

Challenges in implementing the 2006 World Health Organization HIV and infant feeding recommendations in Zambia

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Challenges in implementing the 2006 World Health Organization recommendations for infant feeding in the context of HIV in Zambia

A thesis submitted in partial fulfilment of the requirement for the degree of Masters of Public Health

By

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Declaration

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The thesis "**Challenges in implementing the 2006 World Health Organization (WHO) HIV and infant feeding recommendations in Zambia**" is my own work.

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What is more: "Thank you Jehovah for bringing me this far".

Abbreviations

AFASS	Acceptable, feasible, affordable, sustainable and safe
BFHI	Baby-friendly hospital initiative
HIV	Human immunodeficiency virus
IYCF	Infant and young child feeding
MOH	Ministry of Health
NFNC	National Food and Nutrition Commission
PCR	Polymerase chain reaction
PMTCT	Prevention of mother to child transmission of HIV
VCT	Voluntary testing and counselling
WHO	World Health Organization

Glossary of Terms

Antiretroviral therapy is a combination of three or more different antiretroviral drugs used in the treatment of those infected with HIV to reduce viral load.

Breast-milk substitute refers to any food being marketed or otherwise represented as a partial or total replacement for breastmilk, whether or not suitable for that purpose.

CD4 cells (also known as T4 or helper T cells) are lymphocytes (a type of white blood cell), which are key in both humoral and cell-mediated immune responses. These are the main target cells for HIV. Their numbers decrease during HIV infection, and their level is used as a marker of progression of the infection.

Cessation of breastfeeding means completely stopping breastfeeding, which includes no more suckling at the breast.

Colostrum is the thick yellow milk secreted by the breasts during the first few days after delivery, which gradually evolves into mature milk at 3–14 days postpartum. It contains more antibodies and white blood cells than mature breastmilk.

Commercial infant formula means a breastmilk substitute formulated industrially in accordance with applicable Codex Alimentarius standards to satisfy the nutritional requirements of infants during the first months of life.

Complementary food means any food, whether manufactured or locally prepared, used as a complement to breastmilk or to a breast-milk substitute, when either becomes insufficient to satisfy the nutritional requirements of the infant.

DNA, an abbreviation for deoxyribonucleic acid, is the carrier of genetic information found in cell nuclei.

Exclusive breastfeeding means an infant receives no other food or drink, not even water, other than breastmilk (which can include expressed breastmilk), with the exception of drops or syrups consisting of vitamins, mineral supplements or medicines.

Extended breastfeeding is breastfeeding an infant over the age of one year.

Human immunodeficiency virus (HIV) refers to HIV-1 in this review. Cases of mother-to-child transmission of HIV-2 are rare.

Infant refers to a child from birth to 12 months of age.

Mixed feeding refers to breastfeeding with the addition of fluids, solid foods and/or non-human milks such as formula.

Mother-to-child transmission (MTCT) indicates instances of transmission of HIV to a child from an HIV-infected woman during pregnancy, delivery or breastfeeding. The term is used in this document because the immediate source of the child's HIV infection is the mother. Use of the term mother-to-child transmission implies no blame, whether or not a woman is aware of her own infection status.

Nevirapine, or NVP, is an antiretroviral drug commonly used as a treatment regimen, either alone or in combination with other drugs, to prevent MTCT.

PCR means polymerase chain reaction, a laboratory method in which the genetic material (DNA or RNA) of the virus is detected and amplified. It can be both qualitative and quantitative.

Postnatal transmission is mother-to-child transmission of HIV after delivery, during the breastfeeding period.

Prelacteal feeds are artificial feeds or drinks given to a baby before breastfeeding is initiated.

Replacement feeding means the process of feeding a child who is not receiving any breastmilk with a diet that provides all the nutrients the child needs until the child is fully fed on family foods.

Zidovudine, or ZDV, is an antiretroviral drug which inhibits HIV replication. It was the first drug licensed to treat HIV infection. Today it is frequently used in combination with other antiretroviral drugs and, alone or in combination, it is used in the prevention of mother to-child transmission of HIV. (It is also known as retrovir or azidothymidine, AZT).

3TC - a nucleoside reverse transcriptase inhibitor that is very effective in combination with zidovudine in treating AIDS and HIV.

Abstract

Background: The World Health Organization (WHO) HIV and infant feeding recommendations have not been effectively implemented in Zambia.

Objectives: To describe the adaption and adoption of WHO HIV and infant feeding recommendations; to explore best practices to improve program implementation; to identify and critically analyse key factors influencing program implementation; to formulate recommendations for Ministry of Health and key actors to optimize infant feeding practices.

Methods: Literature review.

Results: While being guided by the conceptual framework, the study has shown that several challenges affected implementation of 2006 WHO HIV and infant feeding recommendations. Poor strategic planning affected program implementation. Legislative instruments were neither ratified nor enacted thus were not supportive of infant feeding program. Policies were not reviewed/ revised to enable infant feeding program implementation. Key actors were not involved in the program planning and implementation at all levels. Infant feeding messages were inconsistent and confusing for HIV-infected mothers. Program impact was not measured due to weaknesses in the health information management system.

Conclusion: The major program implementation challenge in the study was the inappropriateness in infant feeding management and the lack of a national infant feeding coordinator.

Recommendations: MOH should move the infant feeding program to MOH, nutrition unit and deploy a coordinator. The nutritionist Southern province should form multi-stakeholder teams to advocate for review/ revision of policies, ratification and enactment of legislative instruments. All levels should jointly plan and implement the program with the community/key actors.

Key words: WHO, HIV, infant feeding, recommendations, Zambia.

Words: 11,933

Introduction

Before coming for the International Course on Health and Development programme, I was deployed as a nutritionist at the Provincial Medical Office in Livingstone, Zambia. My responsibilities entail problem identification, planning, coordinating, implementing, monitoring, evaluation and resource mobilization for all nutrition programmes in the province.

Through these responsibilities I have observed that infant feeding in the context of human immunodeficiency virus (HIV) is one of the main public health problems. In Zambia, 40% of the children acquire HIV from their mothers. Breastfeeding contributes the highest proportion. Additionally, about 44% of the HIV-infected children below two years suffer from malnutrition in the country. HIV and malnutrition rates are still high despite efforts to implement international recommendations the country has adapted.

In view of the above problems, I have decided to critically analyse the challenges in implementing the 2006 WHO HIV and infant feeding recommendations in Zambia. The analysis will enable me make recommendations on infant feeding strategies to the Ministry of Health and other potential key actors. The recommendations will improve infant feeding in the context of HIV in the country. This will decrease malnutrition and the HIV burden among infants and young children.

The thesis is important for Zambia because its findings will help reduce child morbidity and mortality. This will not only reduce the country expenditure on health care but will improve the quality of life of the affected and infected. By so doing human, financial and material resources spared as a result of reduced morbidity and mortality can be directed at other aspects of economic development.

Chapter 1: Background information

This chapter presents background information.

1.1 Geography

Zambia is one of the countries in Sub Saharan Africa. The country shares borders with eight countries. In the north there is Tanzania and the Democratic Republic of Congo. To the east, there is Malawi and Mozambique. In the south lies Zimbabwe, Botswana and Namibia while in the west there is Angola. The land surface covered by the country is 752,612 km². Zambia has nine provinces with 72 districts (CSO, 2009).

Figure 1: Map of Zambia



Source: Nations online project

1.2 Demographic profile

In 2010, Zambia's population is estimated at 13 million people (CSO, 2011a; CSO, 2011b; MOH, 2010a). The average annual rate of growth is 2.8%. Females constitute 49% of the population while males are 51%. The country's population density is 17.3 persons per km² (CSO, 2011a).

1.3 Socio-economic profile

Zambia's earns most of its foreign exchange from exporting copper. However, the prices of copper on the international market are unstable. Consequently, poverty levels are high. Sixty four per cent (64%) of the population are poor (WHO, 2009a; FAO, 2009).

1.4 Health profile

1.4.1 Health sector management and coordination

The major provider of health services in Zambia is the public sector. Other actors in health service provision are the private sector, civil society and faith-based organizations. The Ministry of Health (MOH) is in charge of all health services. Coordination is the sole responsibility of MOH. The country operates 1489 public health facilities, 271 private health facilities and 122 mission health facilities (MOH, 2010a).

1.4.2 Health care financing

Most of the funds used to finance health services are from Government. Cooperating partners, multilateral, bilateral and individuals also provide financial support to MOH (WHO, 2010).

1.4.3 Health Workforce

Human resources for health in Zambia are grossly low across all professions (WHO, 2010). This has negatively impacted on service provision. Forty three per cent (43%) of the positions are not filled. As a result, certain health facilities particularly in remote areas are operated by staff with no medical background. Some health facilities are operated by a single medical staff person (MOH, 2010a).

1.4.4 Accessibility of health services

Majority of Zambian population encounter difficulties in accessing health services. Forty six per cent (46%) of the rural population travel beyond 5km to access health services. Health facilities are not able to operate mobile health services to reach remote populations due to limited resources. In instances where services are accessible, patients queue for many hours before being attended to (MOH, 2010a). Furthermore, infrastructure is either inappropriate or insufficient (MOH, 2010a; SADC, 2009).

1.4.5 Child health indicators

Children are more vulnerable to malnutrition in their first two years of life (MOH, 2008). Among children less than two years approximately 55% are stunted, 5% are wasted and 17% are underweight (CSO, 2009). Important to note is that, children infected by human immune-deficiency

virus (HIV) usually are malnourished. Furthermore, malnutrition can cause infant and under-five mortality, regardless of HIV status (MOH, 2007b).

Infant mortality rate decreased from 95 to 70 deaths per 1,000 live births between 2001/2 and 2007. In the same period, under five mortality rate decreased from 168 deaths per 1,000 live births to 119 deaths per 1,000 live births (CSO, 2009). Neonatal mortality improved from 37 to 34 per 1,000 live births between 2001/2002 and 2007 respectively (CSO, 2009; MOH, 2005). Of concern is that, more than one quarter die within one month of life. Two-thirds of the children who die do so within the first year of life (CSO, 2009).

1.5 Disease profile

Malaria is the biggest cause of illness and death in children less than five years in Zambia (MOH, 2010a; MOH, 2005). This is followed by respiratory infections, then diarrhoea (MOH, 2005; CSO, 2009). Malnutrition follows and then anaemia (MOH, 2005). However, HIV and acquired immunodeficiency syndrome (AIDS) is rapidly becoming the leading cause of illness and death in children (MOH, 2005).

Zambia is among the world's leading countries in HIV prevalence (MOH, 2007b). The country is ranked 6th highest in the world (WHO, 2011). According to WHO (2011), 13.5% of the population aged 15-49 years are infected with HIV. Antenatal women are infected with HIV are estimated at 16.6% (NAC, 2009; MOH, 2010b). WHO *et al* (2003) reveals that, "a woman infected with human immunodeficiency virus (HIV),... can transmit the virus to her child during pregnancy, labour or delivery, or through breastfeeding" (WHO *et al* 2003, p.3) (see Table 1).

Table 1: Estimated risk and timing of mother-to-child transmission of HIV in the absence of interventions

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

Source: UNICEF, 2003

1.5.1 HIV in infants and young children in Zambia

Given the high antenatal HIV prevalence, the risk of mother-to-child transmission of HIV is high (NAC, 2005). It is estimated that, in the absence of intervention, HIV-infected mothers will infect 40% of their

babies (CIDRZ, 2011; NAC, 2005). This percentage is higher than 33.3% expected internationally (WHO *et al.*, 2007, UNICEF, 2005). The HIV prevalence among infants and children in Zambia is approximately a tenth of the adult prevalence (MOH, 2007b).

