 static sites offering HIV and ART services (National AIDS Commission, 2015).

Traditional birth attendants (TBAs) still play an important role in the delivery of alternative health care in Malawi. This is illustrated by the fact that in 2010 14% of the pregnant women delivered with the assistance of TBAs (NSO, 2011). In 1987 the Government of Malawi through the MoH banned TBAs from conducting deliveries and instead they are supposed to refer pregnant women to health facilities. While this is the case a significant proportion of pregnant women still deliver with assistance of TBAs. The continued use of TBAs has implications on the PMTCT program. Since TBAs assist pregnant women in their homes, access to ART for HIV+ pregnant women to prevent HIV transmission to their babies remains a major challenge.

CHAM is a network of health facilities owned by churches in Malawi and is a major partner of the MoH in the delivery of health services. Unlike the MoH which provides free health services, CHAM provides services at a fee. Most of the CHAM facilities are located in rural areas. In the majority of cases the catchment areas of CHAM and MoH facilities do not overlap. Knowing that the majority of Malawians are poor and hence cannot afford to pay for services at CHAM facilities, the Government of Malawi introduced service level agreements (SLAs) with CHAM facilities. These SLAs were introduced in 2004 during the implementation of the Program of Work[1] (2004-2010) for Malawi's Health sector (Ministry of Health, 2004). These SLAs allow patients to access certain services at CHAM facilities for free e.g. Reproductive, Maternal Newborn and Child Health (RMNCH) including PMTCT services, HIV, and Tuberculosis services. The MoH then pays for these services (Ministry of Health, 2011). A

[1] This was Malawi's health sector strategic plan for the period 2004-2010.

number of studies (Gama, 2013) have shown that the introduction of SLAs has increased access to maternal and child health including accessing PMTCT services for pregnant women.

The delivery of health services in Malawi occurs at 3 levels of health care and these are primary, secondary and tertiary levels of care. These levels are linked to each other through a referral system. This referral system is not specific to the ownership of health facilities: a CHAM facility can refer cases to a government facility at a higher level. While the referral system is supposed to be followed, this is not always the case as it is not strange for patients to jump levels of health care. Government has in some cases charged a fee if a patient went to a central hospital without a referral letter from a lower level facility (Ministry of Health, 2011). The different levels of health care provide different levels of curative, preventive and other supportive interventions. The primary level consists of all health interventions including health posts and health centres. Health surveillance assistants (HSAs) are the lowest provider cadre in the MoH; they are based at community level and report to a health facility. These HSAs are a link between the community and the health facility. They also provide primary level of health care at community as well as at health facility level. District hospitals and CHAM hospitals constitute the secondary level of care. Central hospitals and specialized hospitals such as mental hospitals constitute the tertiary level of health care. In total there are 4 central hospitals - Mzuzu hospital in the north, Kamuzu hospital in the centre, Queen Elizabeth hospital in the south and Zomba hospital in the south east (Ministry of Health, 2011). These tertiary health facilities provide specialized health care services.

One of the major challenges in Malawi's health system is the gross shortage of human resources for health (HRH) at all levels of the health care system as can be seen in Table 3 below.

Table 3: Summary of established vs filled positions in the MoH

Service description	Established Posts	Filled Posts	Vacancy rate (%)
Planning and policy development	626	76	88
Preventive health services	7,553	5,136	32
Nursing	13,669	3,545	74
Pharmacy	545	161	70
Allied Health Technical Services	1,143	381	67
Allied Health Services – Clinical Officers	4,491	1,643	63
Medical specialists	228	32	86
Medical officers	344	168	51
Internal audit services	16	7	56
Accounting services	421	315	25
Administration services	6,732	4,261	37
TOTAL FOR ALL SERVICES	42,309	20,365	52

(Source: Ministry of Health, 2012)

Table 3 above shows vacancy rates are for established positions in the MoH: 52% of all established positions are vacant. Vacancy rate in this context refers to the proportion of established positions which have not been filled. There are certain cadres in the MoH which are heavily affected for example medical specialists and personnel in the planning and policy development section of the ministry where vacancy rates are above 80%. These are followed by nursing and pharmacy professions where vacancy rates are 74% and 70%, respectively and then clinical officers at 63%. It is clear from Table 3 that there is critical shortage of staff which adversely affects the delivery of health services including HIV and related services.

More than 80% of the people in Malawi live in rural areas. While this is the case, the majority of the health workers, however, work in urban areas. For example 77% of the general medical practitioners and 71% of persons in the nursing profession work in urban areas. The scenario is the same in most of the cadres in the Malawi's health sector with an exception of the health surveillance assistants among whom only 21% are in the urban areas (Ministry of Health,

2011). This demonstrates that there are disparities in the distribution of the health workforce in Malawi with a greater concentration of health workers working in the health facilities located in urban areas. The shortage of health workers is exacerbated by the HIV/AIDS pandemic and increased burdens of diseases such as malaria and tuberculosis.

It is evident that many established positions in the health sector remain unfilled. A 2002 study demonstrated that the high attrition rate in the Ministry of Health in Malawi was due to deaths and that a good proportion of these deaths were due to HIV (Malawi Institute of Management, 2002). Staggering demands have been placed on human resources for health by the HIV and AIDS epidemic. For example the number of people on ART is now about half a million people, nearly 2 million Malawians are tested each year and the implementation of voluntary medical male circumcision as an HIV prevention intervention is being scaled up. Studies (Tawfik and Kinoti, 2006) have demonstrated that the HIV epidemic has increased the workload of health workers. For example, in Malawi not doctors alone deliver the basic care package for people living with HIV. Instead, the package is also delivered by less specialized professionals, often called clinical officers, and by nurses supported by nursing assistants, community health workers and people living with HIV (WHO, 2007). Task shifting within the context of HIV services delivery has not only been done in Malawi but also in other Sub-Saharan African countries (Zachariah et. al, 2008). Malawi's Health Sector Strategic Plan (HSSP) has identified a number of interventions which are being implemented in order to address the key human resources challenges being experienced in Malawi. These strategies include increasing the capacity of health training institutions, implementing strategies for retention of HRH especially in hard to reach geographical locations and the implementation of a salary top-up for key cadres in the health sector (Ministry of Health, 2011).

2.5 Elimination of Mother to Child Transmission of HIV Program (EMTCT)

At a global level with leadership from UNAIDS, a Global Plan for the elimination of new HIV infections among children by 2015 and keeping their mothers alive was launched as part of the 2011 Political Declaration on AIDS. This Plan focuses on 22 countries which account for nearly 90% of all HIV positive pregnant women in low and medium income countries. This Plan has 4 key programmatic components: (i) preventing new infections among women of the reproductive age group; (ii) helping women living with HIV avoid unintended pregnancies; (iii) ensuring that women have access to HIV testing and counseling and that those who test positive have access to antiretroviral medicines to prevent transmission during pregnancy, delivery and breastfeeding; and (iv) providing HIV care, treatment and support for women, children living with HIV and their families (UNAIDS, 2012). This thesis focuses on key programmatic area (iii). In 2012 Malawi developed the National Plan for the Elimination of Mother to Child Transmission (eMTCT) of HIV and this was modelled after the Global Plan, i.e., it has the same 4 key programmatic components as contained in the Global Plan. The Malawi plan focuses on strengthening service delivery, prevention of HIV among young people, family planning, PMTCT, ART and Early Infant Diagnosis (EID). The National Plan for the Elimination of Mother to Child Transmission of HIV expires in 2015 (Ministry of Health, 2012). For key programmatic area (iii) Malawi promotes HIV testing and counselling (HTC) among pregnant women and those who are found HIV+ are put on lifelong ART regardless of CD4 count or WHO clinical staging criteria in order to prevent HIV transmission to their children. This is what is called Option B+. At the beginning of the PMTCT program, ART was being given to pregnant women for life only for those who qualified based on CD4 count or WHO clinical staging. For those who did not qualify they were given ART as early as 14 weeks of gestation up to 7 days

postpartum. This approach to PMTCT is known as Option A. On the other hand Option B implies that pregnant women are given lifelong ART only for those women who are eligible and again based on clinical staging and CD4 count. Under this option for those who are not eligible they are given ART only up to the time they stop breastfeeding the child (UNICEF, 2012). Malawi made a decision in 2011 to implement PMTCT program using the Option B+ approach because of inadequate CD4 testing capacity and because of the high fertility rate among Malawian women.

