KNOWLEDGE, ATTITUDE AND ADHERENCE TO RECOMMENDED INFANT FEEDING BY HIV-INFECTED MOTHERS IN ABUJA

BY

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DECLARATION

Declare that this research work "**KNOWLEDGE, ATTITUDE AND ADHERENCE TO RECOMMENDED INFANT FEEDING BY HIV-INFECTED MOTHERS IN ABUJA**" was carried out by me in the department of community medicine under the supervision of Dr. Suleiman Saidu Bashir. The information from the literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation was previously presented for award of degree or diploma nor has it been submitted elsewhere for publication.

_____ _____

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CERTIFICATION

This thesis titled "**KNOWLEDGE, ATTITUDE AND ADHERENCE TO RECOMMENDED INFANT FEEDING BY HIV-INFECTED MOTHERS IN ABUJA**" meets regulations governing the award of the degree of Masters in Public Health of Ahmadu Bello University Zaria, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This research is dedicated to all children living with HIV or who have died or sustained complications from being infected by HIV/AIDS. It is my sincere desire that this work will contribute to the reduction in transmission of HIV from infected Mother to her child.

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LIST OF ABBREVIATIONS

AC	-	Area Council
AIDS	-	Acute Immunodeficiency Disease Syndrome
AFASS	-	Acceptable, Feasible, Affordable, Sustainable and Safe
AMAC	-	Abuja Municipal Area Council
AIDS	-	Acquired Immune Deficiency Syndrome
ARV	-	Antiretroviral drug
ART	-	Antiretroviral therapy
CF	-	Complementary Feeding
EBF	-	Exclusive BreastFeeding
ERP	-	Exclusive Replacement Feeding
FCT	-	Federal Capital Territory
FMoH	-	Federal Ministry of Health
FF	-	Formula Feeding
GDP	-	Gross Domestic Products
GH	-	General Hospital
HAART	-	Highly Active Antiretroviral Therapy
HIV	-	Human immunodeficiency virus
IF	-	Infant Feeding
MCH	-	Maternal and Child Health
MTCT	-	Mother-to-child transmission of HIV
NDHS	-	Nigeria National demographic and Health Survey
NFELTP	-	Nigeria Field Epidemiology and Laboratory Training Programme
NVP	-	Nevirapine

PHC	-	Primary Health Care
PMTCT	-	Prevention of Mother-To-Child Transmission of HIV
PMTCT PLUS		Prevention of mother-to-child transmission of HIV, mother and Child Care
SF	-	Supplementary Feeding
TH	-	Tertiary Hospital
UNAIDS	-	Joint United Nations Programme on HIV and AIDS
WHO	-	World Health Organization

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SUMMARY

HIV has direct effect on child nutrition, the choice of Infant and Young Child Feeding in the context of HIV has significant effect on optimal child growth, survival and development. In the absence of any interventions, 5-20% of infants born to HIV infected women will be infected through breastfeeding. This study determined the level of adherence to recommended infant feeding option among HIV positive Mothers attending post-natal services in health facilities in Abuja. A cross sectional descriptive study was conducted among 404 randomly selected HIV positive mothers attending postnatal clinic in Abuja. Pre-tested interviewer administered structured questionnaire was used to collect data and analysis was done using Epi-info software. Chi-square and Odd ratio were used to determine associations while p-value was set at 0.05.

The study found that a third of the respondents, 135 (33.4%) were within the age range of 30 – 34years. 68 (16.8%) had followed the recommended infant feeding practice while about a third (30.4%) had practiced mixed feeding. Predictors of adherence were found to be good knowledge (p=0.001), attendance of ANC at secondary facility (p=0.01) and employment status of respondents (p=0.01), were found to be independently associated (p-value of < 0.05) with Adherence

Conclusion: Seventy-three (73%) of respondents attended Antenatal Care at secondary health facility. Majority (93%) of the respondents have good knowledge, fair (42%) attitude and low adherence (16.8%) to the recommended feeding option. Predictors of adherence were good knowledge, type of health facility and employment.

Key Words: Adherence to Infant feeding, Mothers, HIV Positive

CHAPTER ONE

INTRODUCTION

1.1 Background

Infant and Young Child Feeding (IYCF) is very critical for child survival, especially in the presence of HIV. While HIV has direct effect on childhood nutrition, the choice of Infant and Young Child Feeding in the context of HIV has significant effect on optimal child growth, survival and development. Hiv/AIDs is one of the world's most serious public health and developmental challenges. It was first reported in 1981 and primarily affects those in their most productive years 15-29years. Hiv not only affects the health of individuals, it affects households, communities, the development and economic growth of countries. Many of the countries hardest hit by HIV also suffer from other infectious diseases, food insecurity and other serious problems.[1]

Globally, in 2015, there were 36.7 million people living with HIV, up from 33.3million in 2010 which is partly due to new infections, people living longer and general population growth. About 70% of people living with HIV/AIDS were in Sub-Saharan Africa of these 51% but only constitute 13% of the world population.[1,2,3] were women. As at December 2015 there were 1.8million children under the age of 15 living with Human Immunodeficiency Virus (HIV).[1]

In Nigeria, the epidemiology of HIV is mainly informed by two national surveys, the Antenatal clinic (ANC) survey conducted among pregnant women and the National HIV/AIDS Reproductive Health Survey (NARHS) which is a general population-based survey. The national HIV and syphilis sero prevalence sentinel survey among pregnant

women attending ANC in Nigeria 2014 reported a national prevalence of 3.0%.[4] The national prevalence of HIV is 3.0% with over 3.2 million people living with HIV/AIDS and about 58% are women. The 2010 mode of transmission study for HIV in Nigeria reported Mother to Child Transmission route as 10%, and Sexual route for 80%. More than 90 percent of HIV infections in children are as a result of mother-to-child-transmission, where the virus is passed from a mother living with HIV to her baby during pregnancy, childbirth or during breastfeeding. While the precise mechanisms for viral transmission during pregnancy are incompletely understood, the risk of this form of transmission increases in direct relation to the severity of the mother's HIV infection.[5] Without intervention to prevent mother-to-child transmission, 30-45% of infants born to HIV-positive mothers become infected during pregnancy, delivery and breastfeeding[6]. Breastfeeding for women living with HIV can be made safer by providing antiretroviral drugs throughout this period.

Despite over decades of fight against the HIV/AIDS epidemic, Nigeria still has a high burden of HIV/AIDS, second only to South Africa by global ranking. Although Nigeria's current HIV prevalence rate among pregnant women is 3.0%, a decline from the peak of 5.8% in 2001,[7] the number of new infections remains unacceptably high.

The 2013 Nigeria demographic and Health survey reported the child mortality rate was 64 per 1000 children surviving to age 12 months and under –five mortality rates was 128 per live birth.[8] This implies that 1 in 15 Nigerian children die before their first birthday and 1 in 8 die before their fifth birth day. About 70 percent of under-five deaths are caused by preventable and curable diseases such as typhoid, malaria, pneumonia, diarrhea, measles and HIV/AIDS. Malnutrition is another cause of morbidity and

mortality in Nigeria, it accounts for at least 50 percent of children's deaths[8]. The HIV among children is mainly through Mother to Child Transmission. Globally, Nigeria contributes the highest number of vertically transmitted childhood HIV infections, accounting for 30% of the global burden.[7] The latter is partly due to the large number of people living with HIV (PLHIV) in Nigeria of whom 58% are women. Most of these women do not know that they are HIV positive and therefore do not receive intervention during pregnancy, labour and breastfeeding to prevent vertical transmission of HIV to their infants. In Nigeria , it is estimated that there are 5.3million births annually. In 2014, 3.1million pregnant women were tested for HIV and 63,350 HIV positive pregnant women received ART to reduce Mother to Child Transmission (MTCT).[9]

Management of Pregnant women living with HIV/AIDS and Children Born to women living with HIV/AIDS

The management of pregnant women living with HIV and AIDS include Antenatal HIV testing and counseling, provision of ARVs for women and children, Nutrition and infant feeding counselling and support and Integrated Management of Childhood Illnesses (IMCI). The National guideline on Prevention of Mother to child transmission of HIV in Nigeria recommended exclusive breastfeeding with extended ARV given to the mother or infant up to 12-months of age. This is in line with the WHO global recommendation[10]

1.2 Problem Statement

In 2014, it was estimated that 380,000 children were living with HIV/AIDS in Nigeria, with 250,000 of them requiring antiretroviral therapy. Only about 20% was accessing ART. There was an unmet paediatric HIV treatment gap of 80%, which is partly due to low early infant diagnosis (9%) in 2014, National HIV and syphilis sero-prevalence ANC

sentinel survey 2014. Linkage to HIV care and treatment is poor. Among the 33,499 children (<15years) diagnosed with HIV/AIDS only 52% were linked to care. The peadiatric ART coverage was 20.7% in ANC sentinel survey, 2014.