Notably, breastfeeding accounts for a higher HIV transmission rate among infants and young children (UNICEF, 2003). Breastfeeding is responsible for a third of HIV transmission among children in population who practice it for extended periods. Notably, breastfeeding is responsible for more than a third of the HIV transmission. It can account for up half of HIV transmission rates (LINKAGES, 2004; WHO, 2003). This makes prevention of mother-to-child transmission of HIV (PMTCT) through infant feeding a pillar to reducing HIV prevalence (UNICEF, 2011a; LINKAGES, 2004). Due to high HIV prevalence, life expectancy at birth in Zambia has decreased from 50 years in 2000 to 49 years in 2010 (CSO,2009; WHO, 2009a).

1.6 Background to infant feeding practices in Zambia

Zambia recognized the need to prevent the transmission of HIV from the mother to the child when there was discovery that breastfeeding exposed infants potentially transmits HIV (USAID, 2010). At that point mother-to-child transmission of HIV raised concern in the country. In 1997, the National Food and nutrition commission (NFNC) called upon LINKAGES to guide the formulation of the National Nutrition Policy (USAID, 2005). The breastfeeding policy did not provide answers to risks surrounding HIV transmission through breastfeeding (LINKAGES, 2004; LINKAGES, 2006). The uncertainty led to the initiation of the Ndola Demonstration Project (NDP) in 1999 (LINKAGES, 2005). The objective of the project was to reduce mother-child transmission of HIV and HIV prevalence. In 2000, antenatal clinics within MOH piloted voluntary counselling and testing (VCT) and infant feeding counselling. Infant feeding counselling became a part of the day to day activity in the PMTCT program (Horizon, 2001; USAID, 2005). However, PMTCT efforts were biased to VCT and introduction of antiretroviral drugs (LINKAGES, 2005). The project made it possible to incorporate infant feeding into maternal and child health services. Subsequently, infant feeding was also integrated into community services (LINKAGES, 2005). By 2005, infant feeding activities became part of the antenatal and postnatal consultations in 60 sites. The sites were limited to six districts and in three provinces. Recognizing the success of the project Government requested its roll out to all health facilities countrywide (USAID, 2005). Uncertainty on HIV and infant feeding still remains a problem (Saadeh *et al.*, 2005).

Chapter 2: Problem Statement, Objectives and Methodology

This chapter presents the problem statement, objectives and methodology.

2.1 Problem statement

Feeding HIV exposed infants is a major public health challenge in Zambia (LINKAGES and Zambia, 2005). This is because HIV is found in breastmilk of an HIV-infected mother (Coovadia, 2007; Doherty *et al.*, 2006). In low-resource populations, breastfeeding is a strategy employed by World Health Organization (WHO) to maximise child survival (Info population report, 2006; MOH and NFNC, 2008). In Zambia breastfeeding is an acceptable means of infant feeding (NFNC and MOH, 2009). Ninety eight (98%) of all children in the country have been breastfed before in their life time (CSO, 2009; NFNC and MOH, 2009). The risk of acquiring HIV is incremental. Transmission goes on provided the infant breastfeeds (WHO, 2004; MOH, 2010b). According to Reada *et al* (2004), for HIV-infected mother extended breastfeeding results in a 42% likelihood of transmitting HIV to her offspring. A study by Anoje *et al* (2012) reveals that, of all the infants born of HIV- infected mothers in Zambia, 84% of them breastfed at one time in their lives.

According to WHO *et al* (2010), “mothers known to be HIV-infected ... should exclusively breastfeed their infants for the first 6 months of life...” (WHO *et al.*, 2010). Exclusive breastfeeding is a safety net against contracting HIV in that it does not damage the stomach, thereby reducing penetration of HIV into the infants body (MOH, 2008). WHO *et al* (2010) also states that, “when replacement feeding is acceptable, feasible, affordable, sustainable and safe, avoidance of all breastfeeding by HIV-infected mothers is recommended” (WHO *et al* 2010, p.7). The high poverty levels for most populations in Zambia do not guarantee applicability of replacement feeding (FAO, 2009, WHO *et al.*, 2007b; Arpadi *et al.*, 2009; WHO *et al.*, 2010). Failure to abide to stipulated guidelines for replacement feeds has resulted in mixed feeding, which potentially causes HIV transmission (Moland *et al.*, 2010). Mixed feeding causes abrasion of the gut, therefore allowing HIV to gain access into the infant’s body (MOH, 2008; Moland *et al.*, 2010). As a result, recommended feeding options (breastfeeding and replacement feeding), predisposes infants to HIV (Moland *et al.*, 2010; Saadeh *et al.*, 2005). Therefore, balancing the risk remains a serious public health challenge (Moland *et al.*, 2010; LINKAGES, 2005a). This makes optimizing infant feeding while PMTCT very challenging (UNICEF, 2011b). Consequently, HIV and malnutrition rates are still high in the country (MOH, 2005; NFNC and MOH, 2009; MOH, 2007b; MOH, 2011).

In an order to address these challenges, WHO in 2006 issued new infant feeding recommendations in the context of HIV (see Annex 1). These were meant for Governments to adopt and adapt (WHO *et al.*, 2010). Zambia adopted the recommendations. Adaptation was done in the local context within the PMTCT program. However, implementing these recommendations has posed uncertainty to program managers, planners and implementers given the risk involved with available feeding options (Katepa-Bwalya *et al.*, 2011). These challenges provide a spring-board for more in-depth examination of country context-specific barriers and enablers to effective implementation of WHO recommendations. The HIV and malnutrition situation raises important questions such as:

- i) What is the impact of the 2006 WHO HIV and infant feeding recommendations on HIV-free survival on all HIV-exposed infants in Zambia?
- ii) How feasible is it for HIV-infected mothers and health care providers to implement and sustain WHO recommendations as a strategy to reduce postnatal transmission of HIV and malnutrition?
- iii) What lessons can be learnt from other country experiences to improve implementation of recommendations?
- iv) What are the best facility and community-based strategies to improve infant feeding practices in the context of HIV, considering Zambia is a high HIV prevalent country?

Exploring these questions will create ideas to improve infant feeding practice. This will contribute to the reduction of HIV and malnutrition in Zambia. Ultimately it will reduce Government and family expenditure on health.

To help address the problem, I have decided to base my thesis on the challenges Zambia faced in implementing recommendations issued by WHO on infant feeding in the context of HIV. At the end of the study I will make recommendations to the Ministry of Health and key actors to optimize infant feeding practices.

2.2 Study Objectives

2.2.1 General objective

To critically analyse factors influencing implementation of WHO HIV and infant feeding recommendations in Zambia in order to give recommendations to the Ministry of Health and other potential key actors to optimize infant feeding practices.

2.2.2 Specific Objectives

1. To describe the adaption and adoption of WHO HIV and infant feeding recommendations in Zambia using the program implementation conceptual framework.
2. To explore best practices to improve the implementation of the WHO HIV and infant feeding recommendations.
3. To identify and critically analyse key factors influencing implementation of WHO HIV and infant feeding recommendations.
4. To formulate recommendations for the Ministry of Health and key actors to optimize infant feeding practices.

2.3 Methods

In order to collect information for my thesis I searched and reviewed published and unpublished literature in the English language. For published literature I searched the following:

Search engines: Pub med, Google and Google Scholar

Websites: WHO, MOH Zambia, LINKAGES

Key words: Technical, strategies, strategic, planning, operationalizing, key actors, involvement , human capacity, development, costing, resources, impact, WHO, HIV, infant, feeding, young, child, breastfeeding, complementary, BFHI, prevention, mother, transmission, malnutrition, prevalence, recommendations, challenges, Zambia.

These words were used singly or in various combinations. I searched both electronic and hard copies. The search was limited to documents published in English because that is the official language in my country. Documents searched were from the year 2000 to 2012. These included research articles and journals; International and national policy documents; national guidelines; national strategic documents; Government and program reports; peer reviewed articles and conference documents.

I also used gray literature and data through personal communication with key informants at MOH, LINKAGES and National food and nutrition commission (NFNC).

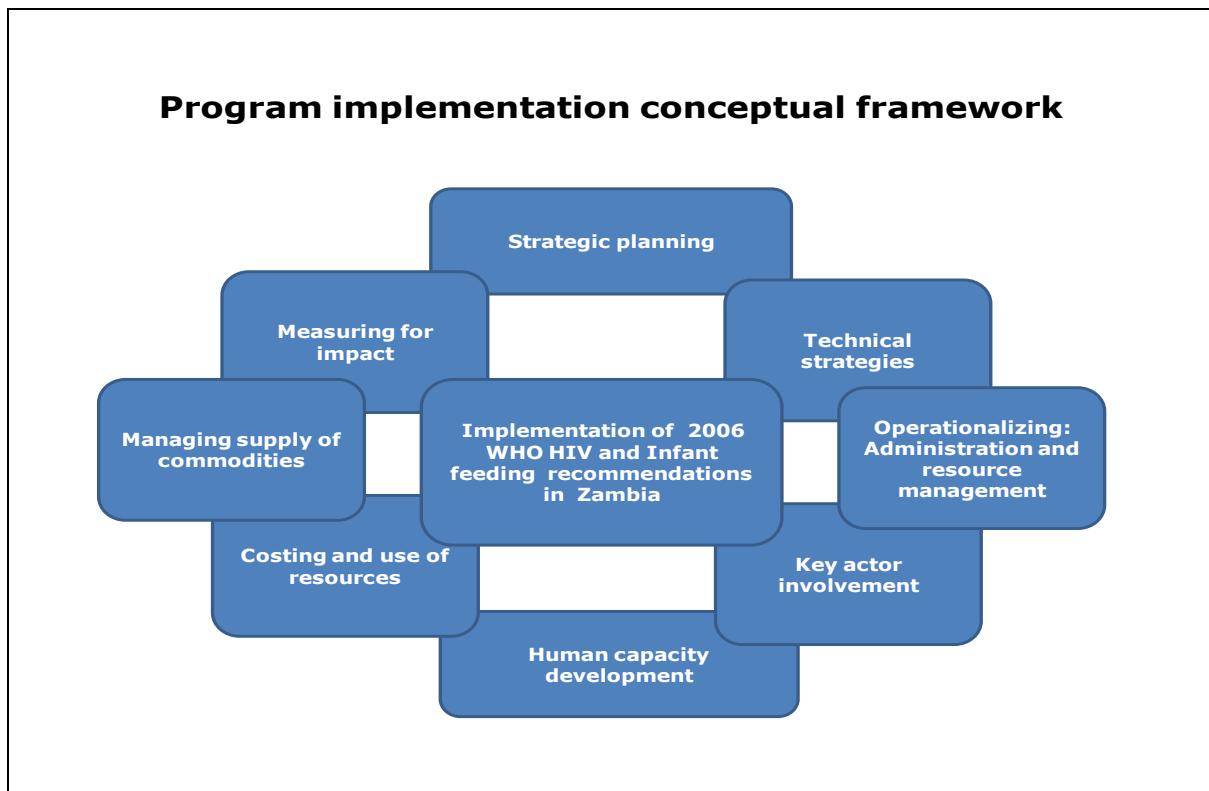
2.4 Limitations

Getting data from Zambia and particularly from within the Ministry of Health was a major challenge. Efforts were always in vain because key contact people were mostly reported to be out office. Alternative people within the Ministry of Health I managed to contact furnished me with inappropriate data for my thesis.

2.5 Conceptual framework

The conceptual framework for my analysis is adapted from Family Health International handbook for designing and implementing HIV programs as shown in Figure 2.

Figure 2: Conceptual framework



Source: Adapted from Family Health International 2002

I have slightly adapted the conceptual framework from Family Health International in line with my area of study. It is against this background that "expanded comprehensive response" in the conceptual framework has been replaced by "WHO HIV and infant feeding recommendations in Zambia". I have also replaced "non-governmental organisation" involvement with "key actor" involvement. Maintaining non-governmental organisation was limiting the scope of the study. In order to include actors such as the public and private sector, civil society and family/household members "key actors" is more appropriate. The public sector includes Government ministries. The private sector encompasses private for-profit and private not-for-profit. Civil society members are community leaders, advocacy, women and church groups, traditional birth attendants, and other community health volunteers. Family/household members include fathers, mothers, mother's in-law and grandmothers.