2.6 The delivery of Option B+ services in Malawi

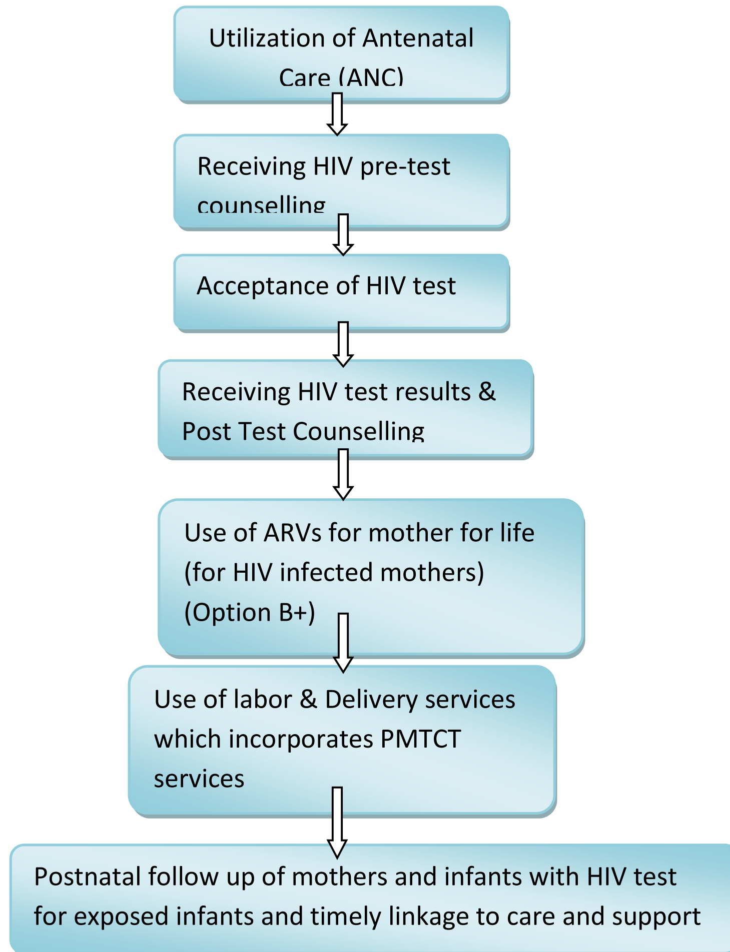
The implementation of antenatal care (ANC) interventions has a significant impact on maternal health outcomes. ANC constitutes a key entry point for pregnant women to receive a wide range of health promotion and preventive health services (Maternal and Child Health Division, 2007). In Malawi, ANC services are provided by Ministry of Health, CHAM and private clinics. ANC attendance among pregnant women in Malawi is high; the 2014 Millennium Development Goal Endline Survey for Malawi estimated that 96% of women aged 15-49 with a live birth in the last 2 years were seen by skilled health personnel during their last pregnancies and 87% of births were attended by a skilled attendant (NSO, 2015). In 2004, 95% of women attended at least one ANC visit during their pregnancy, and 57% of women attending four or more visits. In 2010 this increased to 97% (NSO 2015).

In 2003, Malawi adopted the WHO's recommended ANC approach known as Focused Antenatal Clinics (Banda, 2013) which has been described as ideal for implementation in developing countries. This approach to ANC delivery focuses on reducing the number of ANC visits to 4 and providing focused services such as examining existing health conditions, detecting emerging complications, promoting health, preparing for a healthy birth and educating clients on

postpartum care (Population Council, 2008). HIV testing and counselling and the provision of ART for women who are found HIV+ constitute some of the services that are offered during ANCs.

Figure 5 below shows the PMTCT cascade which outlines the process a pregnant woman follows to prevent vertical transmission of HIV to her baby. The provision of Option B+ aims at preventing the vertical transmission of HIV to their unborn babies. The cascade starts with a pregnant woman seeking antenatal care (ANC). Before she receives any ANC services she joins other women for public health talks which among other issues highlight the importance of HTC services and that for those who are found HIV+ they are supposed to take ART for the rest of their lives. During the initial ANC visit, the woman is given the opportunity to undergo HIV testing and counseling, receive the results and start ART if she is found to be HIV+. In order for ART to be effective the pregnant woman must adhere to treatment which in this cases entails taking one ART tablet once every day. The woman continues taking ART even after the child is born and she does this for the rest of her life. Once the baby is born, he or she is supposed to also undergo timed HIV testing and if the child is HIV+, the child receives appropriate HIV care and treatment services. The Antenatal Care (ANC) serves as an entry point to identify HIV positive pregnant women.

Figure 5: The PMTCT cascade



(Source: Kim et al, JAIDS, 15(Suppl 2:17389) modified by author's personal experience and observation

As mentioned above women are supposed to stick to treatment as mentioned in the cascade. If a pregnant woman refuses to start taking ART after being found HIV or she stops taking ART before delivery this can result in failure to get the needed treatment to mothers and the prevention of their infants from acquiring HIV. Loss (attrition) at any point in the cascade can be seen as a system inefficiency that will have an effect on program impact, reducing overall

coverage, and leading to more infants getting infected. This explains why a health facility keeps a register of all pregnant women who are found HIV positive and if they do not show up they are followed into their respective communities and asked why they are not getting to the health facility to access ART. HSAs, described earlier as the lowest cadre rank in the Ministry of Health, and community health nurses are key in tracing women who have defaulted and ensuring that they continue accessing services through ANCs. It is therefore important to understand the delivery and uptake of Option B+ interventions in Malawi. The above cascade shows the different steps which pregnant women undergo when they are found HIV+.

3.0 Problem Statement and objectives

3.1 Problem statement

Vertical transmission, otherwise known as Mother-to-Child Transmission (MTCT), is the main source of HIV infection in children. An estimated 90% of children acquire HIV infection during pregnancy, labor and delivery or through breastfeeding (UNAIDS, 2004). Approximately 50% of these children will die before their second birthday. In the absence of any interventions the rate of MTCT of HIV in developing countries including Malawi is estimated to be 25-35 %. Of the one million people estimated to be living with HIV in Malawi, 10% are children (National AIDS Commission, 2014). The PMTCT of HIV is the primary intervention in reducing HIV infection in children. It requires continuous follow-up of HIV-positive pregnant women, mothers, exposed infants and infected children with HIV services and retention in care.

Malawi started implementing PMTCT of HIV in 2001 at one of the CHAM hospitals in Northern Malawi but it wasn’t until in 2003 that the National PMTCT program was officially launched. Initially only single dose Nevirapine was used for the treatment of HIV+ pregnant

women. Nevirapine is one of the different types of ARVs. A new ART regimen was introduced in 2008 comprising a combination of AZT/3TC (Zidovudine/ Lamivudine) initiated at 28 weeks, followed by single dose Nevirapine during labor, which was followed by a week of AZT/3TC. The newborn received nevirapine syrup for about a week.

In July 2011 Malawi adopted a novel approach to the implementation of PMTCT which involves initiating all pregnant or breastfeeding women diagnosed HIV+ on life-long anti-retroviral therapy (ART) irrespective of CD4 count and WHO clinical staging. Triple combination ARV drugs are used. This approach, a modification of the 2009 WHO Option B recommendation, is called Option B+ as described above. Following the introduction of Option B+, there has been an integrated implementation of ART and EMTCT programs and the services are fully integrated into maternal and child health services.

Moving from an easy to give single dose of Nevirapine for a specified period of time to therapy taken daily for life was a major transition for HIV prevention and treatment in Malawi. Over the years since Option B+ was introduced in Malawi, a number of countries have also adopted this approach. As of March 2015 twelve African countries were implementing Option B+ (National AIDS Commission, 2015). ART adherence and retention in care constitute major challenges to the implementation of the prevention of mother to child transmission of HIV interventions. These challenges hamper existing initiatives to eliminate mother to child transmission of HIV (WHO, 2014). Without improved retention of pregnant mothers and infants within the PMTCT cascade, only marginal reductions in childhood HIV infections can be achieved, even with highly efficacious combination of Antiretroviral drugs (Kim et al, 2012).

The access to a PMTCT program by pregnant women can be affected by various factors operating at individual as well as household levels. There are also health system factors which might impede successful delivery of PMTCT services. This study was therefore aimed at understanding the factors which hamper the implementation of the PMTCT program in Malawi.

3.2 Objectives of the study

3.2.1 General Objective

The general objective of this study was to identify factors influencing utilization of PMTCT services in Malawi from 2010-2014.

3.2.2 Specific Objectives:

(i) To assess trends in PMTCT utilization among pregnant women attending ANC services in Malawi from 2010-2014, a period that encompasses pre Option B+ (1 year) and post-Option B+ implementation and to concentrate on Mchinji District in central Malawi as an example.

(ii) To identify social, behavioral, financial and cultural factors hampering utilization of PMTCT services and uptake of Option B+ in Malawi.

4.0 Methodology

Several data sources were used in this study. PMTCT program data for the period 2010-2014 was obtained from the Ministry of Health’s Department of HIV. This Department, with support from development partners, collects HIV data from all health facilities in Malawi on a quarterly basis. Quarterly reports are prepared using these data and these reports are shared with all stakeholders.

PMTCT data was also obtained from Mchinji District Health Office (DHO). This data was obtained in order to look at the trends in utilization of PMTCT services both at national level as well as in Mchinji District. Mchinji District is located 100 kilometres west of Lilongwe. PMTCT data from this district would help to demonstrate the performance of the program at district level. Mchinji district was selected for its proximity to Lilongwe where the MOH headquarters office is located.