The global and National guidelines recommend that HIV positive mothers or their infant's take antiretroviral drugs throughout the period of breastfeeding and until the infant is twelve months old.[12] This means that the child can benefit from breastfeeding with very little risk of becoming infected with HIV as supported by the WHO-led Kesho Bora study which found 42% reduced risk of transmission to infants[11]. Furthermore, it has been reported that only 17% of children under six months were exclusively breastfed with a median duration of 18.3 months.[8] However, breastfeeding still remains the recommended feeding options for improving child survival. The UNAIDS has estimated that more than half of HIV transmission from mother to infants occurred during breastfeeding and reported that Nigeria carries the highest burden of new HIV infections among children and home to a quarter of all new HIV infections among children in 2013, which is approximately 51 000 cases. This is because Nigeria, has placed greater emphasis on antiretroviral drugs during pregnancy and delivery, linked with antenatal care, but less emphasis on postnatal follow up for retention in care during breastfeeding.[12]

Poverty is very high in Nigeria with nearly 61% of the population living below the poverty line and 60.9% in absolute poverty.[13] Between 70% and 85% of Nigeria households encounter food shortages every year. The scale of this problem has created a situation where young children are being fed foods that are available (that may not be balanced diet). While infant feeding is a challenge regardless of HIV status, an estimated 29% of Nigeria under-five children are currently underweight, 18% are wasted and 37%

are stunted.[10] To minimize these challenges, breastfeeding is still promoted as the main source of child nutrition with the potential to prevent about 13-15% of all under-five deaths. Thus, the overall concern for women with HIV lies in the need to reduce the risks of MTCT without undermining the benefits of breast feeding.

The risk of transmission depends on many factors, including the timing of maternal infection, maternal viral load, nutritional status of both the woman and baby, antiretroviral (ARV) use, duration of any breastfeeding, and presence of oral lesions in the infant among others. In the absence of interventions to prevent transmission, 5–10% of infants born to HIV-positive mothers become infected with HIV during pregnancy and 10–20% become infected around the time of delivery), with additional 5% risk during breastfeeding[13] Estimates of the risks of HIV infection via breast milk have varied due to the multi-factorial nature of risk of transmission.[14]

1.3 Justification

The HIV prevalence in FCT among pregnant women is 5.8% compared with the national prevalence of 3.0%. The HIV prevalence in Abuja municipal, Gwagwalada and Karshi are 10.0%, 5.0% and 5.4% respectively reported in National HIV and Syphilis Sero-Prevalence Sentinel Survey among Pregnant women attending ANC, 2014. Given the high prevalence of HIV in the FCT and poor infant feeding practices' contributing to child mortality, it is important to support breastfeeding among mothers living with HIV/AIDS. The United Nations member organizations have offered guidance in the development, adoption and or adaptation of HIV and infant-feeding guidelines in way to address these challenges and emphasis has been given to available new scientific evidence.[15] In developed countries, use of Highly Active Antiretroviral Therapy

(HAART) have lowered the levels of MTCT to as low as below 2%.[16,17,18] Finding the optimal infant-feeding strategy for women with HIV in developing countries like Nigeria, where there is often limited access to HAART, remains a challenge.[5] In such settings, clinical guidelines have fluctuated between exclusive formula feeding, exclusive breastfeeding in the first six months of life, and most recently, providing antiretroviral (ARV) drugs to either the mother or the child until one week after exposure to breast milk has ended.[19,20] In addition to the aforementioned challenges related to replacement feeding, exclusive breastfeeding has also proved difficult to adhere to even though most mothers breastfeed for nearly two years.[21,22,23]

More than half transmission of HIV from infected mother to her unborn child occur during the postnatal period because of the high emphasis placed on the use of ARV during pregnancy, labour and delivery with less emphasis on ARV use during breastfeeding.[24] In developing countries, ARV has been used to reduce the risk of prenatal and peri partum transmission for more than a decade. Consequently, testing, counseling, and ARV provided by PMTCT programmes have been largely responsible for the steady decrease in the incidence of paediatric (less than 15 years old) HIV. Therefore there is a need to investigate the attitudes and adherence to infant feeding recommendations with a view to improve breastfeeding practices.

In Sub-Sahara African countries where majority of mothers with HIV infection live, complete avoidance of breastfeeding is often not feasible due to lack of clean water and/or affordable replacement feeding[25,26]. Breastfeeding can be made safer by providing antiretroviral drugs (option B+) throughout this period.[27] However, extended regimens,

such as those recommended during breastfeeding, will be difficult to make universally accessible without exploring issues of attitude and adherence to breastfeeding.

Furthermore, most of the studies on postnatal Prevention of Mother to Child Transmission programmes (PMTCT) have focused on the biomedical consequences of infant feeding modalities, primarily disease transmission and survival. Thus, the range of strategies for reducing MTCT has frequently come with unintended and unmeasured psychosocial ramifications, examples; physical abuse, rejection by partners, families, and abandonment of infants.[28]

PMTCT in Africa, including Nigeria, has provided infant-feeding one-on-one counseling to HIV positive mothers. However, this approach has given the women the chance to freely decide the most appropriate alternative on their own with little attention to other important influences which are beyond the mothers' control, but which may be essential for adherence to the chosen options[29,30,31]. Thus, ensuring safe infant feeding practices will entail finding a strategy that takes into account discrepancies between the counseling provided to the women and attitude that is socially and culturally acceptable to the mothers.

Consequently, PMTCT interventions, postnatal and otherwise, will be more effective if they are evaluated in terms of their psychosocial effects as well as their biological ones. HIV positive mothers are likely to exclusively breastfeed with extended ARV given to either mother or infant pair if they have the right attitude and adhered to the recommendation. Therefore, this study, aimed to describe the adherence of HIV-infected mothers, to recommended breastfeeding in postnatal period, as well as identify factors

influencing adherence in HIV positive mothers in Abuja. Knowing these will not only influence their willingness and ability to participate in the programme but also to adhere to programme recommendations. Without support to maintain good adherence to breastfeeding with extended ARV in the postnatal period, substantial number of children will be infected.[32,33,34]

1.4 Research Questions

a. What is the knowledge and Attitude of HIV positive mothers' on HIV and infant feeding?
b. What is the level of adherence of HIV positive mother's towards HIV and recommended infant feeding options?
c. What are the factors affecting adherence by HIV positive mothers to recommended infant feeding options in Abuja?

1.5 General Objective/Specific Objectives

1.5.1 General objective

To assess knowledge, attitude and adherence to recommended infant feeding option by HIV positive mothers in Abuja.

1.5.2 Specific objectives

i. To determine knowledge and attitude of HIV positive mothers towards HIV and Infant feeding options.
ii. To determine HIV positive mothers level of adherence to recommended infant feeding option.
iii. To determine factors influencing adherence by HIV positive mothers to recommended infant feeding at neonatal follow-up clinic in Abuja.

CHAPTER TWO

LITERATURE REVIEW

Approximately 200,000 infants worldwide become infected annually with HIV through breast-feeding.[35,36] Without treatment, half of these infants will die before their second birthday.[37] Although formula feeding decreases the risk of postnatal HIV transmission, it is associated with an increased rate of early mortality.[38,39] Thus, exclusive breast-feeding is recommended by the World Health Organization for infants of HIV positive mothers for the first 6 months of life with extended ARVs for 12-months.[40] The use of antiretroviral drugs during pregnancy, labor, and delivery effectively reduces intrauterine and intrapartum HIV transmission.[41,42] However, without prophylaxis, an additional 9% of HIV negative infants who are born to HIV positive mothers will become infected after 18 months of breast-feeding.[43] Several observational studies that examined the use of either an extended maternal triple-drug regimen or extended infant prophylaxis have suggested that these interventions reduce postnatal HIV transmission.[44,45,46,47,48] Two clinical trials have shown that infant prophylaxis with daily nevirapine for either 6 weeks or 14 weeks during breast-feeding reduced early postnatal HIV transmission.[49,50,51] The Breastfeeding, Antiretroviral and Nutrition (BAN) study was a randomized, controlled trial evaluating the safety and efficacy of a maternal triple-drug antiretroviral regimen or infant nevirapine administered during 28 weeks of breast-feeding in reducing postpartum HIV transmission.