I have chosen this framework because it is relevant and applicable to program implementation analysis at all levels (FHI, 2002; Atun *et al.*,

2009). The framework can be used to identify past challenges of program implementation and project future improvements (Atun *et al.*, 2009). This framework comprises a set of interacting elements namely: strategic planning; technical strategies; operationalizing; key actor involvement; human capacity development; costing and use of resources; managing supply of commodities and measuring for impact (FHI, 2002). These elements can be adapted according to the health problem being analysed (Atun *et al.*, 2009; FHI, 2002).

Chapter 3: Zambia's experiences from implementing the 2006 WHO HIV and infant feeding recommendations

The chapter has eight sections namely: 3.1) strategic planning; 3.2) technical strategies; 3.3) operationalizing; 3.4) key actor involvement; 3.5) human capacity development; 3.6) costing and use of resources; 3.7) managing supply of commodities and; 3.8) measuring for impact.

3.1 Strategic planning

Strategic planning is a vital step to infant feeding program implementation (FHI, 2002). Planning helps to review national policies and helps verify if new recommendations have been addressed (Bhandari *et al.*, 2008). Strategic planning steps include situation assessment, response assessment, strategic plan development and resource mobilization (FHI, 2002).

3.1.1 Situation assessment

Situation assessment requires collecting key information (UNICEF, 2011b; FHI, 2002). Information is important for advocacy. It helps in the development of communication messages on behaviour change, strategizing training interventions and community mobilization. Information gives an idea on how recommended feeding options will be managed by health workers and HIV-infected mothers (LINKAGES, 2004). WHO *et al* (2003) suggest that information should be collected on feeding practices as shown in Box 1.

Box 1: Information on feeding practices and family resources

- local and cultural practices of HIV and infant feeding
- rates of initiation and exclusive breastfeeding
- breastfeeding duration
- ability to afford replacement feeding
- types of food used for replacement feeding
- types of locally available milk (including quality and cost)
- diarrhoea and pneumonia rates
- capacity of care givers to follow feeding option recommendations
- sanitation, access to safe water, fuel (percentage population)
- average living wage
- local meaning and understanding of acceptable, feasible, affordable, sustainable and safe (AFASS) (see Annex 3)
- barriers to VCT
- extent of stigma and disclosure for the HIV-infected
- health workers and communities attitude to infant feeding practices

Source: adapted from UNICEF., 2003

Other information needed is shown in Box 2 below (UNICEF, 2003).

Box 2: Information on Demand for services

- Estimated number of mothers and infants to be affected by the HIV and infant feeding policy
- HIV prevalence among mothers and pregnant women
- Antenatal care (family coverage (as an opportunity for (VCT)
- Projected number of women in need of support for exclusive /continued breastfeeding and transitioning to replacement feeding
- Status of baby-friendly hospital initiative (BFHI)
- Level of health workers counselling skills and knowledge
- Extent of follow-up after infant feeding training
- Adequacy of infant feeding counselling offered
- Availability of job aids such as counselling cards, algorithms, information and education materials
- Strength of the referral system and coordination between health provision services areas
- Availability of community support groups
- Availability of VCT services in antenatal care, reproductive health and adolescent-friendly services

Source: adapted from UNICEF, 2003

The information in Boxes 1 and 2 can be collected using various methods and from different key sources. However, formative research is the most commonly used method (UNICEF, 2003).

Information was collected from four key data sources. These are the 2007 Zambia Demographic and Health Survey, 2008 World breastfeeding trends initiative-Zambia report, the 2008 Infant and young child feeding (IYCF) assessment report and 2010 formative research (NFNC, 2008; Anon, 2009; CSO, 2009; USAID, 2010).

A review of the four sources shows that most of the information requirements as outlined in Boxes 1 and 2 are available with a few exceptions. Information on barriers to VCT was not collected. In addition, information on the degree to which HIV-infected women are stigmatized and effects of disclosure was also not collected. A study by Albrecht *et al* (2007), demonstrate that stigma and disclosure is problematic. Twenty eight per cent (28%) of the HIV-infected mothers who reveal their positive HIV status after VCT suffer negative outcomes (MOH, 2010b; Semrau *et al.*, 2005). The Human rights watch report (2007) presents evidence that, if the partner of an HIV-infected mother discovers her status, consequences include being expelled from her home. These findings are consistent with Semrau *et al* (2005) and Chinkonde *et al* (2010).

In addition, information on availability of job aids was not collected (UNICEF, 2003). A study by Katepa-Bwalya *et al* (2011) shows that, counselling cards are a useful job aid. Notably, job aids are developed from guidelines. NFNC (2008) acknowledges the lack of guidelines to direct implementation of infant feeding recommendations. Some key actors in Zambia developed and began using the job aids without guidelines. This was also done without NFNC's authority (Chopra *et al.*,

2009). Consequently, the 2010 formative assessment IYCF report and the 2008 World breastfeeding trends initiative-Zambia reports shows that there were inconsistencies in infant feeding messages being communicated to the public (Anon, 2009; NFNC, 2008).

3.1.2 Response Assessment

Response assessment involves using information from the situation assessment to review existing policies and targets (UNICEF, 2003). It requires engaging key actors dealing with infant feeding (FHI, 2002). This process helps address gaps in marginalized populations. It ensures consistency during program implementation (UNICEF, 2003).

Policies reviewed do not show corresponding changes in content from the time Zambia adapted WHO infant feeding recommendations of 2006. Similarly, infant feeding targets were not adjusted.

3.1.3 Strategic Plan Development

The development of a strategic plan is informed by both the situation and response assessments (FHI, 2002). I could not find evidence to show how information from the situation and response assessment was used to inform the strategic planning development process.

3.1.4 Resource Mobilization

Resources should be mobilized from key actors (both public and private sectors) (FHI, 2002). A study by Chopra *et al* (2009) shows that financial, material and human resources for infant feeding program were inadequate. The program was poorly financed in comparison to other health programs (Chopra *et al.*, 2009; NFNC, 2008; MOH, 2010a). According to Chopra *et al* (2009), infant feeding was of less importance within the PMTCT program. Notably, there was no specific budget line targeting infant feeding activities at all levels. Given that infant feeding was considered a crosscutting issue it was expected that the program would get funding through other programs such as PMTCT, maternal and child health (SPMO, 2011). The NFNC (2008) acknowledges that, the infant feeding program lacked political support and was poorly financed at all levels.

3.2 Technical strategies

Zambia has several strategies for infant feeding program implementation (MOH, 2011). Strategies are aimed at improving program access and increasing coverage (FHI, 2002). Strategies are embedded in various documents (MOH, 2011). Technical strategies lagged far behind new HIV and infant feeding evidence (NFNC, 2008).

3.2.1 Policies supporting infant feeding

Policies can be used to advocate for change (UNICEF, 2003). They facilitate uniformity in service provision (LINKAGES, 2004). Policies which support the infant feeding program are National Food and Nutrition Policy (2006) and National HIV and AIDS/STI/TB Policy 2005 (NAC, 2005; MOH, 2006).

Policies are neither reviewed nor revised (NFNC, 2008). To date (2012) Zambia is still using policies developed earlier than when infant feeding recommendations were adapted.

3.2.2 Infant feeding guidelines

Guidelines serve a similar purpose as policies (see 3.2.1) (LINKAGES, 2004). Several guidelines are in place to facilitate the implementation of the infant feeding program in Zambia (MOH, 2011). Guidelines are: the Baby-friendly hospital initiative (BFHI), Recommendations for IYCF in the context of HIV, the National IYCF operational strategy and Nutrition guidelines for care and support for people living with HIV (MOH, 2007a; NFNC, 2008; MOH, 2006-2010; MOH, 2011).

Baby friendly hospital initiative

Interestingly, the BFHI including the ten steps to successful breastfeeding (see Annex 3) were reviewed and a training plan to expand BFHI was developed (NFNC, 2008). Fifteen health workers were trained (for the whole country) by the United Nations Children's Fund in accordance with 2006 recommendations. The training included HIV in BFHI implementation (Chopra *et al.*, 2009). However, the lack or shortage of nutritionists across the country slowed down plan for expansion (NFNC, 2008). The nutrition unit at the MOH headquarters was understaffed with only two nutritionists. All provincial offices lacked nutritionists (Chopra *et al.*, 2009). Very few districts, hospitals and health centres had nutritionists deployed (WHO, 2010). According to NFNC (2008), the BFHI implementation was dependent on other cadre who lacked training.

In addition, managers at all levels lacked guidelines on human and material resources management. Infant feeding was not part of the services routinely conducted at the health facility. This is evidenced by lack of infant feeding program job aids to help improve performance of health workers. It is also evidenced in the inefficient deployment of human resources and the lack of a tracking mechanism to ascertain training needs (Chopra *et al.*, 2009). Additionally, the ten steps to successful breastfeeding were not readily available in BFHI facilities (SPMO, 2011). Whereas private institution provides considerable maternal and child health services, BFHI implementation was concentrated in public health facilities (NFNC, 2008). According to CSO (2009), 5% of the Zambian women deliver at private health facilities.

Recommendations for IYCF in the context of HIV

Zambia developed infant feeding recommendations aimed at addressing feeding needs of infants born of HIV-infected mothers (MOH, 2007a). It is encouraging to note that national recommendations are consistent with international recommendations. However, there were challenges in implementing all the recommendations. For example, expressing and heat-treating breastmilk (USAID, 2010). Whereas it maintains exclusive breastfeeding it is not widely practiced by HIV-infected mothers in Zambia (USAID, 2010; WHO *et al.*, 2010). The practice is perceived unusual by most HIV-infected mothers, civil society, and family or community members. Expressed breastmilk is considered not clean by HIV-infected mothers. Most HIV-infected mothers do not trust caregivers to maintain hygiene whilst using expressed heat-treated breastmilk (USAID, 2010). According to USAID (2010), expressing and heat-treating breastmilk is useful for working mothers as it reduces inclination to mix feed. Mixed feeding as earlier stated, is a source of HIV infection for exposed infants. Notably, expressing and heat-treating breastmilk is not as a major means of feeding infant (WHO *et al.*, 2010).

National IYCF operational strategy

An operational strategy informs the operationalizing of key strategies for implementing infant feeding programs (MOH, 2006-2010). Fortunately, a review of the IYCF operational strategy (2006-2010) shows that infant feeding in the context of HIV was well articulated. However, by 2006 when the recommendations were adapted its development still underway (NFNC, 2008).

Nutrition guidelines for care and support for people living with HIV

These guidelines provide information to HIV-infected mothers on how they can optimise infant feeding services (MOH, 2011). Interestingly, the guidelines have been reviewed in accordance with the new infant feeding evidence.

3.2.3 Legislative instruments supporting infant feeding

Legislative instruments provide for the protection of women's rights with regards breastfeeding (NFNC, 2008). The following are the legislative instruments.

Maternity Protection 183 of 2000 and Statutory Instrument 56 and 57

In Zambia, implementation of the above instruments is supported by the Employment Act CAP 268 (NFNC, 2008). Six per cent (6%) of the Zambian women are in formal employment and 94% are in informal employment (Koyi, 2007; Nkonkomalimba, 2010). Zambia has neither

ratified nor enacted Maternity Protection law which supports the rights of women. Furthermore, Statutory Instrument 56 and 57 which support non-unionized mothers is not enforced or monitored. Women in both formal and informal employment cannot exercise their rights of optimizing infant feeding. According to the Employment Act, maternity leave in the formal sector is 90 days. For non-unionized mothers maternity leave is 120 days. In addition, no law provides for mothers to have break at work to breastfeed or knock off early as required by Maternal Protection law. There are no breastfeeding rooms at workplaces in Zambia (NFNC, 2008).