In addition to collection of PMTCT data from national level as well as in Mchinji District, reports were also collected from the Ministry of Health and the National AIDS Commission and other stakeholders on access to PMTCT interventions. This study mainly utilized existing PMTCT program data from the Ministry of Health. There are also quarterly reports which are produced by the HIV Department in the MoH which were also reviewed. The National AIDS Commission produces annual reports which are submitted to UNAIDS as part of the global monitoring of the progress that countries are making in the fight against HIV and AIDS. It should be emphasized that program data just provides the trends in coverage of Option B+ and other HIV services. Such data does not provide the factors which affect access to PMTCT services. A review of literature on studies conducted in Malawi and elsewhere was conducted in order to identify factors affecting the uptake of PMTCT services. Key findings from this review are presented in the results section of this thesis.

Some of the documents reviewed were obtained using the Google search engine. The two words which were used in this search were Option B+ and Malawi/Africa. Peer reviewed articles were obtained through MEDLINE. The two words used for searching were Option B+ and Malawi. Some of the documents, especially those produced by the Ministry of Health, National AIDS Commission and some international organizations, were not peer reviewed.

These documents were mainly on PMTCT especially on Option B+ and these documents were mainly on Malawi and other African countries.

This study used descriptive program data which are routinely collected by the Ministry of Health. The factors which affect the delivery and uptake of Option B+ were mainly obtained from the review of literature presented in the results section. The lack of a qualitative component is a major limitation of this study. The other limitation for this study is the absence of data at district level for 2011 for Mchinji District. While district level data are aggregated at the national level, the detailed district data are only available at the district level but, unfortunately, the data for 2011 in Mchinji District were not available to the researcher.

5.0 RESULTS

The results will be shown by study objective.

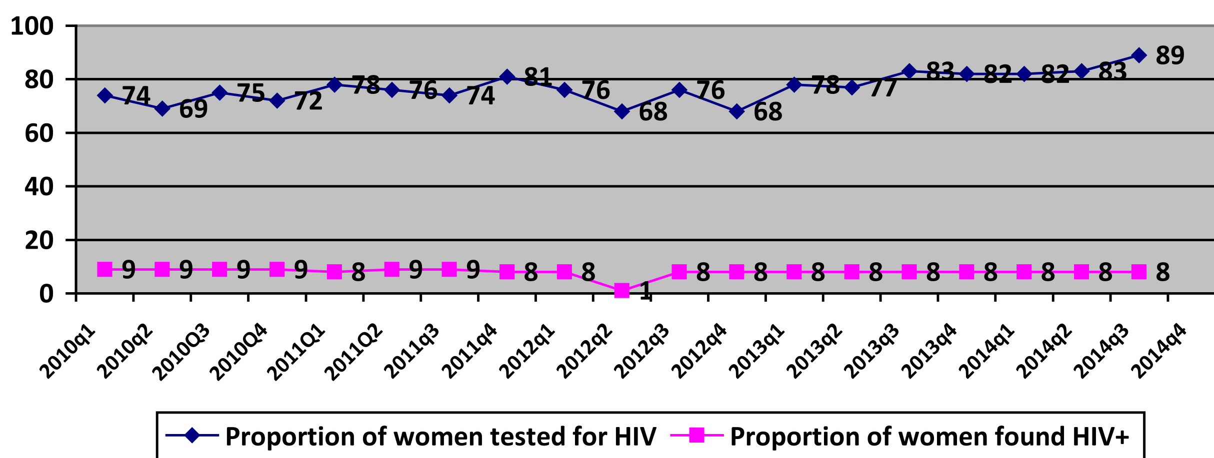
Objective 1: To assess trends in PMTCT utilization among pregnant women attending ANC services in Malawi from 2010-2014, a period that encompasses pre Option B+ (1 year) and post-Option B+ implementation and to concentrate on Mchinji District in central Malawi as an example.

5.1 HIV testing and counselling among pregnant women

HIV testing and counselling (HTC) is an entry point (see Figure 5) for all HIV services such as ART and Option B+. As part of the ANC package, pregnant women are offered HTC services. The 2014 MDG End-line Survey for Malawi found that 96.1% of the women aged 15-49 with a live birth in the 2 years preceding the survey attended ANC during the last pregnancy that led to a live birth and were seen at least once by skilled health personnel. The presence of a

skilled attendant at birth was 87.4% (National Statistical Office, 2014). The high ANC attendance rate for Malawi provides an opportunity for the majority of pregnant women to access maternal health services such as HTC and Tetanus Toxoid Vaccine services. Figure 6 shows the proportion of pregnant women who were tested for HIV over the period 2011-2014.

FIGURE 6: PROPORTION OF WOMEN TESTED FOR HIV AT HEALTH FACILITY LEVEL AND THOSE FOUND HIV POSITIVE IN MALAWI, 2010-2014



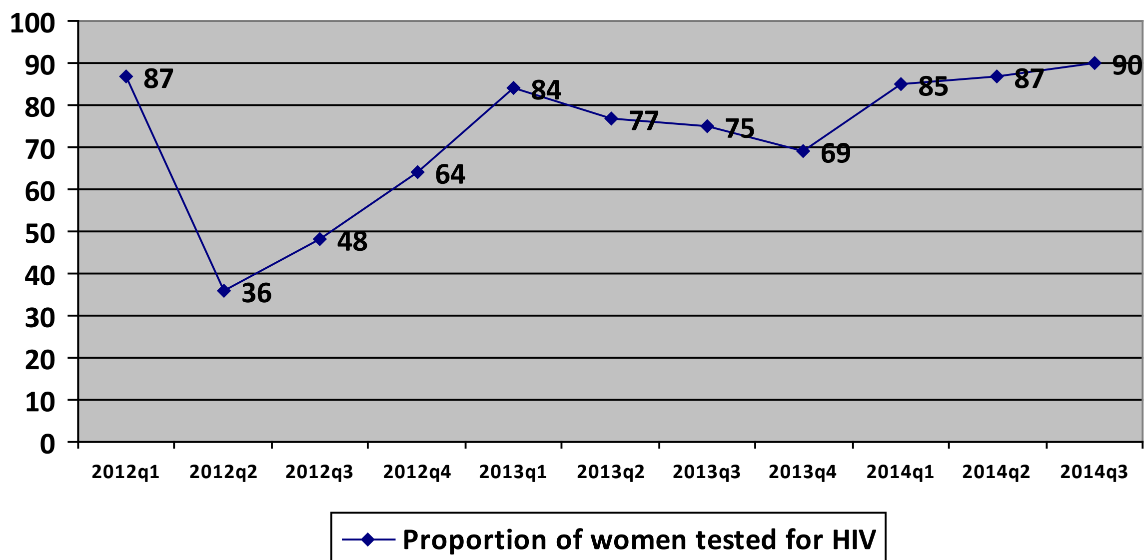
(SOURCE: HIV UNIT QUARTERLY REPORTS 2010-2014)

As mentioned earlier Option B+ was introduced in Malawi in July 2011 which is the third quarter of 2011. Figure 6 above shows that the proportion of pregnant women who were tested for HIV in quarter 1 of 2011 was 78% and this decreased to 76% in the second quarter and then 74% in the third quarter before increasing to 81% in the 4th quarter of 2011. Over the period January 2012 to December 2014 between 11% and 32% of the pregnant women were not tested for HIV. Quarterly reports from the Ministry of Health have reported that intermittent stock-outs of HIV rapid test kits was one of the factors responsible for this (Ministry of Health, 2013).

In 2010 and 2011 up to the 3rd quarter 9% of the pregnant women who attended ANC were found HIV positive and this dropped to 8% from the 4th quarter of 2011 up to 2014 when it was 8% with an exception of the second quarter of 2012 when this was at 1%. It should be mentioned that these results at national level are similar to the 2010 Malawi Demographic and Health Survey (MDHS) which also found that 8.8% of the pregnant women who were tested for HIV during the survey were found HIV positive (NSO, 2011).

Figure 7 shows the proportion of pregnant women in Mchinji District who were tested for HIV for the period 2012-2014.