Breastfeeding is one of the most important strategies for child survival; it reduces morbidity and mortality in children worldwide. However, with the discovery of the

association between breast milk and HIV transmission, the choice of breastfeeding has been questioned which makes adherence difficult because of MTCT.

The benefits of breastfeeding have been well documented, these are decreases postpartum blood loss, promotes bonding between mother and child reduction in risks of breast and ovarian cancers, delayed resumption of menses (lactation amenorrhea) in mothers, among others. For infants it reduces morbidity and mortality due to infectious diseases and it improves child growth and survival.

Because breastfeeding is a metabolically expensive process, there was concern that breastfeeding could be harmful to HIV infected mothers' health. A meta-analysis conducted indicated that mothers' mortality during the18-month period after delivery did not differ significantly according to children's feeding modality (ever vs. never breast-fed) The apparent mortality and other health risks in HIV infected breastfeeding women were explained by confounding i.e., lower CD4 counts. However, the major risk of breastfeeding is MTCT of HIV. MTCT can occur during pregnancy, labor, and delivery, and during Breastfeeding. The risk of transmission depends on timing of maternal infection, maternal viral load, nutritional status of both the woman and baby, antiretroviral (ARV) use, breast health, type of breastfeeding (exclusive, mixed, or replacement feeding).[52] Duration of any breastfeeding, and oral lesions in the infant among others.[53,54] In the absence of interventions to prevent transmission, 5–10% of infants born to HIV-positive mothers become infected with HIV during pregnancy and 10–20% becomes infected around the time of delivery. Estimates of the risks of HIV infection via breast milk have varied due to the multifactorial nature of risk of transmission.

With prenatal and perinatal ARV interventions, over half of all MTCT is estimated to occur in the postpartum period, i.e. through breastfeeding. This is likely to decrease with availability and use of ARV prophylaxis in sub-Saharan Africa.[52] The drive towards "evidence-based practice" has increased the demand for standard procedures in health care provision globally. Global and national clinical guidelines are being developed and revised at an increasing speed as new evidence emerges. In many clinical areas knowledge is short-lived, and new evidence calls for the frequent revision and updating of clinical guidelines. HIV and infant feeding has been a particularly dynamic and demanding area of research, and, between 1992 and 2013, new evidence has regularly been incorporated into Global and National Guidelines leading to a fast pace of change.

Acting upon the evidence that HIV can be transmitted through breastfeeding,[15] the World Health Organization (WHO) developed a series of global infant feeding guidelines on how an HIV positive mother should feed her infant. The Guidelines targeted Policy Makers, Health Workers and HIV-Infected Mothers. Over time, these series of guidelines involved major changes in the infant feeding recommendations for women living with HIV. WHO issued new Infant Feeding Guidelines in 1992, 1997–98, 2000–01, 2003, 2006, 2009, 2010, 2012, and2013. The major changes and the rationale underlying the changes can be summarized as follows; Infant feeding options were made available to mothers after they had been counseled about the advantages and disadvantages of breastfeeding in the context of HIV. This was based on new evidences about the risk of HIV transmission through breastfeeding, coupled with a stronger emphasis on patients' rights to participate in healthcare decision-making (1997) "Exclusive replacement feeding (formula feeding) was recommended as the first option for HIV-infected mothers if found

to be “acceptable”, “feasible”, “affordable” “sustainable” and “safe” (AFASS) in the particular context” (2001). In cases where formula/ replacement feeding was not considered to be AFASS, exclusive breastfeeding with rapid cessation at six months was recommended in order to reduce the risk of mixed feeding.” ; “ Exclusive breastfeeding for the first six months of life was recommended as the first infant feeding choice for HIV-infected mothers due to the improved HIV free survival with exclusive breastfeeding [10]including the recommendation of abrupt cessation of breastfeeding after six months to prevent mixed feeding patterns” (2003), “An extended period of breastfeeding was allowed for. The rationale behind the change was an increasing number of studies that documented improved HIV-free survival with exclusive breastfeeding, combined with evidence of increased death and malnutrition in formula-fed infants’ (2006), “Twelve months of breastfeeding was recommended (six months exclusive breastfeeding and the introduction of complementary feeds thereafter). This change was based on evidence showing the efficacy of antiretroviral drugs (ARVs) in preventing postnatal transmission during breastfeeding” (2010).[15,10]

In Nigeria, PMTCT services started in 11 pilot tertiary institutions in 2002 with less than1%coverage. Specific interventions are: HIV testing and counselling, HIV and Infant feeding counselling; Modification of obstetric practices; administration of ARV prophylaxis to mother-child pair; Care and support for HIV positive women and their families (PMTCT plus).

Of the 22,726 public sector health facilities available, only 5,622 facilities are providing PMCTC services as at December, 2013. Between 2006 and 2013 the number of HIV positive pregnant women who received ARVs increased from 13,000 to 58,000.

However, this was still only 27% of the 244,000 HIV-infected women who were estimated to have been pregnant in 2013.[48]

Despite the reduction in HIV prevalence among pregnant women from 5.8% to 4.1%, there are still challenges related to post-natal transmission as a result of breastfeeding. Nigeria has largely adopted the HIV and infant feeding guidelines developed by the WHO with only minor modifications. The 2010 Nigeria recommendations on HIV and Infant feeding is Breastfeeding for all HIV-infected mothers while receiving ARVs as HAART or prophylaxis to the mother-infant pair. However, where this is not feasible, HIV-positive mothers will be supported to formula feed provided specific conditions are met and the mother or caregiver can access health care that offers comprehensive child health services.

Knowledge of HIV Positive Mother's on the HIV and Infant Feeding Guidelines

Exclusive breastfeeding has been identified as a key intervention to promote infant health and reduce vertical transmission, despite this knowledge; the practice remains low in Sub-Saharan Africa[55] Studies carried out by Davies et al shows that 83% of HIV positive mothers have knowledge on HIV and infant feeding and similar rate of 83% was also reported in a cross-sectional hospital based study among 40-HIV positive mothers conducted in Ghana.[56] The women were counseled on transmission of HIV from Mother to Child and are aware of the recommended WHO guidelines.

A descriptive cross sectional sampling among 50-HIV positive mothers in Zimbabwe shows high knowledge (88%) of women were able to define exclusive breastfeeding.[57] So also the women received nutrition education and understand that mixed feeding

increases the risk of HIV transmission to babies. While a similar cross-sectional descriptive study involving 179 mother –child pair in Kware town of Sokoto State shows 54(31%) of the mothers had adequate knowledge of exclusive breastfeeding with 53% of them initiating breastfeeding immediately after birth.[58]

A study in Lagos among 200 HIV mothers shows poor knowledge of infant feeding options and the benefit of EBF among respondents.[6] Similar study conducted in Benin recruited mothers in two cohorts based on their entry (PMTCT cohort) or non-entry (non-PMTCT cohort) to an HIV MTCT-prevention programme reported that babies in the non-PMTCT cohort were breastfed compared to none in the PMTCT cohort and mixed-feeding rate was high (70.5%) in the non-PMTCT cohort this is due to low knowledge in this cohort[5]. Encouragement of exclusive breastfeeding with the use of extended ARV for either mother or infant pair will help to reduce mixed feeding and thus mother to child transmission of HIV. In a similar cross sectional descriptive study carried out in Nnewi among 400 mothers –child pair shows about 82% have adequate knowledge on HIV and infant feeding. A cross sectional descriptive study conducted in Uyo among 188 women attending maternity clinic show s only 42% were able to define EBF correctly. A cross sectional descriptive study in Jos plateau state among 470 nursing mothers shows 82.3% were able to define EBF correctly[64]

Attitude of HIV Positive Mother's on the Provisions of Infant Feeding Guidelines

HIV positive mothers are likely to exclusively breastfeed if they believe it is beneficial to them and their infants. The same studies revealed more positive than negative attitude towards exclusive breastfeeding, however the fear of transmitting HIV to infants through breast milk featured strongly. Despite the knowledge that replacement feeding reduces

the risk of HIV transmission through breastfeeding, caregivers believe that breastfeeding increases mother-child bonding and should be encouraged. In Nnewi a study reported that 71% of HIV positive mothers shows positive attitude to exclusive breastfeeding.