Interestingly, Maternal Protection law acknowledges the importance of fathers in caring for newborns. Three days paternity leave days are allowed. Fortunately, conditions of service in the public sector provides for paternity leave. However, paternity leave is not yet law. Granting it is employer discretion. Some employers grant it while others do not (NFNC, 2008).

The International code of marketing breastmilk substitutes

Zambia translated the code of marketing breastmilk substitutes through Statutory Instrument number 48 (Food and drug Act regulation, 2006). Implementation was voluntary (NFNC, 2008; Food and drug Act regulation, 2006). Enforcement of legislation was not there. The code was violated. The reason advanced is the lack of enforcement tools. The 2008 World breastfeeding trends initiative-Zambia report reveals an aggressive approach to marketing of breastmilk substitutes in Zambia (NFNC, 2008).

3.3 Operationalizing

Operationalizing involves turning technical strategies into activities (FHI, 2002). Infant feeding activities are breastfeeding, complementary feeding, counselling and administration of antiretroviral prophylaxis (MOH, 2006-2010; Mandala *et al.*, 2009). Successes and challenges in implementing these activities are available in literature.

3.3.1 Infant feeding 0-6 months

According to WHO *et al* (2010), "exclusive breastfeeding is recommended for HIV-infected mothers for the first six months of life unless replacement feeding is acceptable, feasible, affordable, sustainable and safe for them and their infants before that time" (WHO *et al* 2010, p.23). The concept of AFASS (see Annex 2) was difficult for health workers to comprehend (Chopra *et al.*, 2009). The conditions under which to suggest replacement feeding to an HIV-infected mother were vague in the recommendations (WHO *et al.*, 2010). However, health workers are the source of infant feeding information for HIV-infected mothers and have great influence on them (USAID, 2010). A study by Chisenga *et al* (2010), affirms that 40% of HIV-infected mothers do not doubt infant feeding

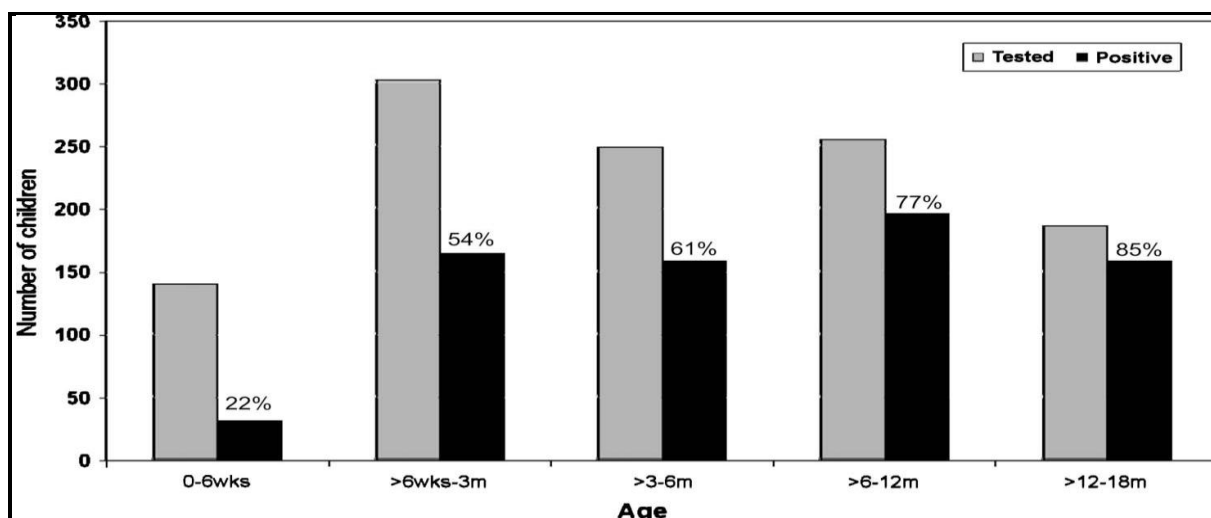
information from health workers. Health workers do not adhere to techniques recommended for counselling. Instead of counselling HIV-infected mothers to arrive at an infant feeding decision, health workers prescribe the infant feeding method (Chisenga *et al.*, 2010). Health workers prefer commercial infant formula feeding as the best method for infants born of HIV-infected mothers. In fact, the bias against breastfeeding for HIV-infected mothers has nothing to do with their infant feeding training background. Despite being trained health workers still prescribe feeding options to HIV-infected mothers (Horizons, 2001).

Additionally, health workers advocate for infant formula, but rarely probe the ability of an HIV-infected mother to use it (Horizons, 2001). During counselling the feasibility of finding safe water and ready fuel was not sought from HIV-infected (Horizons, 2001; Arjan de Wagt & David Clark, 2004; Kankasa *et al.*, 2002). Opting not to breastfeed for the first six months is more risky than acquiring HIV (LINKAGES, 2004, Info population report, 2006).

In addition, the Chilenge infant growth, nutrition and infection study (CIGNIS) reveals confusion in breastfeeding practice of many HIV-infected mothers (Chisenga *et al.*, 2010). These findings are consistent with Doherty *et al.* (2006). The grey area relates to the nature of breastfeeding advice to give HIV-infected mothers (WHO *et al.*, 2010; USAID, 2010). Interestingly, the ideal time frame for HIV-infected mothers to cease breastfeeding was not explicit (Arpadi *et al.*, 2009; WHO *et al.*, 2010). According to Arpadi *et al.* (2009) not much is known about how to breastfeed exposed infants after the age of 6 months. Infant feeding method after this age is relegated to the HIV-infected mother together with her next of kin (Arpadi *et al.*, 2009). Subsequently, at six months HIV-infected mothers were discouraged from breastfeed. Alternatively, they were allowed to continue and cease when they deemed it right (Chopra *et al.*, 2009). Health workers' advice was changing frequently. This was confusing to HIV-infected mothers (Chisenga *et al.*, 2010). Whereas exclusive breastfeeding is recommended for HIV-infected mothers, there is knowledge that breastmilk has the potential to transmit HIV (Doherty *et al.*, 2006).

A study Kankasa *et al.* (2009) demonstrates that infants acquire HIV postnatally through feeding methods (specifically breastfeeding) used. Figure 3 shows increased rate of children who sero-converted increased from 22% among infants below six weeks of age to 85% among children between the age of 12-18 months (Kankasa *et al.*, 2009). It is important to note that, infants are tested for HIV after six weeks. The explanation is that, this is the time when it is possible for HIV transmission during delivery to be distinguished from that of breastfeeding. This test used is polymerase chain reaction (PCR) (WHO *et al.*, 2006).

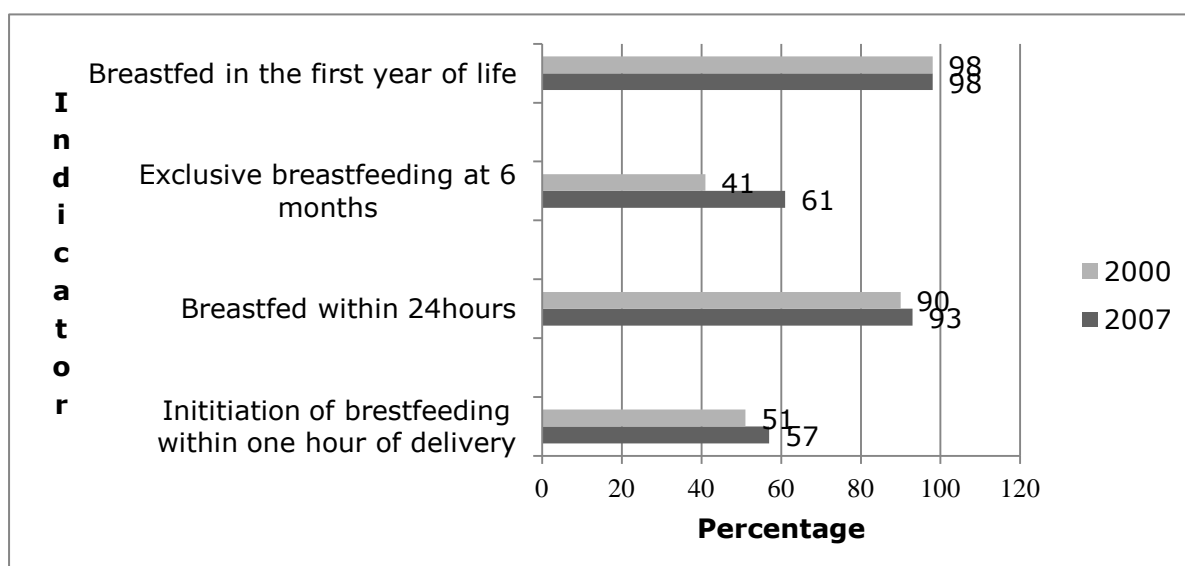
Figure 3: DNA PCR positivity rates by age- May 2006 to June 2007 in paediatric wards, UTH, Lusaka, Zambia



Source: Kankasa *et al.*, 2009

Whereas breastfeeding is a source of HIV infection it is an important intervention to prevent malnutrition (UNICEF, 2011b; MOH, 2008; Doherty *et al.*, 2006). Figure 4 shows breastfeeding practices in Zambia for 2000 and 2007. Initiation of breastfeeding and exclusive breastfeeding rates increased from 51% to 57% and 41% to 61% respectively. Figure 4 also shows that breastfeeding within 24 hours slightly increased from 90% to 93%. The proportion of children breastfed in the first year remained the same (CSO, 2009).

Figure 4: Breastfeeding practices in Zambia



Source: Adapted from NFNC, 2006-2010

Despite the increased breastfeeding rates, the National nutrition surveillance survey report (2009) show that 38% of the infants less than

six months are mixed fed (NFNC and MOH, 2009). Of these, 9% are given various prelacteal feeds (CSO, 2009). Water accounts for 30% prelacteal feeds given, herbal liquids 23% while various types of milk accounts for 15% (NFNC and MOH, 2009). Furthermore, caesarean section accounts for 2% of deliveries (Anon, 2009).

According to MOH (2011), 44% of the HIV-infected children are underweight. These children are less than minus two weight-for-age (MOH, 2011). This proportion is higher than the general population of 15% (CSO, 2009). HIV prevalence is over 50% among in-patient children in nutrition rehabilitation units. In fact, 40% or more die (Heikens, 2008).

3.3.2 Complementary feeding 6-23 months

At six completed months all infants regardless of HIV status should be initiated to complementary feeding (Disha *et al.*, 2012; MOH, 2010b; MOH, 2011). This is because breastmilk becomes insufficient to meet the infant's growing needs (MOH, 2008). Breastfeeding should continue depending on the mothers' economic circumstances (MOH, 2007a; Doherty *et al.*, 2007). For non-breastfed children if not given breastmilk, 1-2 cups of milk are recommended (MOH, 2007a). Complementary foods should be tailored to meet the nutritional needs of the infant. Food given should also be hygienically prepared to make it safe (MOH, 2007a; WHO *et al.*, 2006; WHO *et al.*, 2010; MOH, 2011).