FIGURE 7: PROPORTION OF PREGNANT WOMEN TESTED FOR HIV IN MCHINJI DISTRICT



(SOURCE: MCHINJI DISTRICT HEALTH OFFICE)

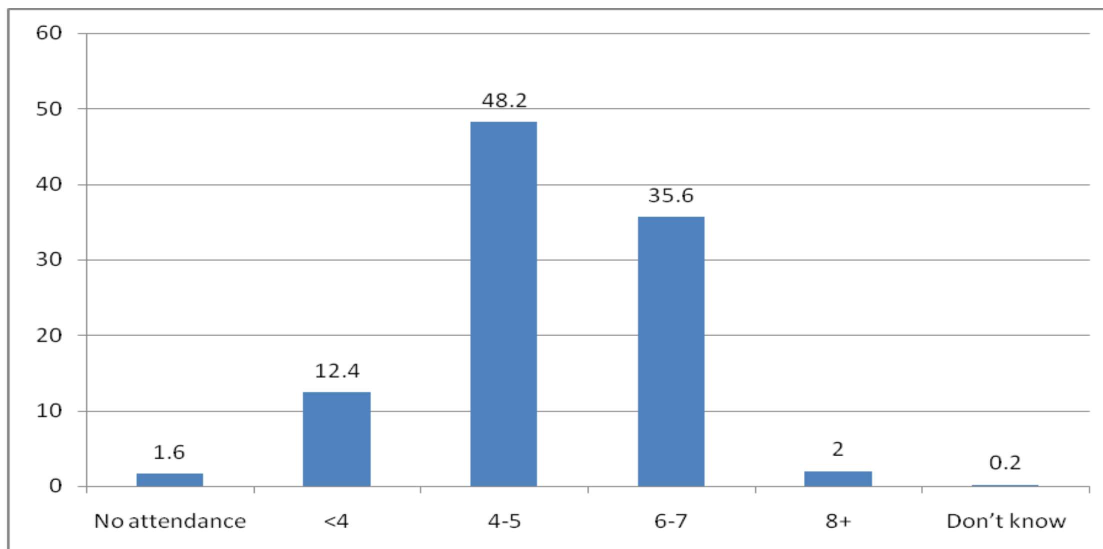
The proportion of pregnant who got tested for HIV in Mchinji District over the period 2012-2014 varied over this period: it was lowest in the second quarter of 2012 at 36% as was also the case at national level and this was followed by quarter 3 of the same year at 48%. Apart from these two quarters of 2012 and the third quarter of 2012 and 4th quarter of 2013, for all quarters more than 70% of the pregnant women were tested for HIV. The highest proportion of pregnant women who were tested for HIV was at 90% in quarter 3 of 2014 followed by the second quarter of the same year. It can also be noted that in general the proportion of pregnant women who were tested for HIV was highest in 2014 compared to the other years namely 2012 and 2013. This situation was also observed at national level when we observe that 2014 had the highest proportion of pregnant women who were tested for HIV.

The ideal situation is that all pregnant women should be tested for HIV. At national level where data were available, it is clear that the introduction of Option B+ in July 2011 has increased the proportion of pregnant women who were being tested for HIV although not immediately. In 2014 the Ministry of Health estimated that there were 660,964 pregnancies in Malawi. Of these expected pregnancies there were 520,789 (79%) pregnant women who received HTC in this year at national level. However, the proportion of pregnant women tested falls short of the national target of 85% as stipulated in the National HIV Strategic Plan (National AIDS Commission, 2015).

It is important that pregnant women should start attending ANC services as early as possible within the first trimester. Figure 8 below shows the proportion of pregnant women at national level who start attending ANC services in the first trimester.

FIGURE 8 NUMBER OF MONTHS PREGNANT AT TIME OF FIRST ANC VISIT, MALAWI, 2011

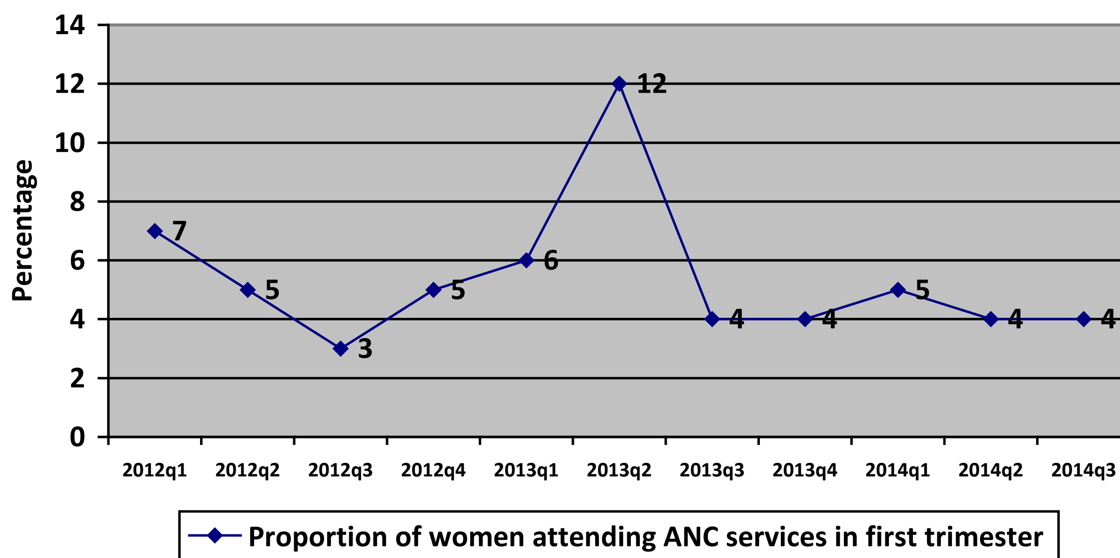
Source: NSO, 2011



Most of the pregnant women start attending ANC when they are 4 or more months pregnant as can be seen in Figure 8 above. Only 12.4% of the pregnant women went for the first ANC visit in the first trimester (National Statistical Office, 2011). A few pregnant women (1.6%) do not ever attend ANC. This situation at national level was also observed at district level as can be seen in Figure 9 below for Mchinji District although it appears that the proportion of women accessing ANC services in the first trimester is lower than the national average.

FIGURE 9: PROPORTION OF PREGNANT WOMEN ACCESSING ANC SERVICES IN THE FIRST TRIMESTER, MCHINJI DISTRICT, MALAWI

Source: NSO, 2011



(Source: Mchinji District Health Office)

The proportion of pregnant women attending ANC services in the first trimester is very low in Mchinji. It was highest in the second quarter of 2013 at 12% while in the other quarters this proportion ranged from 3% in the second quarter of 2012 to 7% in the first quarter of 2012.

5.2 Access to Option B+

Figure 10 below shows the coverage of Option B+ in Malawi over the period 2011-2014.

FIGURE 10: TRENDS IN COVERAGE OF OPTION B+ IN MALAWI AMONG HIV+ PREGNANT AND LACTATING MOTHERS

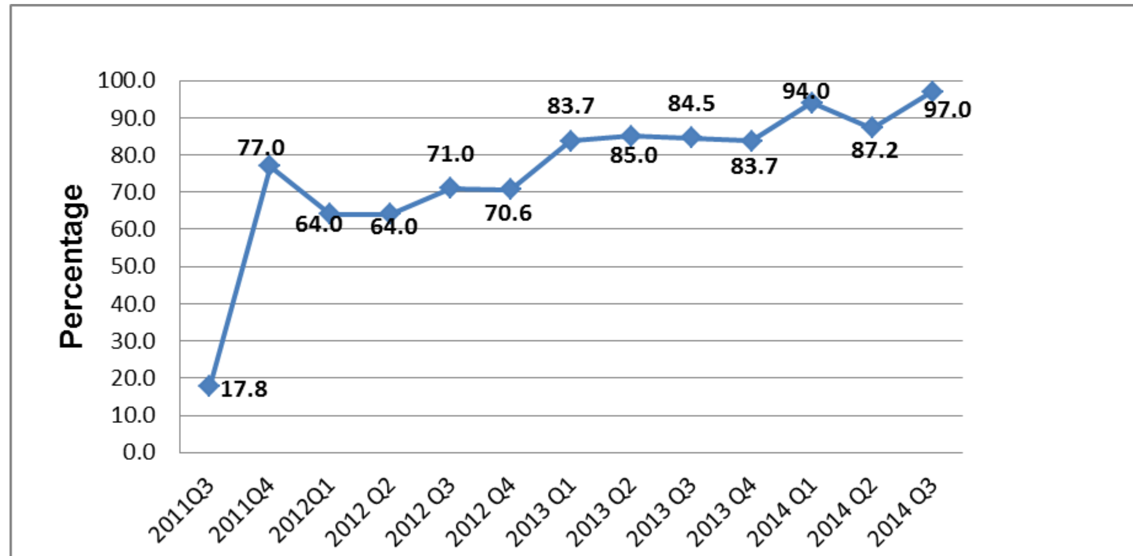
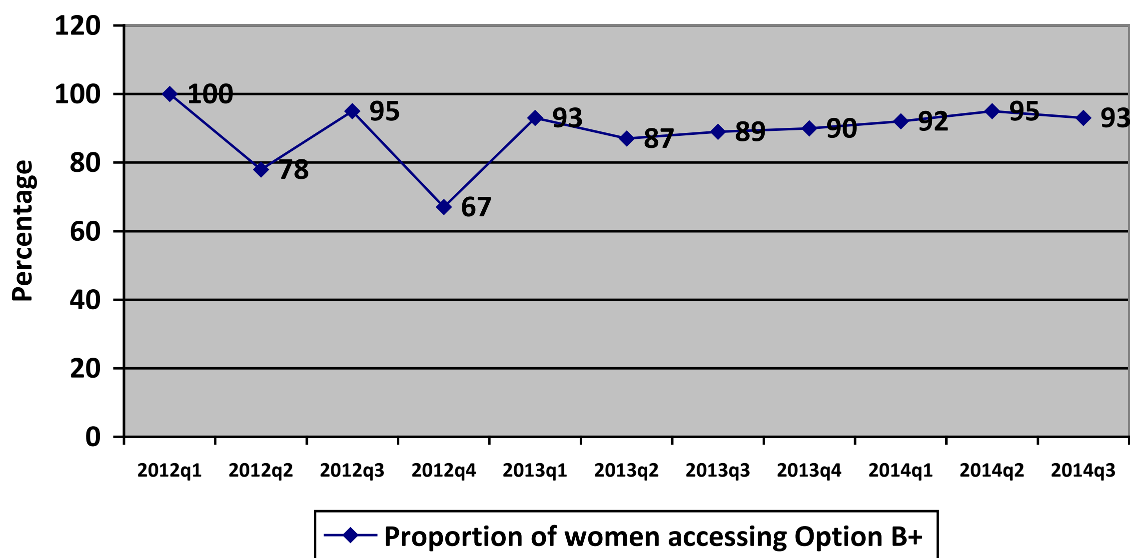