In countries where breastfeeding is the norm, replacement feeding alerts a woman's relation to her HIV-status, resulting in being abused or shunned. It is tantamount to declaring their HIV status, with associated extreme consequences example violence and divorce.

A study conducted in Accra reported that 15% of men and 8% of women show positive attitudes towards HIV positive mothers, While woman who opts to formula feed do so in secret as they are carefully watched. Studies in Uganda and Tanzania have shown that HIV-positive mothers succeed in adhering to replacement feeding after disclosure of their status to family members.

Adherence to infant feeding by HIV Positive Mothers

The choice of infant feeding is important to optimize the chance for child survival. Result of a study carried out by Davies et al shows that 62% of infants below the age of six months had been exclusively breastfed (EBF), the rest were given breast milk with other foods (mixed feeding). These foods are water, traditional medicines and cereal foods. None of the mothers used animal milk, wet-nursing and expressed heat-treated breast milk due to lack of counseling on them. The same study find mothers who mixed-feed their infants as helpless in the face of pressure from family members, and lack of autonomy over decision making process. A cross sectional study of 400 HIV positive

women conducted in selected health facilities in Lusaka reported 74.0% level of adherence to exclusive breastfeeding.[59]

A cross sectional hospital based study conducted in Ghana reported 62% of HIV positive mothers of babies 0-6months; 56% for babies 6-12 months,[56] while in an institutional based cross sectional study of 209 HIV positive mothers conducted in Ethiopia found 89.5% of HIV positive mothers had followed the recommended way of infant feeding practice while 10.5% had practiced mixed feeding.[13]

In Nigeria, a cross sectional study conducted among 400-mother –infant pair attending antenatal care in Nnewi, South –East shows 33.5% practice Exclusive breastfeeding while the rest practice Exclusive Replacement Feeding and gave reasons like baby cries too much and pressure from relatives for not practicing EBF.[60]

Similar descriptive cross sectional study among 200 HIV positive mothers conducted in Lagos state, reported majority Exclusive formula feeding (EFF) was practiced by 73.5% of the respondents, and 18.5% practiced Exclusive Breastfeeding (EBF) while 8% practiced mixed feeding.[6] This may be due to fear of transmission to baby despite good knowledge of infant feeding options and benefits of EBF among the HIV positive mothers.

Factors influencing Adherence of HIV Positive Mothers to recommended infant feeding

Exclusive breastfeeding practice in high prevalence setting remains a challenge because of the likelihood of transmission of HIV to the baby. However, understanding the determinants of adherence may help to overcome this challenge. In Zambia it was found

that being married (aOR, 2.88 95% CI 1.45, 5.71); lower income (aOR, 2.44, 95% CI 1.76, 11.0) irrespective of age or educational level is associated with adherence. In a study conducted by Lars Fadnes et al median duration for exclusive breastfeeding was 3months (95% CI 0-0.2) among most educated and 18months (95% CI 15.0-21.0) among uneducated mothers and being socio-economically better off where associated with non-adherence. In a similar study by Davies et al socioeconomic status of HIV positive mothers influences their Infant feeding decision; 100% of mothers interviewed did not practice exclusive replacement feeding due to cost of infant formula, while 43% cited lack of time and access to clean waters for the preparation of the formula as their main limitation. Similar studies reported cost and socio-economic status of the HIV positive mothers as barriers to replacement feeding.

Stigma and discrimination influences mixed feeding and the failure of HIV-positive mothers to adhere to the guidelines. The information given by counselors to HIV-positive mothers put additional stress on many mothers, as it is against the local culture of early supplementation of water, juice, herbal mixtures, and prolonged partial breastfeeding for up to two years.

The study conducted in Nnewi, Nigeria [60] shows educational status, socioeconomic class, mode of delivery, age of the child and first feed given to neonate after birth were determinant of EBF. Mothers with primary and those with secondary education were 0.33 and 0.57 times less likely to practice EBF compared to mothers with tertiary education. Mothers who delivered through caesarean section were 0.38 times less likely to exclusively breastfeed their newborn compared to those who delivered vaginally. Also, EBF practice decreased with increasing infant age. Mothers who gave breast milk as the

first feed to their newborn were 3.36 and 6.22 times more likely to practice EBF compared to mothers who gave water and infant formula respectively as first feed to their baby.

CHAPTER THREE

METHODOLOGY

3.1 Study Area

Federal Capital Territory (FCT) Abuja is the capital of Nigeria located in the North Central region of Nigeria. The territory is made up of ; Abuja municipal Council (AMAC), Karshi, Abaji, Gwagwalada, Kuje, Bwari and Kwali Area Councils. It is bounded by the States of Niger to the West/North-East, Kaduna to the North-East, Plateau to the East and South, and Kogi to the South-West. It is a cosmopolitan city with inhabitants ranging from Gwari, Hausas, Yoruba, Igbo (Ibo), Fulani amongst many others. . It occupies a land area of 7,753 sq. km with an estimated population of 1.4 million, from the 2006 national census ([61]) and a projected population of over 3million for 2016. Abuja's geography is defined by Aso Rock, a 400-metre monolith created by water erosion and it has an annual growth rate of 9.3%. The estimated prevalence of people living with HIV (HIV prevalence) rate ranges from 5.8% in 2008 to 3.5% in 2013. The prevalence of HIV is 8.7%. with a total of about 298 health facilities. 87% (259) of the sites offers comprehensive PMTCT services. There are over 60,000 people living with HIV in Abuja , new infections occurring every day in children born to HIV positive mothers, low coverage of PMTCT services and about 40,000 people living with HIV receiving ART.

The study sites; Gwagwalada Township Clinic is a primary health facility with 12 bed capacity. The clinic provides PMTCT services to about 1200 clients in a month , and refer the clients to secondary or tertiary facility for HIV treatment and care. General Hospital Karshi is a secondary facility with 26 bed capacity and provides both ART and PMTCT services to about 2100 HIV positive client in a month. While National hospital Abuja is a

tertiary facility that provides comprehensive ART services including EID. The hospital provides PMTCT services to about 800 clients in a month.

3.2 Study Design

A descriptive cross-sectional study design was adopted.

3.3 Study Population

The study population were HIV positive mothers with infant below 12 months of age who were attending postnatal follow up clinic at Gwagwalada Township Clinic, Karshi General Hospital and National Hospital Abuja.

3.3.1 Inclusion criteria

HIV positive mothers with child ≤12-months attending postnatal follow-up clinic in the respective sites were recruited.

3.3.2 Exclusion criteria

HIV positive mothers with sick children in the respective sites were excluded due to the psychological effect it may have on the mother.

3.4 Sample Size Determination

The sample size was calculated using the Leslie and Kish formula[r63] used in estimating the sample size for the cross-sectional study

$$n = \frac{Z\alpha^2 \, p \, q}{d^2}$$

where n is the minimum sample size

$Z_{\alpha=}$ the standard normal deviate, set at 5% put together as 1.96 (for 95% confidence level)

d = Level of precision (0.05)

p is the proportion of HIV positive mothers who breastfeed (p=0.4)[64] while

q is 1-p

non-response rate of 10%

Therefore $n = \frac{1.96^2 \times 0.4 \times 0.6}{0.05^2}$

The minimum sample size is 367 +10% non-response rate = 404

3.5 Sampling Technique

This study used a multi-stage sampling to select the participating Area councils, Health facilities and the respondent as follows:

Stage 1 (The selection of Area council; AC): From the sample frame of six Area Councils in the FCT, 3 Area Councils were randomly selected using balloting technique- the selected area councils were AMAC, Gwagwalada and Karshi.

Stage 2 (selection of Health Facilities in Area Council): From the sample frame of HIV treatment sites in each of the three selected Area Councils, one HIV treatment site was selected using simple random sampling. The selected sites were National Hospital Abuja, Gwagwalada Township clinic, and Karshi General Hospital.

Stage 3 (Selection of respondents in each Area council): The allocation of respondent to each selected treatment site was based on probability proportionate to Size (PPS), as shown in the table below:

Table 1: Distribution of Respondents by Site in Abuja

S/No	Total client enrolment in Neonatal follow-up clinic	No of respondents based on PPS
National Hospital	800	80
GH Karshi	2100	210
Gwagwalada township clinic	1200	120
Total		410

The selection of respondent in each treatment site was done over 3 weeks using systematic sampling technique because. HIV positive mothers with infants below 12-months who met the inclusion criteria were recruited from the clinic.