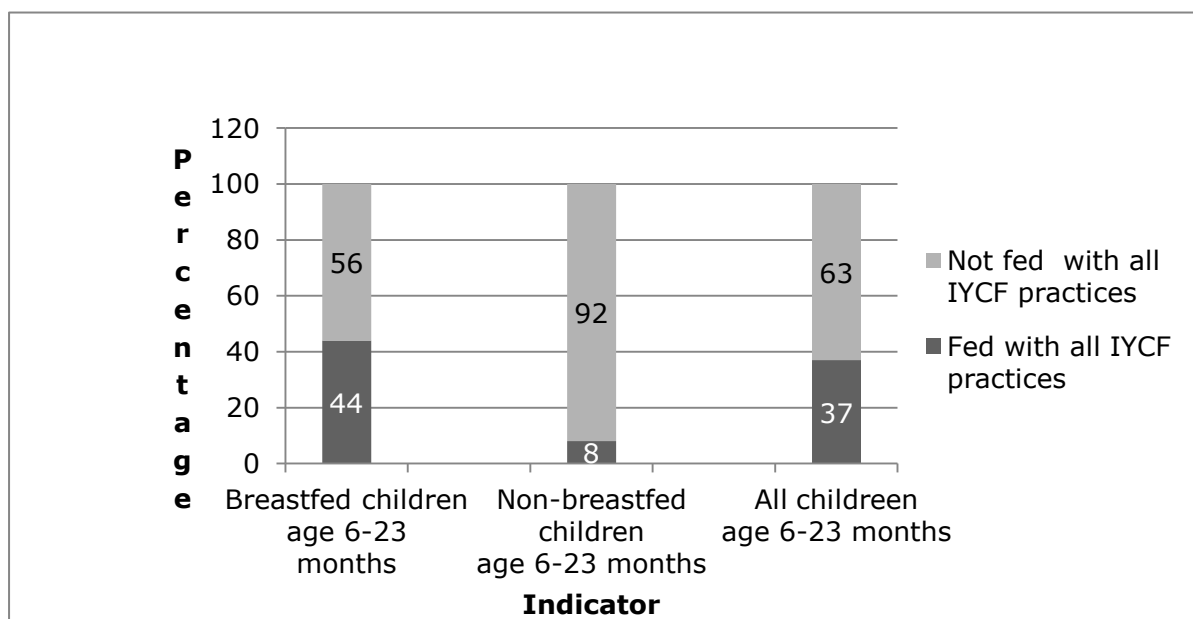
Whether breastfed or not, meal type and feeding frequency is the same. Food consistence varies between semi-solid and solid depending on the child's age (MOH, 2007a). Diets should contain protein, energy and protective foods from both plant and animal sources (MOH, 2008).

Feeding recommendations vary with age. Between 6 and 8 months, 2 to 3 meals are appropriate every day. At 9 to 11 months and 12 to 24 months the recommended number of meals is the same; three to four per day. One to two extra snacks daily (based on the child's intake) are recommended (MOH, 2007a). An HIV-infected child's energy requirement (those showing no signs of illnesses) is 10% more than HIV un-infected children. If the infant or child shows signs of illness, energy requirements are higher (20-30%). Protein needs do not vary with HIV status (MOH, 2007a; MOH, 2011).

Despite recommendations, the quality of complementary foods is often compromised by limitation in variety. Children are fed less time than recommendations (MOH, 2006-2010).

Figure 5 shows complementary feeding practices in Zambia for children aged 6 to 23 months. It does not however, disaggregate HIV-infected from un-infected infants and young children. I could not find disaggregated data. The results in Figure 5 show that a lesser proportion of children are fed with all IYCF practices (CSO, 2009).

Figure 5: Complementary feeding practices in Zambia



Source: Zambia demographic and health survey, 2007

3.3.3 HIV and infant feeding Counselling

Counselling an HIV-infected woman on infant feeding options is a critical to optimizing growth while preventing the transmission of HIV from mother to her child (UNICEF, 2011a). Infant feeding counselling for HIV-infected mother should be done throughout pregnancy, after child birth and continue till child is two years (MOH, 2008).

Counselling was constrained by several factors. The period from antenatal through to postnatal is a good opportunity for infant feeding counselling (MOH, 2008). Whereas, antenatal coverage was high at 90% in Zambia, institutional, assisted deliveries and postnatal visits (within two days) were low at 28%, 45% and 39% respectively (MOH, 2010a). The quality and outcome of counselling was usually poor. There are numerous contributing factors to the poor counselling (Katepa-Bwalya *et al.*, 2011).

Inappropriate infrastructure

Effective VCT requires space which is secure. Clients should not be visible or allow discussions to be heard (Torpey *et al.*, 2010). VCT is a key starting point to infant feeding counselling (MOH, 2010b). A study by the Zambia Prevention Care and Treatment Partnership (ZPCT) shows that VCT facilities in health centres were not secure and had limited space (Torpey *et al.*, 2010). The MOH also acknowledges that infrastructure for counselling was not appropriate to guarantee confidentiality (MOH, 2010b). According to MOH (2010b), all pregnant women should be tested for HIV. Formative assessment for IYCF report 2010, Zambia show that 59% of the pregnant women go for VCT (Anon, 2010). According to NAC

(2012), 84% of women attending antenatal (at least attended once) in 2008 went back to collect their HIV test results.

Health worker workload

In Zambia health workers are overburdened with too much work (Chopra *et al.*, 2009; MOH, 2010a). Staffing levels are low. Turnover of well trained and experienced human resource is high (WHO, 2010). One health worker counsels as many as twenty women every day. This is more than the recommended eight (Chopra *et al.*, 2009). In principle working conditions are poor (Potter and Brough, 2004).

Influence from civil society and household members

A study by Chisenga *et al* (2010) shows that, 30% of decision mother's make on infant feeding choice is from civil society/members of her household. More often their influence is biased against stipulated WHO recommendations (Chisenga *et al.*, 2010).

3.3.4 Administration of antiretroviral prophylaxis for PMTCT

Antiretroviral regimens play a significant role in PMTCT (Anderson and Susan, 2011; Torpey *et al.*, 2012; WHO, 2009b; MOH, 2007b; Coutoudis *et al.*, 2002). It is important to note that the 2006 WHO recommendations did not provide guidance on how using antiretroviral drugs during breastfeeding would prevent HIV (Mandala *et al.*, 2009). However, antiretroviral treatment was recommended for eligible HIV-infected women to improve their quality of health (WHO *et al.*, 2010). Though antiretroviral treatment is meant to improve women's health, breastfeeding infants also benefit (CIDRZ, 2011). This is because the mother's viral load decreases with antiretroviral treatment. This reduces the risk of HIV transmission (Kumwenda, 2009; Anderson and Susan, 2011). HIV-infected women should start antiretroviral prophylaxis at 28 weeks. Zidovudine (AZT) is administered two times a day (WHO, 2009b). One tablet Nevirapine is administered when labour starts (CIDRZ, 2011; WHO, 2009b). A study by Doherty *et al* (2006) shows, 26% of HIV-infected women failed to take one tablet of Nevirapine as recommended. A combination of AZT+3TC during delivery and one week after was administered (WHO, 2009b). Infants were also given Nevirapine as prophylaxis after birth for a period of one week (CIDRZ, 2011; WHO, 2009b).

A study by Torpey *et al* (2012) shows 4.9% reduction in HIV transmission between 0 to 12 months if mother and child took antiretroviral prophylaxis. There were many barriers in administration of antiretroviral prophylaxis (Human right watch, 2007). Only 61% of the women receive antiretroviral prophylaxis (MOH, 2010c). Adherence was poor partly due to stock-out of both adult and paediatric prophylactic antiretroviral drugs (Torpey *et al.*, 2010). There was inadequate follow-up to ensure uptake of

both adult and paediatric ARV prophylaxis (SPMO, 2011). Dispensing of antiretroviral prophylaxis for pregnant women and other HIV-infected was done in one place (Mandala *et al.*, 2009).

According to Human Rights Watch (2007), adherence was also poor because of non-disclosure. The 2010 national PMTCT protocol guidelines and the 2007 Human right watch report reveals that antiretroviral prophylaxes were concealed in food and commonly known medicine storage places (MOH, 2010b; Human right watch, 2007). A study by Albrecht *et al* (2007) shows that 25.6% of the HIV- infected mothers who did not reveal their HIV status, failed to take antiretroviral prophylaxis to PMTCT as required. Among those whose revealed their HIV status 48.8% had been counselled with their partner during antenatal (MOH, 2010b; Albrecht *et al.*, 2007). Other women were not keen on couple counselling in case their partner tested HIV negative (Chisenga *et al.*, 2010). Interestingly, Semrau *et al* (2005) argues that couple counselling has the potential to minimize negative outcomes associated an HIV-infected mother HIV status being known.

Administering antiretroviral prophylaxis is based on performing CD4 cell count enumeration (MOH, 2007b). In Zambia few health facilities are equipped to assess CD4 cell count. Even if CD4 enumeration is done, results are not made available to health facilities which submitted specimen. In addition, health workers in primary health facilities are not competent to initiate antiretroviral regimens (Dielemen and Harnmeijer, 2006; Mandala *et al.*, 2009).

3.4 Key actor involvement

Key actor involvement is critical to planning and implementing infant feeding programs. It helps build consensus on roles and responsibilities. It helps direct ideas towards achieving the same goal (UNICEF, 2003; FHI, 2002).

Not all key actors in Zambia were involved in infant feeding program planning, later on implementation. According to MOH (2006-2010), the only stage key actors were involved in was the developing the IYCF operational strategy. There is evidence from the IYCF operational strategy (2006-2010) that coordination was weak. Key actors lacked a platform to meet and deliberate on the infant feeding program. Suffice to state that given the platform men in particular expressed willingness to take part in the program (USAID, 2010). The breastfeeding committee was non-functional. Its membership excluded all key actors (Anon, 2009; SADC, 2009; MOH, 2006-2010).

The infant feeding program is managed by NFNC (MOH, 2006-2010). The mandate of the NFNC does not permit direct supervision of program implementation. NFNC is inadequately financed to support the infant feeding program (NFNC, 2008; Chopra *et al.*, 2009).

3.5 Human capacity development

HIV-infected mothers perceive health workers as experts who can provide them with useful infant feeding information (Katepa-Bwalya *et al.*, 2011). However, health workers lacked adequate knowledge and skills to help HIV-infected mothers succeed in feeding their infant (Potter and Brough, 2004; Chisenga *et al.*, 2010). Health worker capacity was not well developed (Chopra *et al.*, 2009). Challenges in human capacity development stemmed from shortcoming in training (Potter and Brough, 2004; Chopra *et al.*, 2009).

A study by Chopra *et al* (2009) shows that, PMTCT training course included infant feeding. The course was twelve days. An analysis of the PMTCT curriculum shows that breastfeeding was given low priority. Only four hours were allocated to session on infant feeding. Practical sessions were completely left out of the training curriculum (Chopra *et al.*, 2009). According to Chopra *et al* (2009), efforts by senior nutritionists to revise the curriculum proved futile. The Chopra *et al.* (2009) study also reveals that the curriculum was developed by other cadre.

Health workers did not understand the interrelationship between HIV and breastfeeding (Chopra *et al.*, 2009). Health workers also had minimal information and understanding of VCT and antiretroviral prophylaxis (Torpey *et al.*, 2010).

Community trainings were conducted in both local language and English. Not all participants were conversant with English (SPMO, 2011). Furthermore, key members of civil society and family/household were excluded in capacity building activities (Chisenga *et al.*, 2010; USAID, 2010).

In addition, trainees (community members and health workers) were neither supervised nor followed up after training (Chopra *et al.*, 2009; SPMO, 2011). Trained counsellors lacked job aids. Counselling cards were not readily available after training (SPMO, 2011).

3.6 Costing and use of resources

LINKAGES *et al* (2006) conducted a study to find out how much it would cost to roll out infant feeding program in Zambia. The cost of expansion varied per district and per intervention. The major costs were embedded in training (including curriculum development or revision) health workers, monitoring and evaluation. Other costs considered were health promotional activities, policy review and advocacy (LINKAGES *et al.*, 2006).