Figure 10 above shows that only 17.8 of the pregnant women accessed Option B+ at the beginning of the program in July-September 2011. Coverage, however, increased to 77% in the fourth quarter of 2011 before going down to 64% in the first and second quarter of 2012. In quarter 4 of 2014, 97% of the pregnant women accessed Option B+ services. This study also looked at the proportion of HIV+ pregnant women and lactating mothers in Mchinji District who received ART (Option B+) and this is shown in Figure 11 below.

FIGURE 11: PROPORTION OF HIV INFECTED PREGNANT WOMEN AND LACTATING MOTHERS WHO RECEIVED ART IN MCHINJI DISTRICT, 2012-2014



(Source: Mchinji District Health Office)

Figure 11 shows that in the first quarter of 2012 all pregnant women received ART compared to only 64% at the national level. Coverage went down in the second quarter of 2012. Over the period 2012-2014 the fourth quarter of 2012 had the lowest proportion of pregnant women who received ART. From the 4th quarter of 2013 90% or above received ART. These results in general demonstrate that a large proportion of pregnant women in Malawi are accessing Option B+ services in Malawi. Ideally all pregnant women are supposed to access Option B+ services but these results further demonstrate that challenges exist in the delivery and uptake of these services.

5.3 Trends in ARV coverage in Malawi

Table 4 below shows the number of adults aged 15+ who were on ART between 2010 and 2014.

Table 4: Number of people aged 15+ on ART in Malawi

Year	Quarter	Number of persons on ART
2010	1	192,603
	2	205,145
	3	216,432
	4	228,468
2011	1	240,570
	2	251,790
	3	269,048
	4	294,585
2012	1	316,934
	2	336,500
	3	356,823
	4	369,229
2013	1	385,680
	2	403,172
	3	417,963
	4	430,645
2014	1	444,270
	2	461,192
	3	476,195
	4	533,027

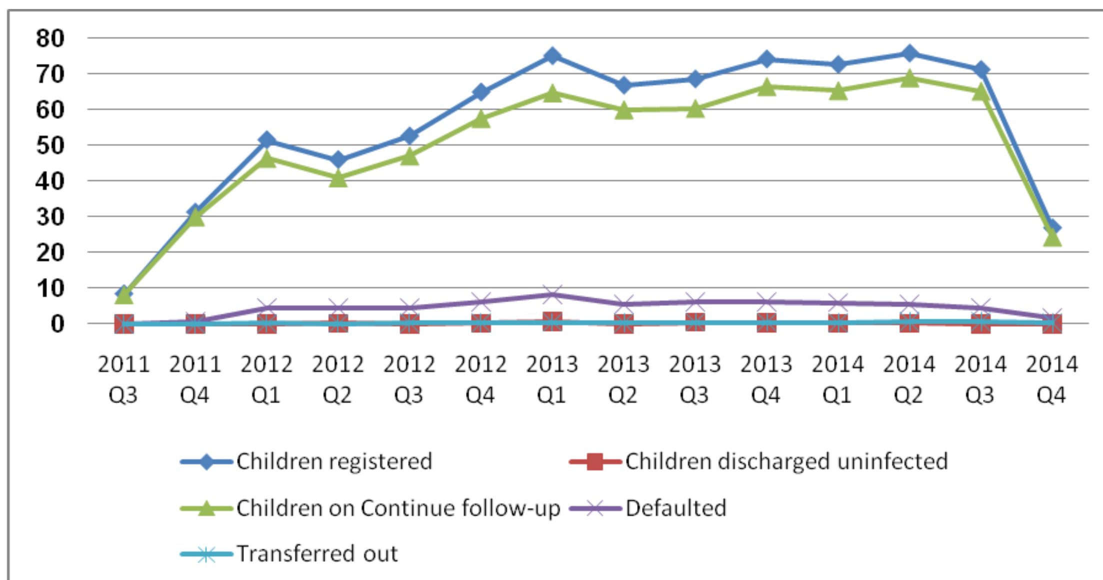
Source: MOH Quarterly HIV reports: 2010-2014

In quarter 3 of 2011 269,048 persons were on ART and this was at a time when Option B+ was introduced in Malawi. In the third quarter of 2014 this increased to 476,195 persons. These figures show that ART uptake almost doubled over this period. This surge in numbers of people on ART between 2011 and 2014 is directly attributable to the introduction of Option B+ because of the large number of HIV+ pregnant women and lactating mothers who previously were not eligible for ART. As of December 2014 there were 533,027 people on ART. Nearly

800,000 persons required ART in Malawi in 2014; hence this represented 67% of PLHIV who required treatment. The introduction of Option B+ is one of the factors which has led to an increase in the proportion of women on ART as has been demonstrated earlier and this has contributed to the overall increase of people on ART. The challenge, however, is that the proportion of children with HIV who are on ART remains low in Malawi as described below.

Figure 12 shows that while more children were enrolled/registered as exposed children, there is a drop out of those who continue to be followed up at 2 months and that about 5% default.

FIGURE 12: TRENDS OF CHILDREN OF THE 2 MONTH BIRTH COHORT



ART coverage among infants at 12 months is very low. Figure 13 below shows trends of exposed children among 12 months cohort and it shows, among other things, that defaulting is a major problem at 12 months.

FIGURE 13: TRENDS OF EXPOSED CHILDREN AMONG 12 MONTHS BIRTH COHORT

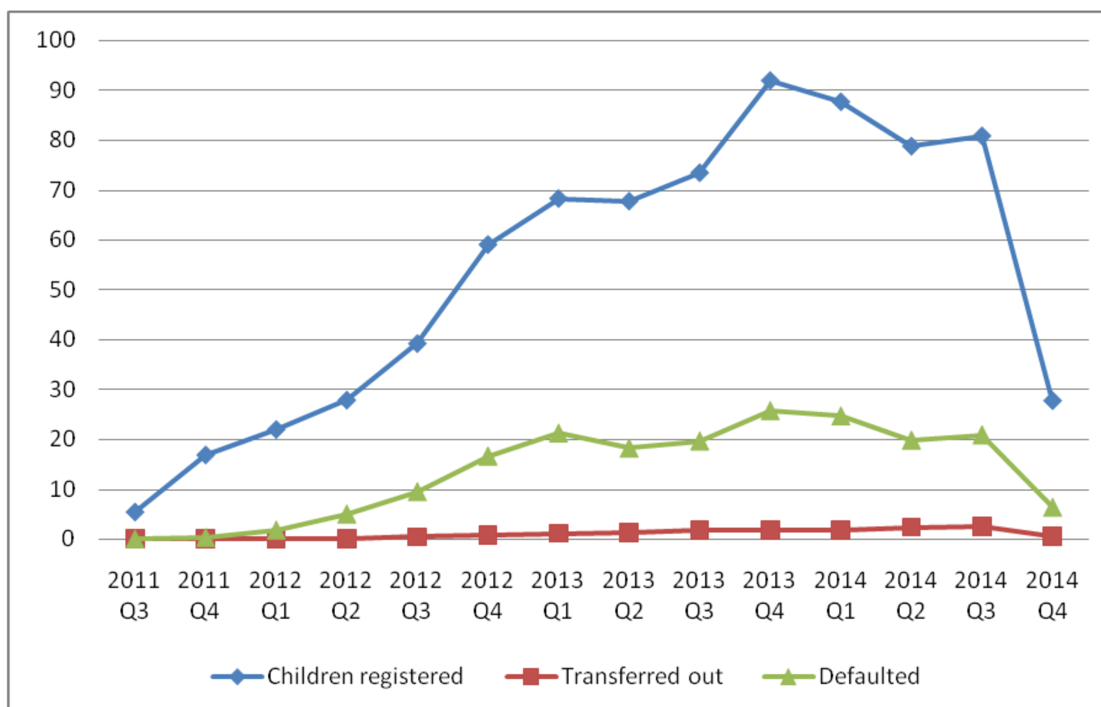


Figure 13 above shows that the default rate in the 12 months old cohort was around 5% but as the children grow older the default rate increases. This graph generally shows that defaulting is a major challenge being experienced in the pediatric ART program in Malawi. Table 5 below shows Early Infant Diagnosis (EID) outcomes for infants born to HIV+ women in Mchinji District.