3.6 Study Instrument

A structured questionnaire adapted from previous studies was used in this study. The questionnaire covered questions on socio-demographic characteristics, Antenatal Attendance, Knowledge on infant feeding and HIV/AIDS, Attitude and adherence on infant feeding and HIV/AIDS recommendations, Factors affecting adherence to infant feeding recommendation, including Child status. The questionnaire contained mainly close-ended questions to facilitate data collection, entry and analysis.

The questionnaire was pre-test to ensure validity, reliability, acceptability and clarity of study tool. It was conducted in Nyanya General Hospital, which is similar in composition with the selected Area council. Twenty respondents were recruited for the pre-test. Some of the findings were; “research assistants spent too much time on each respondent” hence approaches to improve time management were introduced including increasing number of research assistants from four (4) to nine (9), better counseling and interpersonal approach

and it was observed that respondents were not coming to clinic in large number so," ready to use therapeutic food" was introduced for the children and this improve the turn out. Furthermore healthcare workers at the clinic were given stipends to improve communication and ensure respondents were reminded to come to clinic for their appointment.

3.7 Data Collection Methods

Data was collected by research assistant in quite environment with respondents in comfortable mood using semi –structured provider administered questionnaire. There were nine (9) research assistants who speak English, Hausa, and had previous field experience. The research assistants were trained using the existing National HIV/AIDS and PMTCT guidelines for four days. They were introduced to the aim, objectives and methodology of the study. The training was interactive, with presentations, and plenary sessions.

To ensure data quality team leader checked 5% of randomly selected completed questionnaire for error and correctness. Daily review meetings were held to ascertain completeness and correctness of filling the questionnaires as well as to identify and address issues and challenges encountered. During this study supportive supervision was provided throughout the process of data collection, collation, and reporting including meetings.

3.8 Data Management

3.8.1 Measurement of variables

This study used the Likert scale to assess knowledge and attitude. Knowledge was measured using eight point scale; Attitude was measured using 3 scale points. While adherence was assessed using 24-hour recall (proportion of mothers who exclusively breastfeed and are on ARV or the child was on ARV the previous 24 hours. Comprehensive review and manual editing of the filled questionnaires were performed before electronic data entry. Data was entered into Microsoft Excel 2007 and Epi-info software (version 7.0). Data cleaning and random checks of entered data were performed to exclude incomplete, inconsistence and inaccurate data before analysis. Electronic data back-up was undertaken (using a flash drive and e-mail).

3.8.2 Statistical Analysis

Data analysis was performed using Microsoft Excel 2007 and Epi-info software (version 7.0) for univariate analysis using frequencies and proportions; bivariate analysis of the association between HIV Status and selected indicators, socio-demographic and other factors using prevalence odds ratios, Chi² (χ^2) test of statistical significance; Variables that were significant at $P \leq 0.05$ at bivariate analysis were subjected to multivariate analysis using unconditional logistics regression model with forward selection approach, to identify independent predictors of adherence, knowledge and attitude.

All analyses were done at 95% confidence interval. Level of significance for all tests was 5% (0.05). Data was summarized and presented using tables and charts for key indicators.

3.8.2.1 Criteria used to grade knowledge, attitude and adherence to infant feeding

Knowledge, Attitude, and adherence were graded separately using likert[62] scale and selected variables that addressed each of these objectives (8 for knowledge, and 3 for attitude). Table 2 below presents the variables used to grade knowledge, and attitude. Twenty-four (24hrs) recall was used to estimate the proportion of women who adhered to infant feeding.

For knowledge, one (1) was the score for answering a question on a knowledge variable correctly and zero (0) for wrong responses, this gave a total of 8 marks for knowledge. Percentile score for knowledge was calculated for the study sample. All respondents who scored less than 50% were classified as having poor knowledge; between 50-75% fair while above 75% were classified as good knowledge, because a high level of knowledge is usually required to avoid paediatric infection.

Merged agreed score of 3 was used for correct response and 1 for incorrect response to each of the questions on the three (3) characteristics for attitude. The interquartile was used to score the attitude of respondents with 75 percentile as cut off point. An individual that score above 75% had positive attitude while below 75% has negative attitude on infant feeding.

3.9 Ethical Considerations

Ethical clearance was obtained from the Health Research Ethics Committee of Federal Capital Territory (Appendix 2). Written and signed informed consent (Appendix 3) was obtained from each respondent before a questionnaire was administered. Confidentiality of information, voluntary participation and respect for human subjects were ensured. To

increase turn out Ready-to-Use Therapeutic Food (RUTF) were given to participants whether they participated or did not participate in study. No cash was given

Characteristics	Frequency	Percent (%)

3.10 Limitations

Information on adherence to breastfeeding recommendations was acquired based on recall of infant feeding practice. To minimize bias 24-hour recall was used. However, several misclassifications might have occurred since a mother who has been exclusively breastfeeding her infant but for some reasons gave her infant water or some other liquids the previous day is considered not exclusively breastfeeding.

Table 2: Socio-demographic Characteristics of the respondents (n=404)

Age group (in years)		
<20	13	3.2
20-24	27	6.7
25-29	124	30.7
30-34	135	33.4
35-39	91	22.5
40-44	14	3.4
Marital status		
Married	369	91.3
Never married	17	4.2
Single parent/divorced	18	4.5
Formal school		
Post-secondary	135	33.4
Secondary completed	164	40.6
Primary completed	86	21.3
None	19	4.7
Religion		
Christianity	288	71.3
Islam	112	27.7
Traditional	4	1.0
Occupation		
Civil servant	102	25.3
Farmer	20	5.0
Housewife/Unemployed	103	25.5
Trader/Artisan	179	44.3
Number of children		
<4	317	78.5
≥4	87	21.5
Income (Naira)		
> 18,000	139	34.4
≤ 18,000	265	65.6
Relation diagnosed for HIV		
Diagnosed for HIV	95	23.5
Not Diagnosed for HIV	309	76.5
HIV status Disclosure to partner		
Disclosed status	359	88.9
Did not disclosed status	45	11.1

Table 2 shows the socio-demographic characteristics of respondents in the study. A 100% response rate was achieved as a total of 404 HIV positive mothers with infants less or equal to 12-months in neonatal follow-up clinic who met the inclusion criteria responded. The age group 25-29 years comprised of 30.7% and 30-34years comprised of 33.4% while less than 20years was 3.2%. About 91.3% are married. Nineteen (4.7%) had no formal education and 33.4% had post-secondary education. At the time of survey, about 25.3% were civil servants, 25.5% were housewife/unemployed and 44.3% were traders/artisan. Two-third of respondents earned less than ₦18,000 monthly. Most of them (88.9%) have disclosed their HIV status to their partners. One fifth of respondents have more than four children.

Table 3: Antenatal Care Attendance of the respondents (n=404)

Characteristics	Frequency	Percent (%)
Attend ANC		
Attended ANC	382	94.6
Did not Attended ANC	22	5.5
Gestational Age at first Visit		
First Trimester	20	5.0
Second Trimester	10	2.5
Third Trimester	374	92.6
Institution attended for ANC		
General Hospital	295	73.0
PHC/MCH	89	22.0
Teaching hospital	20	5.0
Counseled on Infant Feeding(IF)		
Counseled on IF	403	99.8
Not counseled on IF	1	0.3
Counseled on Breastfeeding and HIV		
Counseled on Breastfeeding & HIV	373	92.3
Not Counseled on Breastfeeding & HIV	31	7.7
Counseled on Complementary feeding		
Counseled on complementary feeding	300	74.3
Not counseled on complementary feeding	104	25.7
Counseled on Replacement feeding		
Counseled on Replacement feeding	297	73.5
Not counseled on replacement feeding	107	26.5
Mode of Delivery		
Spontaneous vaginal Delivery	311	76.9
Elective Caesarean Section	60	14.9
Emergency Caesarean Section	33	8.2
Started on ART		
After delivery	133	32.9
Before pregnancy	263	65.1
During Labour	8	2.0

Table 3 presents the antenatal care attendance of the respondents. Most of the respondents attended Antenatal Care (94.6%). About 73% attended ANC in secondary health facility and 5% attended in tertiary facility. About 92.6% had their first ANC visit in the third trimester. Nearly all the respondents (99.8%) received counseling on infant

feeding, breastfeeding and HIV (92.3%), complementary feeding (74.3%), and replacement feeding (73.5%). About 23.1% of respondents delivered by caesarian section. Two-third of the respondents were started on ART before pregnancy, 2.0% of the respondents started ART during labour and 32.9% started ART after delivery.