A review of the LINKAGES *et al* (2006) study shows that the cost of modifying or establishing infrastructure to suit interventions which support the infant feeding program was not done. Infrastructure needed

includes VCT space, infant feeding counselling rooms and childcare facilities in the workplace (NFNC, 2008; Torpey *et al.*, 2010).

Furthermore, use of resources was biased towards other PMTCT program components. At national and household levels the cost and use of resources was constrained by competing demands (Chopra *et al.*, 2009).

3.7 Managing the supply of commodities

Replacement feeding is recommended only when the stipulated requirements are fulfilled (WHO *et al.*, 2010). A study by Chisenga *et al.* (2010) shows that, 30% of the HIV-infected mothers would not breastfeed if they had a constant supply of commercial infant formula. The Southern Province annual report (2011) states that key actors made efforts to manage the supply of commercial infant formula. However, sustainability was difficult.

Notably, affordability and sustainability alone do not constitute eligibility to replacement feed. Other aspects such as safety of preparation matter (MOH, 2008). Zambia demographic and health survey (2007) reports that fuel and water to prepare replacement feeds in Zambia is problematic (CSO, 2009). According to CSO (2009), only 16% of the population use electricity, 59% use firewood and 25% use charcoal. Furthermore, only 65% of Zambia households have access to safe water (CSO, 2009).

In addition, the supply of antiretroviral prophylaxis and HIV test kits was erratic. Stock-outs of supplies at health facilities were experienced (Torpey *et al.*, 2010; MOH, 2010a).

3.8 Measuring for impact

The impact of strategies used should be measured (FHI, 2002). Key infant feeding indicators were not included in the health management information system. For the few indicators collected, collection was poorly done (Anon, 2009; Chopra *et al.*, 2009). Monitoring tools at all levels capture very little information on infant feeding (Chopra *et al.*, 2009).

Chapter 4: Strategies to improve implementation of 2010 WHO HIV and infant feeding recommendations: Examples of best practice from other countries

This chapter presents examples of best practice in implementing the 2006 WHO HIV and infant feeding recommendations from other countries.

Examples of best practice for improving implementation of 2010 WHO HIV and infant feeding recommendations are available in literature. However, best practices must be considered as context-specific and will need to be adapted to suit the Zambian context. Zambia can learn from experiences from other countries with similar contexts to improve identified challenges.

4.1 Strategic planning

Best practices on strategic planning processes can be drawn from Malawi and South Africa.

Strategic Plan Development

As earlier stated, I could not find evidence of how Zambia used information for strategic planning. However, a study by Chinkonde *et al* (2010) shows that Malawi not only planned infant feeding program together with key actors at different levels but also implemented with them.

South Africa demonstrated that joint planning with the community increases ownership. Technical support was offered to communities to enable them to plan. This resulted in communities claiming ownership of the infant feeding interventions such that, community support continued after donor withdrawal (IYCN, 2011).

4.2 Operationalizing: Administration and resources management

Best practices on resources management can be drawn from Zimbabwe, Rwanda, South Africa and Malawi.

4.2.1 Zimbabwe implemented an intervention based on teaching HIV-infected mothers. The intervention was restricted to the health facility. The intervention package comprised four interventions (two videos and two leaflets on PMTCT). During group health education videos were shown and leaflets distributed. All women opting out of group health education were given two leaflets. One leaflet contains an explanation on how an HIV-infected mother can transmit HIV to their infants and the

consequences. The other one explains proper positioning and attachment to the breast to prevent breast conditions. It also gives guidance on why it is important to seek medical treatment for breast conditions on time. It also encourages HIV-infected mothers to avoid unprotected sex during lactation period (Piwoz *et al.*, 2007).

The results show that for every intervention an HIV-infected mother was exposed to, there was a recorded 38% decrease in HIV transmission during breastfeeding. For HIV-infected mothers who came into contact with four interventions, the likelihood of transmitting HIV to their infants was 79% less than their counterparts with no exposure. HIV-infected breastfeeding mothers exposed to three or four interventions, an 88% decrease in the rate of HIV transmission was recorded. For those exposed to one or two intervention reduction in HIV transmission was 35% (Piwoz *et al.*, 2007).

4.2.2 Zimbabwe's initiated and scaled up provider initiated testing and counselling. Instead of using medically trained staff to counsel, community counsellors were engaged in all health facilities providing maternal and child health services. This reduced the workload for the overburdened health worker. The results show that the proportion of pregnant women testing for HIV during antenatal increased. The increase was 73% from 87% between 2006 and 2010 (ITPC, 2011).

4.2.3 The Zvitambo study group in Zimbabwe demonstrates that teaching HIV-infected mothers and counselling them on how to breastfeed techniques can increase exclusive breastfeeding rates. The proportion of infants aged six weeks exclusively breastfed increased from 7% to 28%. Those aged three months exclusive breastfeeding increased from 3% to 19% (Rollins *et al.*, 2004).

4.2.4 By decentralizing HIV services within PMTCT sites Rwanda increased access to antiretroviral therapy for pregnant women. The percentage of HIV-infected pregnant women being enumerated for CD4 increased. The increase was from 60% to 70%. The proportion of HIV-infected pregnant women given their CD4 enumeration results and who were able to access HIV services also increased. The increase was from 92% to 98%. The percentage enrolled on antiretroviral therapy increased from 35% to 97% between 2006 and 2008 (Tsague *et al.*, 2010).

4.2.5 A study done in South Africa by Tsague *et al* (2010) reported an increase in CD4 cell count uptake among HIV-infected women. Rather than have giving an appointment for CD4 cell count assessment, it was done on the same day and results given the very day. Uptake of CD4 cell count increased to over 97% during pregnancy (Tsague *et al.*, 2010). However, it is not clear what the baseline was from the study though an increase is reported.

4.2.6 Malawi's infant feeding program is operated by the nutrition unit of the MOH. A nutritionist is deployed to run the program. The person collaborates with the counterpart in the PMTCT program. The nutritionist officially participates fully in all PMTCT activities. In the event that national infant feeding coordinator is absent during PMTCT meetings, the program still has representation (Chopra *et al.*, 2009).

4.3 Key actor involvement

Zambia can learn from how Malawi involved key actors.

4.3.1 All key actors at the level of implementation in Malawi are represented in the national PMTCT task force (Chopra *et al.*, 2009; Chinkonde *et al.*, 2010).

4.3.2 In Malawi the private sector engaged men in PMTCT activities through "Bambo wa Chitsanzo" (Chinkonde *et al.* 2010, p.7) programme. Stages of HIV transmission were demonstrated with the help of a manual developed by the organisation. Benefits of exclusive breastfeeding and risks of mixed feeding were explained. Through this initiative the proportion of infants less than six months exclusively breastfed went above 90%. The numbers of couples utilizing PMTCT services increased seven-fold (Chinkonde *et al.*, 2010).

4.4 Human capacity development

Human capacity development best practices are drawn from Malawi.

4.4.1 Malawi's the PMTCT course is ten days. Three days were devoted to infant feeding counselling sessions. Practical sessions are part of the course (Chopra *et al.*, 2009).

4.4.2 In Malawi improved uptake of PMTCT services by training health workers to perform more than one task. Rather than having only clinicians to assess antiretroviral eligibility other cadres were trained. Multi-skilling enhanced continuum of service and care (Chinkonde *et al.*, 2010).

4.4.3 Malawi improved human resources by task-shifting. VCT was shifted to community-based health volunteers (Chinkonde *et al.*, 2010).

Chapter 5: Discussion

This chapter presents the discussion on the major findings from literature search.

Based on the evidence presented, several factors challenged the implementation of the WHO 2006 HIV infant feeding recommendations in Zambia. Challenges in program implementation are evidenced in all thematic areas of the conceptual framework. The use of the conceptual framework enabled a systematic organization of my thoughts. It focuses on the process of program implementation. Useful examples of best practices from other countries have been identified from literature. Zambia can draw lessons from these countries to improve the implementation of the WHO 2010 HIV and infant feeding recommendations.

5.1 Strategic planning

The study has shown that a complete situation assessment is possible looking at the amount of information collected in Boxes 1 and 2. However, without complete information as shown in the study, it is not easy to plan. For instance, because information on barriers to VCT was not collected, we do not know what influence these barriers may have had on uptake of VCT. The effect is demonstrated by the proportion pregnant women who did not get tested and the proportion of pregnant women who never returned to collect their HIV test results. Effects also demonstrated by fear of discordant results. VCT paves way for infant feeding counselling. It is not possible to offer appropriate infant feeding counselling without one's HIV status being known. Health workers are not able to ascertain which woman needs infant feeding assistance. If women are not counselled they cannot make informed infant feeding choices. We may therefore still have a gap in the situation assessment, because not all information required was collected. This has adverse effects on program implementation.

In addition, there is evidence from the study that information relating to job aids was not collected. This may also affect referral to VCT. Effects demonstrated by low uptake of VCT. When there is no step by step guidance it is possible to make omissions such as not linking HIV-infected women to VCT, access to prophylaxis or treatment. Indications in the study are that it possible to engage key actors. This is evidenced by their willingness to develop and distribute the job aids. Furthermore, men are also willing to be engaged in infant feeding program. While this is the case, the continued lack of information, absence of a platform, weak coordination and failure to consult observed in the study is an indication

of gaps in program implementation. Effects demonstrated by key actors producing and distributing job aids which were not evidence informed. The study affirms that at the time job aids were produced there were no guidelines. What is worrying is the basis on which key actor produced the job aids. This therefore may explain the inconsistencies in infant feeding messages and the resultant confusion in messages disseminated.

This action has cost implications. Producing outdated job aids is a waste of the much needed financial resources in terms of reproduction at a later date and redressing the confusion. Incidentally, this may explain the insufficiency of funds to implement infant feeding activities such as establishing and/or upgrading infrastructure. It is clear from the study that key actors are part of health care financing for MOH from which infant feeding draws funding.

Whereas we can blame key actors for their action, the fact that they responded and are willing to be involved is a good indication. Program implementation is possible if there is appropriate guidance. The observed haphazardness in infant feeding program implementation may be attributable to the limited mandate NFNC has over supervising other actors.

Furthermore, failure to collect information on the extent of stigma and disclosure for HIV-infected mothers was an impediment to setting the stage for corrective action. This may explain the proportion of HIV-infected women who suffered stigmatization and hence failed to disclose their HIV status. Stigma and non-disclosure can perpetuate information gaps, affect adherence to antiretroviral regimens and failure to comply with infant feeding recommendations. Effects demonstrated by HIV-infected mothers hiding of antiretroviral prophylaxis in various food and medicine storage places. The hiding places are not ideal for drug storage and may affect efficacy. This may reduce the benefits of PMTCT. It is also possible to fail to take the drug at the stipulated time because of circumstances at that time. Therefore, the purpose of PMTCT is defeated when drugs lose potency or when adherence is poor. Other effects also demonstrated by reluctance in being seen in the same antiretroviral drugs dispensing waiting room with general HIV patients.

Whereas the study has shown that couple counselling can be a barrier to infant feeding program implementation, it is worth noting that it can facilitate disclosure. This in turn helps PMTCT, because interventions are then possible. The results on couple counselling are not consistent.

5.2 Technical strategies

The study reveals shortcomings in technical strategies employed to implement infant feeding recommendations. Many explanations can be found to show that technical strategies did not move at the same pace with new infant feeding evidence. The effects demonstrated by the failure

to review/revise policies. This means that Zambia uses policies which are based on previous infant feeding evidence. This has many negative implications given that policies form the basis for guidelines.

Firstly, this may in part explain the absence of guidelines for managers at all levels and the subsequent failure to integrate infant feeding into routine health services. This implies that the infant feeding program was vertically implemented. Effects demonstrated by the low priority given within the PMTCT program. It is possible infant feeding may not have benefited from the existing resources that were running other related programmes. This in itself constrained program implementation.