TABLE 5: EID RESULTS FOR MCHINJI 2011-2014

	Q3 2011	Q4 2011	Q1 2012	Q2 2012	Q3 2012	Q4 2012	Q1 2013	Q2 2013	Q3 2013	Q4 2013	Q1 2014	Q2 2014	Q3 2014	Q4 2014
Confirmed Infected at age:														
2 months	0	0	0	0	0	1	0	0	3	2	0	1	0	0
12 months	0	0	0	0	1	4	2	3	3	8	0	1	1	3
24 months	0	0	0	0	1	2	2	1	4	9	3	3	2	3
Confirmed not infected at age														
2 months	0	0	1	0	18	16	11	9	40	47	56	8	64	46
12 months	0	0	0	0	5	12	16	12	59	96	53	16	55	90
24 months	0	0	1	0	1	12	5	11	27	72	51	33	50	62
Total number of children	0	0	2	0	26	47	36	36	136	234	163	62	172	204

These results show that the implementation of the Option B+ program has been quite successful in Malawi as over 90% of the children are born HIV negative at 2, 12 and 24 months of age.

Objective 2: To identify social, behavioral, financial and cultural factors hampering utilization of PMTCT services and uptake of Option B+ in Malawi

5.4 Social, Behavioral, Financial and Cultural Factors affecting implementation of the Option B+ program in Malawi

The information and data presented in this section were derived from a review of relevant literature on PMTCT and Option B+ in Malawi. The studies that are reported cannot be linked directly to the data presented in the results section for Objective 1 but most of the study results reported in this section took place in the same time period, 2010-2014, as the data presented in Section 5.1-5.3.

Behavioral/social factors

One study found that among women enrolled on Option B+, 9.3% had collected ART but then never returned to the facilities where they collected the treatment (Mother to Mother, 2014). As stated earlier, Option B+ requires testing pregnant women for HIV and those who are found HIV+ are advised to start treatment on the same day. This is, however, a major challenge to the uptake of ART under Option B+. Some studies (Kieffer et al, 2014) have found that women are in general not given adequate time or information about the implications of starting ART treatment for life. In some cases even the health workers themselves have the perception that the testing and initiation of ART for pregnant women who are found HIV+ happens very quickly and it is quite difficult for pregnant women to process the information that they receive. Pregnant

women who are found HIV positive and initiated on ART for life on the same day are more likely not to return compared to those who, after being found HIV+ and advised to start ART for life, are further counselled and start the treatment later (Mother to Mother, 2014). Mother to Mother is an NGO working in Malawi which has done research on Option B+.

The Mother to Mother study demonstrated that there is loss to follow up (LFTU) among pregnant women who are found HIV+. This study has also shown that a significant proportion of children born to HIV+ women are also lost to follow up. This problem seems to be widespread as studies have also found that in Sub-Saharan Africa about a third of HIV exposed children in PMTCT programs fall out of care in the 3 months after delivery and a further 45% stop care after their first HIV test (Sibanda, et al. (2013).

A number of factors have been given for this loss to follow up. The Mother to Mother study referred to earlier found that in some cases clients give wrong addresses deliberately to health workers. The provision of wrong addresses by these women is mainly due to the fear of stigma and discrimination. Some studies have also found that many women do not disclose their HIV status to their husbands. They fear violence and this has impact on ART adherence as women may hide medicines and may also miss doses and appointments (Ghanotakis et al, 2012).

Loss to follow up of women in the PMTCT program was associated with younger age at ART initiation and most of them had stopped ART. Reasons for stopping ART included travel away from home; lack of transport money; developed side effects; too sick to travel to a clinic and limited understanding of the initial ART education session (Tweya et al, 2014).

Another study conducted on impact of option B+ in Malawi found that LTFU increased after introduction of option B+. The rapid ART initiation done through the option B+ may result in

women being less prepared for ART and then less likely to remain in care (Kim et al, 2015). Women who initiated ART to prevent MTCT were five times likely never to return to the clinic compared to women who initiated for their own health (Tenthani et al, 2013).

A study by Kalembo et al (2013), found that there was low rate of male partner involvement and that it was then very difficult for a woman tested HIV positive to get full support and encouragement from their male partner. The study further found that there were significant differences in the uptake of PMTCT services with increased uptake where there was male partner involvement. Women with supportive male partners were more likely to use condoms, deliver at a health facility and complete follow up in the program compared to those without male partner involvement (Kalembo et al, 2013). A similar study done by Chinkonde found that more women who attended follow up visits after delivery reported having partner support than women who dropped out (Chinkonde et al, 2009).

A qualitative study conducted in Malawi (Haerizadeh et al, 2013) has shown that study participants appreciated the Option B+ program and associated the following key benefits of the program:

- HIV+ women are able to breastfeed for longer periods. The child remains HIV negative because of the treatment being given to the mother. As a result of this program the health of the child improves tremendously.
- The health of the mother also improves when they are on treatment.
- Previously the lack of breastfeeding of the child was related to being HIV+. These days HIV+ women are able to breastfeed; hence no one in the community will know that they are HIV+.

- Both the mother and child are healthy, hence reducing stigma towards the mother and child.

The implementation of Option B+ therefore has some advantages, at least as perceived by those in the above study, including the simplification of PMTCT and ART treatment especially considering that literacy levels in Malawi are very low. Women who are HIV+ are also aware of the benefits of Option B+ (Haerizadeh et al, 2013).

Structural/health system/financial factors

Quarterly reports from the MoH for the period 2010-2013 show that there was intermittent supply of HIV rapid test kits and this is cited as one of the factors that resulted in sub-optimal PMTCT coverage. From 2014 however the availability of test kits improved.

Once pregnant women have been diagnosed HIV+ they are supposed to be started on ART and they are supposed to return to the health facility to have refills of ARVs as well as monitoring of the child's health including HIV status. The proportion of HIV positive mothers on Option B+ retained in HIV care at 12 months and at 24 months is lower than expected. This lower than expected retention rate is mostly attributed to failure by pregnant women to initiate prescribed ART. A number of reasons have been given for this and these include poor counseling of newly diagnosed HIV-positive pregnant women in health facilities, poor male involvement in PMTCT programs and sub-optimal HIV disclosure to spouses and family (National AIDS Commission, 2015).

As mentioned earlier, 27% of pregnant women deliver outside the health facilities and in some cases with the assistance of TBAs (NSO, 2011). In such a context it is difficult for all pregnant women to deliver in health facilities and obtain optimal PMTCT care. While Malawi is

implementing the Option B+ program quite well, there are factors such as intermittent shortage of test kits, sub-optimal provision of provider initiated testing and counselling, delivery with assistance of TBAs, lack of disclosure and lack of male involvement which affect the delivery of the program.

In addition to stigma and discrimination, women on ART may discontinue the treatment because of religious beliefs. There are certain religious groups which forbid their members from taking any form of medication and that even ANCs and deliveries are done by the prophets in the church. Such religious beliefs constrain access to Option B+ services including ANCs (Munthali et al, 2015).

Women may also experience side effects and receive inadequate information given to them about ART including its side effects. Pregnant and lactating women may not pay a lot of attention to ART after delivery and breastfeeding because health workers emphasize to them that Option B+ is aimed at protecting their baby. Not much emphasis is given to the fact that being on treatment is good for the mother as well. Because of lack of such emphasis some mothers will stop treatment soon after delivery and breastfeeding (Mothers to Mothers, 2014).

Option B+ is a relatively new program and hence not every woman is aware of it. This is why some studies have found that the low level of knowledge about PMTCT among pregnant women is one of the major barriers to uptake. This is exacerbated by the fact that there is inadequate numbers of health workers and as such they lack time to explain to pregnant women all the details concerning Option B+. These health workers in some cases tend to rush and they do not even give time to mothers to ask questions about the program (Ng'ambi et al, 2013). Hence some women and men do not understand what Option B+ is. For those who had heard

something about Option B+ they were able to describe what it was all about (Haerizadeh, 2013). Levy (2009) says that in Malawi, one of the challenges is that the counselling which is being done in the course of providing HTC services is that the process is overly biomedical (Levy, 2009) which may make it very difficult for women to understand.

A more recent study has found that there are some pregnant women who, once they are diagnosed HIV+ and are told that they should start taking ARVs, refuse to take them. This was due to a number of reasons including not understanding why they should take the treatment and that they need time in order to accept the results. In addition to this, pregnant women also fear the implications of being found HIV+ ; HIV+ pregnant women have been chased from their homes, abandoned and even divorced because they have communicated to their husbands that they have been found HIV+. While women will disclose their HIV+ results to their spouses, some will not because of the fear of these experiences and if they take the ARVs they will even take them without their husbands knowing (Munthali et al, 2015).