Table 4: Respondent's knowledge on infant feeding and HIV (n=404)

Characteristics	Knowledge on infant feeding	
	Know Frequency (%)	Do not know Frequency (%)
HIV is transmitted through Breast milk	282 (69.8)	122 (30.2)
EBF causes Childhood illnesses	318 (78.7)	86 (21.3)
EBF can reduce transmission to baby	377 (93.3)	27 (06.7)
EBF is for six months	298 (73.8)	106 (26.2)
Formula feeding increases transmission	116 (28.7)	288 (71.3)
Mixed feeding is good	95 (23.5)	309 (76.5)
Formula feeding is expensive	364 (90.1)	40 (09.9)
Complementary feeding is good	377 (93.3)	27 (06.7)

EBF-Exclusive Breast Feeding

Respondent's knowledge on Infant Feeding and HIV

Upto 69.8% of respondents reported that HIV can be transmitted through breast milk, 78.7% reported Exclusive Breast Feeding (EBF) can prevent childhood illness, 93.3% reported exclusive breastfeeding can reduce transmission, 73.8% reported breast milk only for the first 6-months is adequate. About 28.7% of respondents reported that formula feeding increases transmission of HIV, 73.8% reported Formula feeding is expensive; mixed feeding is not good in 76.5% and 93.3% reported that Complimentary feeding is good from 6-months (Table 4).

Table 5: Distribution of Respondent's based on grading of Knowledge of Infant Feeding and HIV (n=404)

Knowledge grade	Frequency	Percent (%)
Good	86	21
Fair	258	64
Poor	60	15

Distribution of respondent's grading of knowledge of infant feeding and HIV

258 (64%) scored between 50 and 75 percentile; 60 (15%) scored below 50 percentile. They are consequently graded as having good, fair and poor knowledge respectively (Table 5).

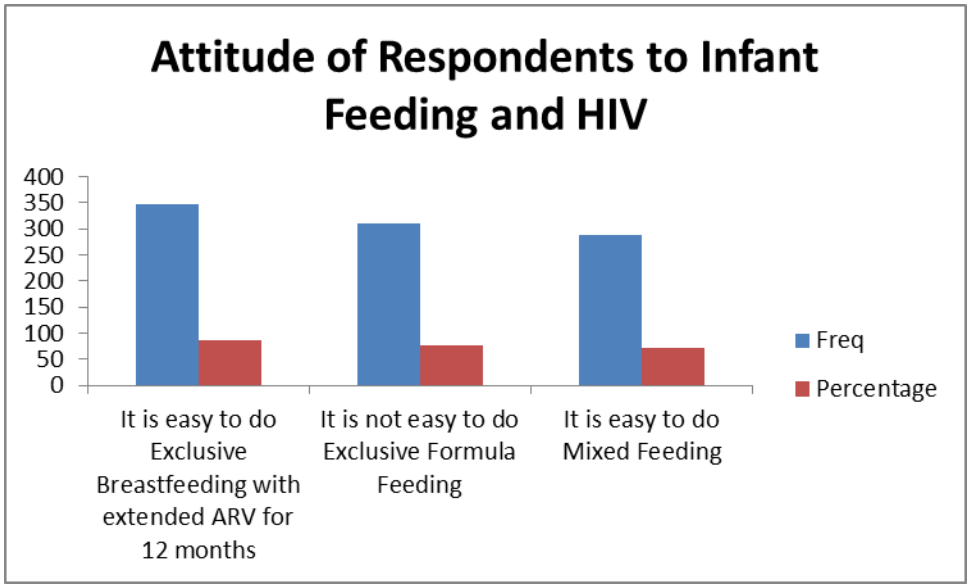


Figure 1: Attitude of Respondents to Infant Feeding and HIV recommendations

Attitude of respondents on infant feeding and HIV Recommendations

Figure 1 shows that about 347 (85.9%) of the respondents agreed that it is easy to breastfeed with extended ARVs and 77% reported that it is not easy to do exclusive formula feeding while 289 (72%) reported that it is easy to do mixed feeding.

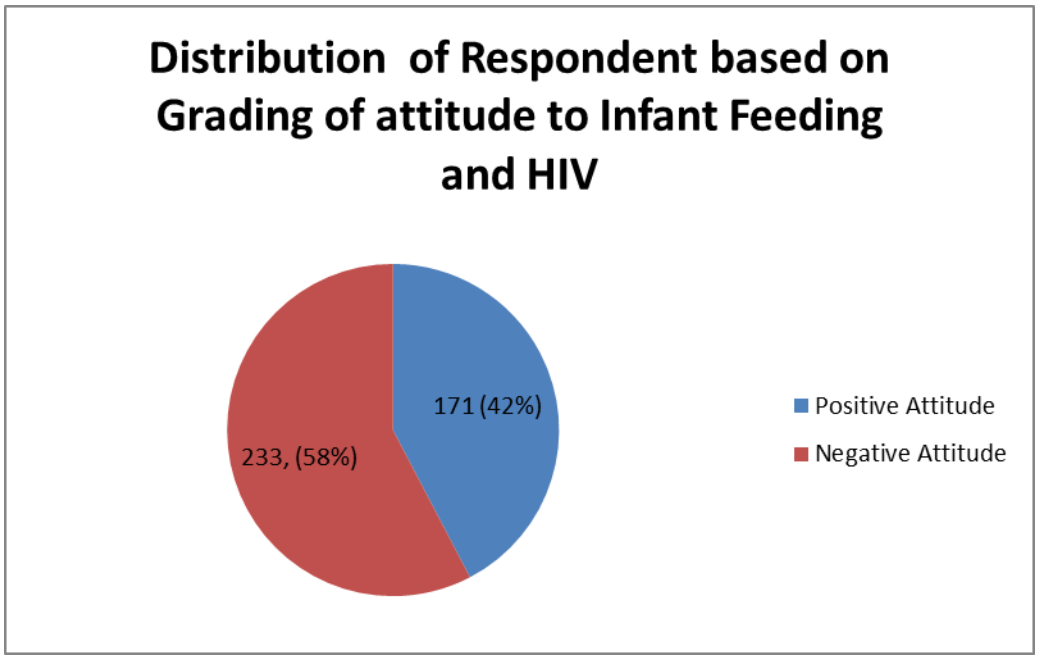


Figure 2: Distribution of respondents based on grading of attitude to Infant Feeding and HIV recommendations

About 171 (42%) of the respondents scored above the 75 percentile and 233 (58%) of the respondent scored below the 75 percentile. Graded as positive and negative attitude respectively (Figure 2).

Table 6: Infant feeding practice of respondents (n=404)

Variables	Frequency	Percent (%)
Ever breastfed		
Never breastfed	50	12.4
Was ever breastfed	354	87.6
Initiation of breastfeeding after birth		
Within first hour	269	67.4
Within first 8 hour	107	26.8
After 8 hour	28	5.8
Pre lacteal feeding practice		
Gave pre lacteal feed	129	31.9
Did not give pre lacteal feed	275	68.1
Ever practice Exclusive Replacement feeding		
Was ever practice Replacement feeding	159	39.4
Never practice Replacement feeding	245	60.6
Person who demonstrated/recommended feeding option…..		
Health worker	348	86.14
Support group worker	41	10.15
Neighbours	13	3.22
Others	2	0.5
Who decide feeding option		
Couple	224	55.5
Self	140	34.7
Husband	17	4.2
Others	23	5.7
Started complementary feeding		
On complementary feeding	280	69.3
Not on complementary feeding	124	30.7
Currently on Antiretroviral drugs (ARV)		
On ARV	386	95.5
Not on ARV	18	4.5
Currently breastfeeding		
Breastfeeding	253	62.6
Not Breastfeeding	151	37.4
Infant Feeding practice		
Exclusive Breast milk for Six months with ARV upto 12 months	68	16.8
Mixed feeding	123	30.4
Exclusive Formula feeding for Six months	213	52.7

Table 6 described the infant feeding practice of the respondents. About 354 (87.6%) reported breastfeeding their babies. About two-third initiated breastfeeding within the first hour after birth. About 68.1 % did not give pre lacteal food and 31.9% gave pre lacteal food. About 60.6% did not practice exclusive replacement feeding. 86.1% reported that replacement feeding demonstration was undertaken by the health care worker. The decision of feeding option was reported as couple decision 55.5%, babies mother 34.8% and babies father 4.2%. About 386 (95.5%) of the respondent reported were currently on ARV treatment and 253 (62.6%) were currently breastfeeding. About 68 (16.8%) of respondents reported exclusive breastfeeding.