Secondly, the effects demonstrated are in the gaps in the allocation of roles and responsibilities. It may explain the lack of supervisory tools, inefficiency in deployment of human resources at all levels and duplication of training.

Thirdly, it may also explain the shortages of nutritionists across the country and the subsequent failure to implement BFHI scale up plans. The absence of a provincial link and the grossly insufficient numbers of nutritionists at the implementation level negatively impacted program implementation. It was impractical and not feasible to coordinate infant feeding activities directly from the national headquarters to the districts. Despite United Nations Children's Fund training 15 health workers in BFHI to include HIV, these were too few to have an impact on the whole country. It meant complete withdrawal of the trainers from their usual workplace for long periods if they had to cover training for the whole country. This is because a single BFHI course takes five days and requires six trainers. Therefore, even though a scale up was planned, without staff at lower levels implementation was constrained. As a result the 46 hospitals which were once declared baby-friendly eventually lost that status as standards would not be maintained. It must be noted that there is an improvement in 2011. All provincial offices have a nutritionist in charge of the program. Given the low staffing levels at district, hospital and health facility, implementation was and is still dependent on other cadre who were not accountable to nutritionists. Compounded with the lack of supervision service provision was poor.

Fourthly, it explains the marginalizing of the private institutions in BFHI. Looking at the number of health facilities run by the private sector, it is only appropriate to mention that this omission was a source of missed opportunities. The proportion HIV-infected mothers who access maternal and child health services from the private sector were completely left out of the infant feeding program.

Furthermore, the study has shown that legislative instruments were neither ratified nor enacted. Effects demonstrated by the limited number of days for maternity leave. Effects also demonstrated by the absence of

breastfeeding breaks and a workplace accommodation for breastfeeding mothers. Other effects demonstrated are the failure to enforce the code of marketing breastmilk substitutes. All these effects have direct implications on the success of program implementation and specifically exclusive breastfeeding. This is because the number of maternity leave days allowed are too few to support exclusive breastfeeding. Whereas leave days ranging from 90-120 were offered, a full exclusive breastfeeding period is 180 days. Therefore, breastfeeding mothers were expected to report back for work at the end of the stipulated number of days. Indeed this did not support the WHO recommendation of the period to exclusively breastfeeding (see Annex 1). That is why in part, HIV-infected mothers may have ended up practising mixed feeding for which the negative consequences are explained in section 5.3.

In addition, the WHO exclusive breastfeeding recommendation was challenged by the perception of expressing and heat-treating breastmilk by HIV-infected mother and family/community. Effects demonstrated by their negative views of the practice. This may explain the proportion of mothers who mixed fed and the violation of the code marketing of breastmilk substitutes. Since HIV-infected mothers were opposed to expressing and heat treating breastmilk it is possible they were vulnerable to using commercial infant formula. Furthermore, given that implementation of the code is voluntary, marketing would be opportunistic. It is obvious that there was a market for breastmilk substitutes which was promoted by some health workers anyway in their bias to replacement feeding.

The findings in this section indicates that HIV-infected women were at a cross roads. On one hand, the Maternal Protection law did not support their rights, on the other hand health workers advice was confusing and misleading. Worse still, HIV-infected mothers received little or no support from partners because paternity leave is not mandatory.

5.3 Operationalizing

The study has shown successes and challenges in operationalizing technical strategies into activities. Successes include the increase in breastfeeding rates. Despite gains made in breastfeeding, over a third of the infants less than six months are not fed according to WHO recommendations. Effects demonstrated by the proportion of infants not fed according to recommendations. This implies that these infants are at risk of HIV transmission and malnutrition even though breastfeeding was successfully initiated. Failure to comply with recommendations may suggest how inadequately WHO recommendations were understood by health workers.

The study has shown that the time frame to cease breastfeeding was unclear. The effects are demonstrated by the confusion on what advice to

give HIV-infected mothers. This confusion may also explain the inconsistencies in infant feeding messages given by health workers to HIV-infected mothers. The effects are demonstrated by some HIV-infected mothers being advised by health workers to stop breastfeeding at six months while others are advised to stop when appropriate. Not breastfeeding increases the risk of infection (diarrhoea and pneumonia) and malnutrition particularly during an infant's first year. It may again explain why mothers practiced mixed feeding (including prelacteal feeding). Prelacteal feeds replace colostrum which is beneficial to the infant as it contains anti-infective properties. Mixed feeding has an increased risk of causing diarrhoea. Diarrhoea reduces nutrient intake and can lead to malnutrition. Mixed feeding also causes intestinal abrasions in the gut of the infant. This makes it easy for HIV to enter in the body. This may also explain the high rates of PCR positivity between six weeks and 18 months. It may also explain the high malnutrition rates and the high proportion of infants dying before one month and others before their first birthday.

Another factor contributing to the non-compliance of WHO recommendations shown in the study is mother's condition after caesarean section. The percentage of mothers undergoing a caesarean section may seem small, but it contributes to the overall program implementation challenges. Whereas the mother should be allowed time to recover from the anaesthesia, caution should be taken to support her once she has come round. Cots should be available for such mothers. This reduces the much needed bonding between mother and baby advocated by the ten steps to successful breastfeeding (see Annex 3). If the separation of baby and mother is not well explained, (that it is to allow mother recovery), the practice has the potential to have spill-over effects.

The study shows that health workers had challenges assisting HIV-infected mothers to successfully replacement feed. This is evidenced by health workers' failure to translate AFASS into practical infant feeding messages. Effect is demonstrated by variation in advice given to HIV-infected mothers and lack of standardization in infant feeding messages. This may be attributable to lack of guidance from the WHO recommendation on what constitutes AFASS. Whereas the proportion of HIV-infected mothers trust who that the health workers will give them practical infant feeding messages this was constrained. Due to uncertainty among health workers it may explain why health workers failed to abide by WHO recommendations and instead resorted to prescribing infant feeding options to HIV-infected mothers without effectively assessing AFASS. Assessing AFASS was a necessary condition given the high poverty levels, high proportion with inadequate access to fuel and safe water in the country. Consequently, these challenges explain the non-compliance to recommendations.

Notably health workers in Zambia were biased towards replacement feeding. Health workers were still biased despite having undergone infant feeding training. This is an indication of gaps in training. The effects are demonstrated by health workers' inadequate understanding of relationship between HIV transmission and breastfeeding, VCT and antiretroviral prophylaxis. This is particularly worrying given the high HIV prevalence among the adult population and among pregnant women in the country. The training gaps identified in the study emanate from shortcomings in curriculum development. The effects are demonstrated by the marginalization of breastfeeding in the PMTCT training curriculum. This is evidenced by the limited time allocated to infant feeding, inability to include practical sessions, and the observed language barriers (which implicitly excluded key actors). Tragically, health providers also lacked job aids, supervision or follow up after training. These gaps in training may explain why health workers recommended replacement feeding. Effects are demonstrated by the proportion of HIV-infected women who would have opted to replacement feed.

Apart from high poverty levels it may therefore partly explain the high proportion of infants not fed with all IYCF practices. Training gaps are also evident in the exclusion of influential members of the civil society and the family/household from training. This exclusion may explain why their influence on infant feeding was mostly not in accordance with given recommendations. All these factors challenged program implementation.

Furthermore, the study has shown that inadequate or lack of infant feeding counselling was a major challenge to program implementation. This is evidenced by the inappropriate infrastructure, high work load, and low institutional and assisted deliveries. The effects of inappropriate infrastructure are demonstrated by the low uptake of VCT. High workload may explain the poor-quality counselling. The study affirms the high workload by the number of clients each health worker had to counsel in a day coupled with the low proportion of staffing levels. High workload limits available time for counselling, causes stress and burnout. Given that HIV-infected mothers were led into infant feeding decisions, it may also explain why the HIV and malnutrition burden. An infant feeding program in the context of HIV can only succeed if the HIV-infected mother's local circumstances are explored with her and she eventually makes an informed decision. It is easy to shift blame to the health worker for the poor-quality infant feeding counselling. It is important to realise that infant feeding counselling means assuming additional tasks for the health worker. From the low staffing levels it is apparent that the bulk of the counselling is done by other cadres who are not nutritionists. More tasks are added without withdrawing others. These factors confirm that health workers have a high workload. A health worker can only do so much work and the rest of the work is bound to suffer. Tragically, these health workers are not nutritionists and are not accountable to a nutrition supervisor. The logical behaviour is to be loyal to one's own profession.

These factors explain the poor quality counselling and the resultant prescribing of feeding options for HIV-infected mothers.

This study has also identified low institutional and assisted deliveries. Whereas Zambia should have taken advantage of the high antenatal coverage as an opportunity for VCT and infant feeding counselling, this was met with challenges. Over 50% of the HIV-infected mothers could not be given infant feeding support because delivery was non-institutional, unassisted or a lesser proportion attended postnatal clinics. This may be explained by the proportion of the population with limited access to health facilities, absence of mobile health services and long queues (at the health facility) reported in the study. This undoubtedly meant there were missed opportunities to offer infant feeding counselling as per recommendations.

5.4 Managing supplies of commodities

This study has shown that key actors and HIV-infected mothers failed to manage supplies of commodities. The effects were demonstrated by stock-out of antiretroviral drugs, test kits and commercial infant formula. Stock out of antiretroviral drugs predisposes infants to HIV infection. It implies missing doses or not taking prophylaxis at all. Similarly, when HIV test kits stock out mothers cannot be tested, consequently they will not know their HIV status and therefore cannot receive infant feeding support. In the same vein, shortages of commercial infant formula make children vulnerable to HIV and malnutrition. This may translate to feeding less times or using less than recommended in a bid to economize. These factors may explain the high HIV and malnutrition rates observed in the study.

5.5 Measuring for impact

This study has shown challenges in collecting key infant feeding indicators. This may explain why monitoring tools did not address infant feeding and subsequent failure to supervise health providers. The lack of supervision results in the failure to take timely corrective action.

5.6 Best practices to improve program implementation

This study had identified several best practices from other countries using the conceptual framework. These can be used to improve program implementation in Zambia. However, these best practices should be considered in a context-specific manner. Their applicability to the Zambian context needs to be assessed before considering adopting them.

Chapter 6: Conclusions and Recommendations

This chapter presents the conclusion and recommendations.

6.1 Conclusions

The study has identified and critically analysed from literature factors influencing implementation of WHO HIV and infant feeding recommendations. Despite these numerous challenges there are indications that it is possible to address them. This is in view of key actors are already motivated and there are best practices from neighbouring countries.

The studies from Malawi show that it is possible to improve program performance. By entrusting management of infant feeding program to MOH headquarters nutrition unit Zambia would gain mileage in program implementation just like Malawi. Having someone directly accountable to infant feeding like in Malawi would go a long way to improving the strategic planning process. Given the weak coordination in Zambia this would bridge the gap in terms of joint planning with key actors just like in Malawi. Multi-stakeholder involvement would be a voice strong enough to push for the ratification and enactment of legislative instruments. The team would be instrumental for making sure that the current policies are reviewed or revised. The person would also strengthen internal coordination and motivation of both nutritionist and other cadre dealing with infant feeding.

Having a national infant feeding coordinated within the MOH would also facilitate checks and balances in management of supplies. This would help improve supply of antiretroviral prophylaxis as this person will be coordinating with the PMTCT coordinator as in the Malawi model. A coordinator would make the reporting system have a structure. Therefore, the weak monitoring and evaluation would improve. This is because right now there is no one to champion the infant feeding program. With someone championing the program observed challenges would be tackled including advocating for curriculum change just like in Malawi and inclusion of key indicators in routine health information management systems.

An opportunity exists for reducing mother-to-child transmission of HIV. Specifically, the study has shown that it is possible to reduce the workload; improve exclusive breastfeeding rates; reduce mixed feeding; increase access to antiretroviral regimens and increase the number of couples counselled using the Malawi, Rwanda, Zimbabwe and South Africa approaches from this study.