The other challenge for discontinuing ART among pregnant and lactating women is that in some cases they experience side effects; hence they make decisions to stop taking the treatment (Ng'ambi et al, 2013). Larson et al (2012) has also cited distance to health facilities and the frequency of visits required as key issues affecting access to PMTCT treatment (Larsson et al, 2012). Parents and their children in some cases have to travel very long distances and they may have challenges with regard to the cost of transportation and the long time the process takes (Ng'ambi et al, 2013).

The study by Mother to Mother in 2014 demonstrated that the provision of early infant diagnosis (EID) services faces a lot of challenges. The barriers to accessing EID services include the lack of knowledge about the services among mothers and caregivers and the shortage of health care workers. Other factors include shortage of dry blood sample test kits and difficulties getting blood from infants, including problems of transportation and fuel, hamper sample collection and processing. Even when a specimen is collected, if results are not available after travelling to the clinic parents and care givers are unlikely to return again for the results, especially if this happens more than once. There is also a belief among parents and caregivers that starting ART in young children will cause complications which leads them to delay obtaining results or starting ART (Mothers to Mothers, 2014).

6.0 Discussion

As a response to the 2010 WHO recommendations, Malawi revised its policies for PMTCT and for ART to reflect a public health approach. A decision was made that access to ART for pregnant women should not solely depend on CD4 capacities at health facilities. Access to ART for HIV positive women is now based on a confirmed HIV test result without any CD4 count testing. As has been mentioned earlier, in July 2011 the Government of Malawi introduced Option B+ in which pregnant women who are found HIV+ are initiated on ART for life regardless of their CD4 count. This approach is aimed at eliminating the vertical transmission of HIV through MTCT of HIV. This approach offers a number of advantages including that it is simple to implement, leads to a reduction in post-delivery mortality, reduction in risk of drug resistance associated with ART mono therapy, provides for equitable access to PMTCT and ART and has potential to eliminate MTCT of HIV (Schouten et al, 2011 and Government of Malawi 2011).

While good progress has been made in the implementation of Option B+, the results demonstrate that there are challenges, as not all HIV+ mothers and their children are reached with this service. For a successful Option B+ program, there is a need for all pregnant women to be tested for HIV. Health workers have been taught in Malawi about Option B+ and that every pregnant woman should be offered HTC services. This study has generally shown that not all pregnant women are tested.

In 2014 the Ministry of Health estimated that there were 660,964 pregnancies in Malawi. Of these expected pregnancies there were 520,789 (79%) pregnant women who received HTC in this year at national level. However, the proportion of pregnant women tested falls short of the national target of 85% as stipulated in the National HIV Strategic Plan (National AIDS Commission, 2015). Not all pregnant women access services at health facility and 27 % deliver outside a health facility including at TBAs; this prevents them from accessing HTC services. Other reasons for not meeting the national target of 85% could be due to inadequate HIV testing materials; however, MOH Quarterly reports for 2014 have indicated improvement in availability of HIV testing materials in 2014. This shortfall in proportion of pregnant women tested could mainly be due to inadequate Provider Initiated Testing and Counseling (PITC) being provided due to shortage of health workers. To address this issue, the MOH has introduced a cadre solely dedicated to conducting HIV testing in health facilities. Partners are supporting the MOH to implement this strategy.

Malawi's MoH promotes PITC and if this is done, a good proportion of pregnant women should be tested. Malawi's 2014 report to the UNAIDS notes that the failure of the health system to test all pregnant women may be as a result of sub-optimal implementation of PITC in antenatal clinics (National AIDS Commission, 2015). It is also important that HIV testing

materials are available all the time in order to ensure that absence of such materials should not be the reason for not testing pregnant women.

However, it should be noted that in general the proportion of pregnant women who were tested for HIV was highest in 2014 compared to the other years namely 2012 and 2013. This situation was observed both at national level and Mchinji district. Contributing factors to this included uninterrupted supply of HIV testing materials and increased awareness of Option B+ program through intensified messaging.

The results demonstrate that generally a large proportion of pregnant women are accessing option B+ services in Malawi. However the results further demonstrate that challenges exist in the delivery and uptake of option B+ because ideally all HIV positive pregnant and lactating women are supposed to access option B+ services. The results show that defaulting is a major challenge being experienced especially in the pediatric ART program. The default rate increases with age of the child. This is coupled with loss to follow up of women especially those who initiate ART at younger age. Most of these women stop ART and this puts their infants at a higher risk of HIV infection. It is therefore important to understand these barriers to retention in care so that there are addressed in order to have an effective EMTCT program. The EMTCT plan expires in 2015 and consultative meetings with different stakeholders, on review of the plan are underway. This provides an opportunity to refocus on strategies that will address the identified challenges.

These results therefore do demonstrate that while the Option B+ program has been quite successful in Malawi there are also challenges that need to be addressed. The continued training of health workers and the use of community health workers to trace mothers and their children

who have dropped out of the program constitute some of the ways in which some of the challenges are being addressed (MoH quarterly reports, 2010-2014).

Male involvement is another critical area that needs to be promoted in order for the women to have the support and encouragement they need to be able to sustain being on ART and also to reduce the gender based violence that women experience. By involving males in the PMTCT program, it will go a long way in desensitizing communities in thinking that the PMTCT program is solely for women. Intensifying and promoting male involvement will promote couple HIV testing and counseling.

The trend results in Section 5.3 demonstrate that at national level, as well as in Mchinji District, the introduction of Option B+ has led to an increase in the number of women accessing PMTCT services. Some studies have also found that Option B+ led to a seven fold increase in the number of women starting ART for PMTCT in its first year alone (Mothers to Mothers, 2014). Since fertility in Malawi is quite high, the effective delivery of Option B+ reduces MTCT of HIV.

7.0 Conclusion and Recommendations

This study was aimed at determining trends in utilization of Option B+ services in Malawi as well as identifying factors that affect the delivery of Option B+ in Malawi. This study has generally shown that Malawi has made significant progress in the delivery of Option B+. The implementation of Option B+ has led to a significant increase in the number of pregnant and lactating women on ART both at national level as well as in Mchinji district. The program has also led to the low numbers of children being born HIV+. While progress has been made in the

delivery of Option B+ services in Malawi, the study has also shown that barriers to accessing services also prevail.

For example in both Mchinji and at the national level both the mother and their infants are lost to follow up. This raises the need to strengthen service linkages between communities and health facilities bearing in mind that the community has a great influence on the clients' decision to go to the health facilities for services. There is a need for providing clients adequate and very specific information about what Option B+ is. Such information can include the benefits of the program, the need for counselling and spelling out the side effects of being on ART. Involvement of men and sensitizing them on Option B+ services will help men appreciate the need to support their partners. The implementation of a successful Option B+ program is embedded in the Malawi health system. The considerable challenges that exist in the system - acute shortage of human resources, transport issues, client care and support, adequate infrastructure and gaps in financial resources – cannot be the responsibility of the PMTCT program alone but the PMTCT program must continue to do its part to contribute to broader health systems strengthening components. The set of recommendations provided below are those that are within the purview of the PMTCT program. The EMTCT plan for Malawi expires September 2015, thus the results and recommendations of this study are timely and provide an opportunity to focus the PTMCT program and the Option B+ strategy on specific challenges that will be necessary for the program goals to be achieved.

These recommendations are for Ministry of Health and other implementing partners in the health sector including the civil society.

(1) There is need to intensify community awareness and mobilization on issues of PMTCT, especially Option B+, so that communities are fully sensitized.

(2) There is need to strengthen psychosocial support programs for women on Option B+ to increase retention in care.

(3) There is need to intensify promotion of male involvement in PMTCT services so that males can support their spouses to access PMTCT services.

(4) There is need to develop treatment literacy programs to target both the patients and the general public.

(5) There is need to scale up innovative mechanisms for sample transportation of specimens for Early Infant Diagnosis (EID) to testing sites and delivery of results to the requesting Health Facility.

(6) There is need to advocate and promote early Antenatal Care attendance of pregnant women so that they access PMTCT services early enough for optimal benefit from PMTCT interventions.

(7) There is need to strengthen the ART program for children which lags behind the program for adults.

(8) There is need to intensify Provider Initiated HIV Testing and Counseling (PITC) in all ANCs in order to identify all HIV positive pregnant women so that they are enrolled on Option B+.

(9) There is need to strengthen linkages between Health Facilities and community structures in order to strengthen defaulter tracing programs and bring defaulted mothers and children back in care.

References

Banda, C.L. (2013). Barriers to utilization of focused antenatal care among pregnant women in Ntchisi District in Malawi. Tampere: University of Tampere (MPH Dissertation).

Chinkonde, J. R., Sundby, J., Martinson,F. (2009). The prevention of mother-to-child HIV transmission programme in Lilongwe, Malawi: why do so many women drop out. *Reproductive Health Matters* 2009; 17(33):143-151.