Table 7: Characteristics of the index Child of HIV positive mother

Variables	Frequency (n=404)	Percent (%)
Sex of baby		
Male	220	54.5
Female	184	45.5
Current Status of baby		
Positive	17	4.2
Negative	387	95.7
Age of the Child (in Months)		
< 3 months	131	32.5
3-6months	130	33.1
6-12months	143	35.4

Table 7 shows the characteristic of the index child of the respondents. Slightly more than half (54.5%) of the children are male. About 4.2% were HIV positive. About a third are between the age of 3-6 months.

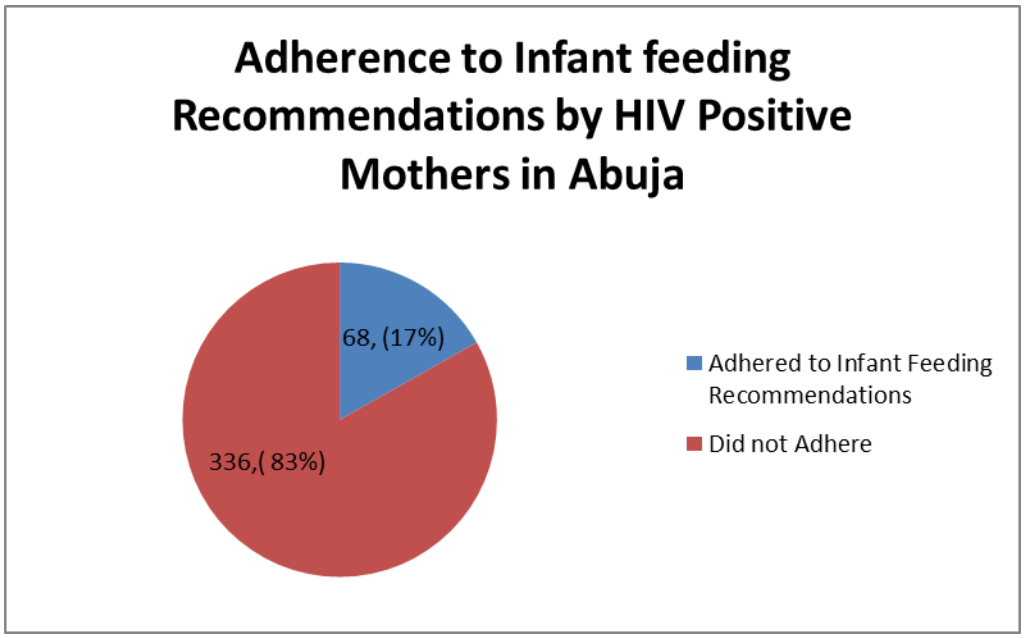


Figure 3: Adherence to Infant Feeding Recommendations by HIV positive Mothers in Abuja

Figure 3 shows that seventeen percent 17 % of HIV positive mothers adhered to recommended infant feeding options.

Table 8: Factors associated with Adherence to Infant Feeding Recommendations by HIV Positive Mothers

Characteristics	Adherence			Test statistic		
	Adherent	Not adherent	Total	χ^2	df	p value
Mother's Age group (yrs)						
<20	3	10	13	9.8457	6	0.13
20-24	6	21	27			
25-29	25	99	124			
30-34	21	114	135			
35-39	8	83	91			
>39	5	9	14			
Marital status						
Married	60	309	369	1.6348	2	0.44
Single parent/divorced	5	13	18			
Never married	3	14	17			
Formal school						
Post-secondary	23	112	135	1.4992	3	0.68
Secondary completed	30	134	164			
Primary completed	11	75	86			
None	4	15	19			
Religion						
Christianity	52	236	288	1.6363	2	0.44
Islam	16	96	112			
Traditional	0	4	4			
Occupation						
Civil servant	13	89	102	11.9217	3	**0.01**
Trader/Artisan	28	151	179			
Farmer	0	20	20			
Housewife/Unemployed	27	76	103			
Institution attended for ANC						
Secondary hospital	58	237	295	6.5575	2	**0.04**
PHC/MCH	9	80	89			
Teaching hospital	1	19	20			
Status of Baby						
Positive	2	15	17	3.2796	2	0.194
Negative	61	311	372			
Not done	5	10	15			

Table 8 shows that the occupation (χ^2=11.9217; P value 0.01) of the respondents and the institution (χ^2=6.6575; P value 0.04) the respondents attended for antenatal care is associated with adherence to Infant Feeding Recommendations.

Table 9: Association between Knowledge, Attitude with Adherence to Infant Feeding

Characteristics	Adherent	Not adherent	Total	OR	95% CI	p value
Number of Children						
<4	60	257	317	2.3	1.1 – 5.0	0.05
≥4	8	79	87			
Income						
> 18,000	15	124	139	0.5	0.3 – 0.9	0.03
≤ 18,000	53	212	265			
Disclosure to Partner						
Yes	59	300	359	0.8	0.4 – 1.7	0.69
No	9	36	45			
Attitude						
Positive	24	147	171	1.4	0.8 – 2.4	0.25
Negative	44	189	233			
Knowledge						
Good	3	83	86	14.6484	2	**0.001**
Average	55	203	258			
Poor	10	50	60			

Table 9 the study reported good knowledge (χ^2=14.6484; P value 0.001); number of children (P value 0.05) and income (P value 0.03) is associated with adherence. Attitude (P value 0.25) is not associated with adherence.

Table 10: Predictors of Adherence

Term	Aor	95% CI.	p-value
Knowledge (Good/Average)	7.2	2.2 – 23.8	**0.00**
Knowledge (Good/Poor)	1.3	0.6 – 2.7	0.54
Institution attended (PHC/MCH/Gen. Hosp)	2.6	1.2 – 5.7	**0.01**
Institution attended (Teaching hosp./Gen. Hosp)	4.2	0.5 – 32.8	0.17
Occupation (Unemployed/Employed)	0.4	0.2 – 0.8	**0.01**
Number of children (≥4/<4)	2.2	1.0 – 4.8	0.06

Table 10 of the study reported that the predictors of adherence are; good knowledge of the respondents on HIV and Infant Feeding and type of health facility the respondents attended for ANC (General hospital) and employment.

CHAPTER FIVE

DISCUSSIONS

This study provides the level of Knowledge, Attitude and adherence to recommended Infant feeding by HIV positive mothers attending postnatal clinic in Abuja, Nigeria.

The findings in this study show high knowledge (93%) of infant feeding and HIV. This is similar to study conducted in Ghana, which revealed a rate of 83% HIV positive mothers were counseled on infant feeding and has received information on the new recommended infant feeding. This shows that the knowledge of the mothers was good. This could have been informed by their level of education. Education has an important effect on mothers' knowledge, attitudes and increase child survival. The increase knowledge may also be due to the fact that majority of the mothers were counseled by trained counselors on the different options during antenatal care.

Furthermore, this study shows that some respondents showed negative attitudes (52%) to exclusive breastfeeding, higher than the rate reported by Onah et al which revealed negative attitude of 28%.[60]

Though 85.9% of the respondents reported that it is easy to do exclusive breastfeeding only a few (17.0%) of the mothers breastfed exclusively. This is below average levels. The low prevalence of mothers who breastfed exclusively as reported in this study is similar to that obtained in a another study in Edo state[65] which reported that 17% of Nigerian children were exclusively breastfed for less than 4 months, while 13% were exclusively breastfed for less than 6 months. Breast feeding provides infants with superior nutritional content that is capable of improving child survival and reduction in possible future out of pocket expenses. Breast feeding for the first six months of an

infant's life has been found to be a cost effective intervention in saving children's lives and can avert 13-15% of the 9 million deaths of children under 5 years old in low and middle income countries like Nigeria.[66] Also, all the mothers did not breastfeed beyond the first year. The common reason given was that the baby could not get enough from the breast milk and would soon be hungry. This shows that the likelihood of being fed appropriately does not increase with education nor nutrition knowledge. Our finding is in disagreement with another study[67] carried out among Omani children, where it was observed that low levels of women's education had potential negative effects on the child's nutrition and feeding patterns. However, women who were formally employed indicated that the frequency and duration of breast feeding were affected as working conditions were not always conducive for breast feeding. The low adherence to breast feeding observed in this study are not limited to Nigeria. A study in South Africa,[68] reported a three week duration of effective breast feeding and a probability of about a third of women breastfed for three months. Another study,[69] also reported that more than half of the breast feeding mothers did not breastfed their infants for more than 4 months. This reveals that exclusive breast feeding was common up to 4 months and not up to 6 months of age. Supportive environment for breast feeding is a critical determinant for successful breast feeding after 3 months or longer.[70] It is therefore important to conduct further study to understand the disparity on why despite the scientific evidence that shows exclusive breastfeeding and antiretroviral drugs given to mother or infants throughout the period of breastfeeding reduces postnatal transmission to the child only a third of the mothers are on ARVs as shown in this study.