However, adopting and adapting these best practices should be done to suit the Zambian context. This would enable the country reduce HIV and malnutrition rates. It is possible to have great achievement like Malawi and other countries if Zambia adapts their best practices.

6.2 Recommendations

6.2.1 National level recommendations

- The Ministry of Health should move management of the infant feeding program to the nutrition unit of the MOH headquarters.
- The Public Service Commission of Zambia should authorize creation of two positions for nutritionists at the MOH headquarters. They should then give treasury authority for the posts created. One nutritionist should be deployed as a national infant feeding coordinator.
- The National infant feeding coordinator should coordinate the national multi-disciplinary strategic planning process with all key actors. The person should ensure that the team meets bi-annually to review the program.
- The NFNC should advocate for the revision of the PMTCT training curriculum to increase time allocated to infant feeding from four hours to the Malawi model of three days. The curriculum should include practical sessions and use local language during community training.
- The Ministry of Education in conjunction with MOH should include infant feeding in pre-service and in-service training.

6.2.2 Sub-national level recommendations

- The nutritionist Southern Province should form and operationalize multi-stakeholder teams which will advocate for ratification and enactment of legislative instruments. The same teams should advocate to the national level for policies to be reviewed/revise.
- The multi-stakeholder team should participate in advocacy, monitoring and evaluating implementation of legislative instruments. The team should meet bi-annually to review performance.

The District and hospital health management teams should:

- include members of the community such as civil society groups, people living with HIV in infant feeding training. They should follow-up/supervise trainees to offer technical support on a quarterly basis.
- reduce the workload by withdrawing the number of tasks for health workers involved in infant feeding counselling.
- ensure that key infant feeding indicators are routinely and effectively collected through the health management information system. There should be monitoring and evaluation of impact.

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Annex 1: 2010 and 2006 WHO HIV and infant feeding recommendations

2010 Recommendations	Related Previous Guidance (2006)
<p>1. Ensuring mothers receive the care they need</p> <p><i>Mothers known to be HIV-infected</i> should be provided with lifelong antiretroviral therapy or antiretroviral prophylaxis interventions to reduce HIV transmission through breastfeeding according to WHO recommendations</p>	<p>No previous recommendation on the use of antiretroviral drugs to prevent transmission through breast-feeding. Update previously stated: “Women who need antiretrovirals for their own health should receive them.”</p>
<p>In settings where national authorities have decided that the maternal and child health services will principally promote and support breastfeeding and antiretroviral interventions as the strategy that will most likely give infants born to mothers known to be HIV-infected the greatest chance of HIV-free survival.</p>	
<p>2. Which breastfeeding practices and for how long</p> <p><i>Mothers known to be HIV-infected (and whose infants are HIV uninfected or of unknown HIV status)</i> should exclusively breastfeed their infants for the first 6 months of life, introducing appropriate complementary foods thereafter, and continue breastfeeding for the first 12 months of life.</p> <p>Breastfeeding should then only stop once a nutritionally adequate and safe diet without breastmilk can be provided</p>	<p>Exclusive breastfeeding is recommended for HIV-infected mothers for the first six months of life unless replacement feeding is acceptable, feasible, affordable, sustainable and safe for them and their infants before that time.</p> <p>At six months, if replacement feeding is still not acceptable, feasible, affordable, sustainable and safe, continuation of breastfeeding with additional complementary foods is recommended, while the mother and baby continue to be regularly assessed. All breastfeeding should stop once a nutritionally adequate and safe diet without breastmilk can be provided.</p> <p>For HIV-infected women who choose to exclusively breastfeed, early cessation of breastfeeding (before six months) is no longer recommended, unless their situation changes and replacement feeding becomes acceptable, feasible, affordable, sustainable and safe.</p>
<p>3. When mothers decide to stop breastfeeding</p> <p><i>Mothers known to be HIV-infected</i> who decide to stop breastfeeding at any time should stop gradually within one month. Mothers or infants who have been receiving ARV prophylaxis should continue prophylaxis for one week after breastfeeding is fully stopped.</p> <p>Stopping breastfeeding abruptly is not advisable.</p>	<p>The optimal duration for the cessation process is not known, but for most women and babies a period of about two to three days up to two to three weeks would appear to be adequate, based on expert opinion and programmatic experience.</p> <p>Abrupt or rapid cessation even at six months is not generally recommended because of possible negative effects on the mother and infant.</p> <p>No previous recommendation existed on ARV prophylaxis to prevent transmission through breastfeeding.</p>
<p>4. What to feed infants when mothers stop breastfeeding</p> <p><i>When mothers known to be HIV-infected</i> decide to stop breastfeeding at any time, infants should be provided with safe and adequate replacement feeds to enable normal growth and development.</p>	<p>Home-modified animal milk is no longer recommended as a replacement feeding option to be used for all of the first six months of life.</p> <p>Feeding recommendations for non-breastfed infants (whether or not HIV-exposed) are given in Guiding principles for feeding non-breastfed infants 6–24 months.</p>

<p>Alternatives to breastfeeding include:</p> <ul style="list-style-type: none"> • <i>For infants less than six months of age:</i> <ul style="list-style-type: none"> – Commercial infant formula milk as long as home conditions outlined in Recommendation #5 below are fulfilled, – Expressed, heat-treated breastmilk (see Recommendation #6 below), <p>Home-modified animal milk is not recommended as a replacement food in the first six months of life.</p> <ul style="list-style-type: none"> • <i>For children over six months of age:</i> <ul style="list-style-type: none"> – Commercial infant formula milk as long as home conditions outlined in Recommendation #5 are fulfilled, – Animal milk (boiled for infants under 12 months), as part of a diet providing adequate micronutrient intake. Meals, including milk- only feeds, other foods and combination of milk feeds and other foods, should be provided four or five times per day. <p>All children need complementary foods from six months of age.</p>	
<p>5. Conditions needed to safely formula feed</p> <p><i>Mothers known to be HIV-infected</i> should only give commercial infant formula milk as a replacement feed to their HIV-uninfected infants or infants who are of unknown HIV status, when specific conditions are met:</p> <ol style="list-style-type: none"> a. safe water and sanitation are assured at the household level and in the community, and, b. the mother, or other caregiver can reliably provide sufficient infant formula milk to support normal growth and development of the infant; and, c. the mother or caregiver can prepare it cleanly and frequently enough so that it is safe and carries a low risk of diarrhoea and malnutrition; and d. the mother or caregiver can, in the first six months, exclusively give infant formula milk; and e. the family is supportive of this practice; and f. the mother or caregiver can access health care that offers comprehensive child health services. <p><i>These descriptions are intended to give simpler and more explicit meaning to the concepts represented by AFASS (acceptable, feasible,</i></p>	<p>When replacement feeding is acceptable, feasible, affordable, sustainable and safe, avoidance of all breastfeeding by HIV-infected mothers is recommended.</p> <p>A table of definitions of AFASS was also given in <i>HIV and infant feeding: Guidelines for decision-makers</i>² and <i>HIV and infant feeding: A guide for health-care managers and supervisors</i>,³ noting that they should be adapted in light of local conditions and formative research.</p>

<i>affordable, sustainable and safe).</i>	
<p>6. Heat-treated, expressed breastmilk</p> <p><i>Mothers known to be HIV-infected</i> may consider expressing and heat-treating breastmilk as <i>an interim feeding strategy</i>:</p> <ul style="list-style-type: none"> • In special circumstances such as when the infant is born with low birth weight or is otherwise ill in the neonatal period and unable to breastfeed; or • When the mother is unwell and temporarily unable to breastfeed or has a temporary breast health problem such as mastitis; or • To assist mothers to stop breastfeeding; or • If antiretroviral drugs are temporarily not available. 	<p>From 2000, heat-treatment of expressed breastmilk was one of the main options to be explained in counselling sessions with HIV-infected women. After 2006, heat-treated breastmilk was no longer considered a main feeding option. Clarification of Key Points in the HIV and infant feeding Update states: “Heat-treatment of expressed breastmilk may be feasible for some women, especially after the baby is a few months old and during the transition from exclusive breastfeeding to replacement feeding.”</p>
<p>7. When the infant is HIV-infected</p> <p><i>If infants and young children are known to be HIV-infected</i>, mothers are strongly encouraged to exclusively breastfeed for the first six months of life and continue breastfeeding as per the recommendations for the general population, which is up to two years or beyond.</p>	<p>Breastfeeding mothers of infants and young children who are known to be HIV-infected should be strongly encouraged to continue breastfeeding as per the recommendations for the general population, which is up to two years or beyond.</p>

Source: Adapted from WHO *et al.*, 2010

Annex 2: Definition of acceptable, feasible, affordable, sustainable and safe (AFASS)

These terms should be adapted in the light of local conditions and formative research. The following may serve as a starting point:

Acceptable: The mother perceives no barrier to replacement feeding. Barriers may have cultural or social reasons, or be due to fear of stigma or discrimination. According to this concept the mother is under no social or cultural pressure not to use replacement feeding; and she is supported by family and community in opting for replacement feeding, or she will be able to cope with pressure from family and friends to breastfeed, and she can deal with possible stigma attached to being seen with replacement food.

Feasible: The mother (or family) has adequate time, knowledge, skills and other resources to prepare the replacement food and feed the infant up to 12 times in 24 hours. According to this concept the mother can understand and follow the instructions for preparing infant formula, and with support from the family can prepare enough replacement feeds correctly every day, and at night, despite disruptions to preparation of family food or other work.

Affordable: The mother and family, with community or health-system support if necessary, can pay the cost of purchasing/producing, preparing and using replacement feeding, including all ingredients, fuel, clean water, soap and equipment, without compromising the health and nutrition of the family. This concept also includes access to medical care if necessary for diarrhoea and the cost of such care.

Sustainable: Availability of a continuous and uninterrupted supply and dependable system of distribution for all ingredients and products needed for safe replacement feeding, for as long as the infant needs it, up to one year of age or longer. According to this concept there is little risk that formula will ever be unavailable or inaccessible, and another person is available to feed the child in the mother's absence, and can prepare and give replacement feeds.

Safe: Replacement foods are correctly and hygienically prepared and stored, and fed in nutritionally adequate quantities, with clean hands and using clean utensils, preferably by cup. This concept means that the mother or caregiver:

- has access to a reliable supply of safe water (from a piped or protected-well source)
- prepares replacement feeds that are nutritionally sound and free of pathogens
- is able to wash hands and utensils thoroughly with soap, and to regularly boil the utensils to sterilize them
- can boil water for preparing each of the baby's feeds
- can store unprepared feeds in clean, covered containers and protect them from rodents, insects and other animals

Source: WHO *et al.*, 2010

Annex 3: The ten steps to successful breastfeeding

The ten steps to successful breastfeeding

Every facility providing maternity services and care for new-born infants should:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within an hour of birth.
5. Show mothers how to breastfeed, and how to maintain lactation even if they are separated from their infants.
6. Give new-born infants no food or drink other than breastmilk, unless medically indicated.
7. Practice rooming-in - allow mothers and infants to remain together - 24 hours a day.
8. Encourage breastfeeding on demand
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

Additional Areas

1. Comply with the marketing of breastmilk substitutes legislation and the international Code.

All health facilities should comply with the law that regulates the marketing of breastmilk substitutes. This will protect mothers and caretakers from undue pressure imposed by manufacturers and agents of baby foods.

2. Encourage all pregnant women to the test for HIV and provide them with appropriate support on infant feeding.

All pregnant and lactating women shall be encouraged to test for HIV so that appropriate support is given to both the mother and the baby and family at large.

3. Promote Mother friendly care practices.

All mothers shall be assisted to have labour and delivery practices that will enhance their own health and also their infants good start in life, including breastfeeding.

Source: MOH, 2008; MOH, 2010b