Gama, E.L.S (2013). The implications of contracting out health care provision to private not-for-profit health care providers: The case of service level agreements in Malawi. Edinburgh: Queen Margaret University (PhD Thesis).

Ghanotakis, E., Peacock, D., and Wilcher, R. (2012). The importance of addressing gender inequality in efforts to end vertical transmission of HIV. *Journal of the International AIDS Society,* Suppl 2, 17385. doi: 10.7448/IAS.15.4.17385.

Haerizadeh, S., Mworeko, L., Kamwana, J., Banda, A., Hsieh, A. and Garner. A. (2013). *Understanding the perspectives and/or experiences of women living with HIV regarding Option B+ in Uganda and Malawi.* Global Network of People Living with HIV.

Kalembo, F. W., Zgambo, M., Mulaga, A. N., Yukai, D., & Ahmed, N. I. (2013). Association between Male Partner Involvement and the Uptake of Prevention of Mother-to-Child Transmission of HIV (PMTCT) Interventions in Mwanza District, Malawi: A Retrospective Cohort Study. *PLoS ONE*, 8(6), e66517.doi:10.1371/journal.pone.0066517

Kieffer, M. P., Mattingly, M., Giphart, A., van de Ven, R., Chouraya, C., Walakira, M., and the EGPAF Technical Directors Forum. (2014). Lessons Learned From Early Implementation of Option B+: The Elizabeth Glaser Pediatric AIDS Foundation Experience in 11 African Countries. *Journal of Acquired Immune Deficiency Syndromes (1999)*, *67*(Suppl 4), S188–S194. doi:10.1097/QAI.0000000000000372

Kim, M. H., Ahmed, S., Buck, W. C., Preidis, G. A., Hosseinipour, M. C., Bhalakia, A., Kline, M. W. (2012). The Tingathe programme: a pilot intervention using community health workers to create a continuum of care in the prevention of mother to child transmission of HIV (PMTCT) cascade of services in Malawi. *Journal of the International AIDS Society*, *15*(Suppl 2), 17389. doi:10.7448/IAS.15.4.17389

Kim, M. H., Ahmed, S., Hosseinipour, M. C., Giordano, T. P., Chiao, E. Y., Yu, X., Nguyen, C., Chimbwandira, F., Kazembe, P. N., Abrams, E. J.(2015). The impact of option B+ on the antenatal PMTCT cascade in Lilongwe, Malawi. *Journal of Acquired Immune Deficiency Syndromes: JAIDS.* 68(5):e77-83, 2015 Apr 15.

Larsson, E.C., A. Thorson, G. Pariyo, P. Conrad , M. Arinaitwe, M. Kemigisa , J. Eriksen, G. Tomson, A.M. Ekström . (2012). Opt-out HIV testing during antenatal care: experiences of pregnant women in rural Uganda. *Health Policy Plan.* 2012 Jan; 27(1):69-75.

Levy, J.M. (2009). Women's expectations of treatment and care after an antenatal HIV diagnosis in Lilongwe, Malawi. *Reproductive Health Matters* 17(33):152-61

Malawi Institute of Management. (2002). *The impact of HIV/AIDS in the public sector in Malawi.* Lilongwe: Malawi Institute of Management.

Maternal and Child Health Division, Office of Health, Infectious Diseases and Nutrition, Bureau for Global Health, U.S. Agency for International Development. (2007). *Focused antenatal care: providing integrated, individualized care during pregnancy*.

Ministry of Health. (2004). *Programme of work for the health sector 2004-2010*. Lilongwe: Ministry of Health.

Ministry of Health. (2011). *Clinical Management of HIV in Children and Adults*. Lilongwe: Government of Malawi.

Ministry of Health. (2012). *Malawi National Plan for the Elimination of Mother to Child Transmission*. Lilongwe: Ministry of Health.

Ministry of Health. (2012). *Human resources for health strategic plan 2012-2014*. Lilongwe: Ministry of Health.

Mothers to Mothers. (2014). *Current practices to improve uptake, retention and adherence for Option B+ in Malawi*. Lilongwe: Mothers to Mothers.

Munthali, A.C., Ngwira, B., Chinsinga, B., Kaunda-Khangamwa, B., Masiye, F., Kadzandira, J., (2015). *Qualitative Study on Human Rights, Ethical and Equity Issues in the context of Option B+ in Malawi*. Center for Social Research (CSR).

Muraguri, N. (2012). *A progress report on the Global Plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive.* Presented Mid-term Review meeting Nairobi 6-7 December 2012.

National AIDS Commission. (2015). *Global AIDS response progress report*. Malawi. Lilongwe: National AIDS Commission.

National AIDS Commission. (2015). *National HIV Strategic Plan 2015-2020*. Lilongwe: National AIDS Commission

National Statistical Office. (2011). *Malawi demographic and health survey 201*0. Zomba: National Statistical Office.

National Statistical Office. (2012), *Integrated household survey (3).* Zomba: National Statistical Office.

Ng'ambi, W.F., Tweya, H., Speight, C., Man-Bourdon, C., Hosseinpour, M. and S. Phiri. (2013). *Determinants of Antiretroviral Treatment Adherence among Women Accessing PMTCT "Option B+": A Retrospective Study at Bwaila Hospital, Malawi.* 7th IAS Conference on HIV Pathogenesis, Treatment and Prevention, Kuala Lumpur, 30 June-3 July 2013. http://pag.ias2013.org/Abstracts.aspx?AID=2602

Population Council. (2008). *Adapting focused antenatal care: lessons from three African countries*. Frontiers in Reproductive Health. New York: Population Council

SADC. (2009). *SADC HIV strategic framework 2009-2015*. Botswana: SADC.

Schouten et al**.** (2011). Prevention of mother-to-child transmission of HIV and the health-related Millennium Development Goals: time for a public health approach. *Lancet:* 378: 282–84.

Sibanda, E.L., Weller, I.V.D., Hakim, J.G. and Cowan, F.M. (2013). The magnitude of loss to follow up of HIV exposed infants along the prevention of mother to child HIV transmission continuum of care: a systematic review and meta-analysis. *AIDS* 17: 2787-97.

Stefano, V., Schwartländer, B., Sow, S.P., Eholie, S.P. and Murphy, R.L. (2012). The history of antiretroviral therapy and of its implementation in resource-limited areas of the world *AIDS* 26(10):1231-1241doi:10.1097/QAD.0b013e32835521a3

Tawfik, L., Kinoti, S.N. (2006). *The impact of HIV/AIDS on the health workforce in developing countries*. Massachusetts: Management Sciences for Health and Maryland: University Research Co.

Tenthani, L., Haas, A. D., Tweya, H., Jahn, A., van Oosterhout, J.J., Chimbwandira, F., Chirwa, Z., Ng'ambi, W., Bakali, A., Phiri, S., Myer, L., Valeri, F., Zwahlen, M., Wandele, R. G., Keise, R. O.,(2014). *Retention in care under universal antiretroviral therapy for HIV-infected pregnant and breastfeeding women ('Option B+') in Malawi*. Ministry of Health in Malawi and IeDEA Southern Africa.

Tweya, H.,Gugsa, S., Hosseinipou, R. M., Speigh,T. C., Ng'ambi, W., Bokos, I. M., Chikonda, J., Chauma, A., Khoman, I.P., Phoso, M., Mtande, T., Phir, I. S.(2014). Understanding factors, outcomes and reasons for loss to follow-up among women in Option B+ PMTCT programme in Lilongwe, Malawi. *Tropical Medicine & International Health*. 19(11):1360-1366.

UNAIDS. (2013). *Report on the global AIDS epidemic*. Geneva: UNAIDS.

UNAIDS. (2013). *Getting to zero: HIV in eastern and Southern Africa*. Geneva: UNAIDS.

UNAIDS. (2014). *90-90-90: An ambitious treatment target to help end the AIDS epidemic*. Geneva: UNAIDS.

UNAIDS. (2014). *The GAP report*. Geneva: UNAIDS.

UNICEF. (2012). *Option B and Option B+: key considerations for countries to implement an equity-focused approach*. New York: UNICEF.

UNFPA Malawi. (undated). *Main population issues in Malawi*. Lilongwe: UNFPA Malawi.

WHO (2007). *Task shifting to tackle health worker shortages*. Geneva: WHO.

WHO (2007). *Prevention of Mother-To-Child Transmission (PMTCT)Briefing Note*. Geneva: WHO.

WHO (2014). *Implementation of Option B+ for Prevention of Mother to Child Transmission of HIV: The Malawi experience.* Brazzeville: WHO

Zachariah, R., Ford, N., Phillips, M., Lynch, S., Massaquoi, M., Janssens, V. and Harries, A.D. (2009). Task shifting in HIV/AIDS: opportunities, challenges and proposed actions for sub-Saharan Africa. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 103 (6): 549-558.doi: 10.1016/j.trstmh.2008.09.019.