Studying the socio-cultural and economic environment of HIV-positive mothers in the context of infant feeding in relation to the WHO infant feeding recommendations is of critical importance for understanding the reasons why there is often a gap between knowledge and adherence of infant feeding recommendations.

The age distribution of the respondents from this study and the ANC 2014 survey were similar with a third aged 25-29 years old. Women with no formal education in the ANC survey was 7.5% compared to 4.7% in this study. The women in this study have a level of education that allows them to understand what message was passed. Antenatal care visit among study respondents was high (94.6%) compared with national average of 60%.[4] It is commendable that over 90% of women in this study received counselling on 'breastfeeding and HIV and complementary feeding even though majority of the respondents attended antenatal care in the last trimester. About 23.1% of the respondents delivered by caesarean section, however, a national survey of 4118 HIV positive women in UK showed caesarean rate of 63%.[61] About 65% of the respondents started ART before pregnancy which implies that PMTCT is least likely in this group. It is of concerned that ART was started in a third of the respondents after delivery even though UNAIDS has reported that more than half of peadiatric HIV transmission occur during postnatal period. This underscore the need for adherence to breastfeeding with extended ARV given to mother or infant.

The finding in this study shows low level of adherence to exclusive breastfeeding (EBF) (17%), this is similar to a study conducted in South West, Nigeria (18.5%). The low rate may be due to persistent fear of transmission of HIV from an infected Mother to Child during breastfeeding, traditional belief that colostrum is not seen as adequate for baby.

However, since the exclusive breastfeeding rate is 17% in general population in Nigeria, one may not expect a higher rate in HIV positive women.

About 87.6% of children of respondents were ever breastfeed compared to almost all children (97.8%) born to mothers that responded to NDHS 2013. About two thirds of the study respondents started breastfeeding within the first day. This is higher than the figure reported from the national survey (38.4%). Although prelacteal feed is widely practiced in Nigeria and it is practiced more in the northern zones than in the southern zones of the country only a third of the respondents gave prelacteal food, this is below the national figure of 56.0%.

About 4.2% of respondent's babies were HIV positive. This is not surprising given that majority of respondents (95%) were currently on treatment at the time of study and despite the fact that a third (32.9%) of them started ART after delivery. This is why it is important to start women on treatment as soon as they are identified as positive.

In this study adherence was mainly influenced by attendance of health services at secondary health facility. Compare to 22% of the HIV positive mothers who attended antenatal care and 12% of the mothers who deliver at PHC. The reason could be due to lack of qualified or trained personnel at this level (e.g. lack of qualified Nurse/Midwifes, Doctors, paramedics, lack of appropriate Equipments, Supplies and Consumables among others).

Good knowledge (p=0.00), low income (p=0.03), as well as type of health facility (secondary facility) where respondents attended ANC (p=0.01) were found to be associated with adherence. This suggest the available of trained staff who gave

information and counseled the HIV positive mothers on HIV and Infant Feeding However, the study found that HIV positive mothers that were employed are less likely to adhere (aOR 0.4; p=0.01). This could be due to the fact mothers working away from home and having finances to buy formula will opt to formula feed.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Majority (93%) of the respondents have good knowledge, their attitude was fair (42%) with low adherence (17%) to the recommended feeding option. Predictors of adherence were good knowledge, type of health facility attended and employment status.

6.2 Recommendations

1. Reinforced Infant feeding recommendation during postnatal period or after delivery and this should be complimented with support in the community to be provided by peer groups (example mother to mother support group). Knowledge is high but uptake of ARV during postnatal period is low , this is an area for further research
2. Provide treatment to HIV positive mothers irrespective of the time of initiation of antenatal care throughout pregnancy, delivery and breastfeeding.
3. Where possible HIV positive mothers should be encouraged and supported to attend antenatal care and deliver at secondary facilities.
4. While effort should be made by government at different level of care to operationalize and strengthen the provision of one PHC per ward with trained nurse/midwifes and community health workers to support service delivering at this level.
5. The federal government should approve a compulsory one-year attachment of Nurses/midwifes at PHC /MCH as part of their in service training including engagement of retired Nurses or midwives among others.

REFERENCES

1. Snapshot CG. The Global HIV / AIDS Epidemic. 2015; (November):6–9.

2. Federla Ministry of Health National Demographic and Health Survey Nigeria. 2013;

3. Joint United Nations Programme on HIV AIDS. GLOBAL AIDS RESPONSE PROGRESS REPORTING 2014 Construction of Core Indicators for monitoring the 2011 United Nations Political Declaration on HIV and AIDS. 2014;1–180. Available from: www.unaids.org/AIDSReporting

4. Federal Ministry of Health National HIV and Syphilis Sero-Prevalence Sentinel Survey among Pregnant Women Attending Antenatal Clinics in Nigeria. December 2015.

5. Iwelunmor J, Ezeanolue EE, Airhihenbuwa CO, Obiefune MC, Ezeanolue CO, Ogedegbe GG. Socio-cultural factors influencing the prevention of mother-to-child transmission of HIV in Nigeria: a synthesis of the literature. BMC Public Health [Internet]. 2014;14(1):771. Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4133635&tool=pmcentrez&rendertype=abstract

6. Aa R. Ginigeme ON Infant feeding practices in the first six months of life among HIV positive mothers attending Teaching Hospitals in Lagos , Nigeria. 2014;41(1):64–9.

7. FMOH. National HIV Sero-prevalence Sentinel Survey : Technical report [Internet]. Nigeria Federal Ministry Of Health, Department of Public Health National AIDS/STI Control Programme. 2010. Available from: http://www.nigeria-aids.org/documents/2010_National HIV Sero Prevalence Sentinel Survey.pdf

8. National Population Commission. Nigeria Demographic And Health Survey : Preliminary Report. MEASURE DHS ICF International Calverton, Maryland, USA National Population Commission Abuja,. 2012.

9. Abah IO, Darin KM, Ebonyi a. O, Ugoagwu P, Ojeh VB, Nasir N, et al. GLOBAL AIDS RESPONSE Country Progress Report Nigeria GARPR 2014. AIDS Patient Care STDS. 2006;43(1):3–5.

10. WHO, UNICEF, UNAIDS, UNFPA. Guidelines on HIV and Infant Feeding: Principles and recommendations for infant feeding in the context of HIV and summary of evidence. World Health Organization. Geneva. 2010. 1-49 p.

11. The Kesho Bora Study Group. Eighteen-month follow-up of HIV-1-infected mothers and their children enrolled in the Kesho Bora study observational cohorts. J Acquir Immune Defic Syndr. 2010;54(5):533–41.

12. Global HIV/AIDS Progress Report. 2012. UNAIDS 2014

13. Muluye D, Woldeyohannes D, Gizachew M, Tiruneh M. Infant feeding practice and associated factors of HIV positive mothers attending prevention of mother to child transmission and antiretroviral therapy clinics in Gondar Town health institutions, Northwest Ethiopia. BMC Public Health. 2012;12(1):240.

14. Koye DN, Zeleke BM. Mother-to-child transmission of HIV and its predictors among HIV-exposed infants at a PMTCT clinic in northwest Ethiopia. BMC Public Health. 2013;13:398.

15. Doherty T, Sanders D, Goga A, Jackson D. Implications of the new WHO guidelines on HIV and infant feeding for child survival in South Africa. Bull World Health Organ. 2011;89(1):62–7.

16. WHO, UNICEF, UNAIDS. Global HIV/AIDS Response Progress Report 2011. Vasa. 2011;1–233.

17. UNAIDS. UNAIDS report on the global AIDS epidemic 2013. UNAIDS. 2013. p. 198.

18. UNAIDS. Global Aids Response Progress Reporting 2015. The Lancet. 2015. 218 p.

19. Young SL, Mbuya MNN, Chantry CJ, Geubbels EP, Israel-Ballard K, Cohan D, et al. Current knowledge and future research on infant feeding in the context of HIV: basic, clinical, behavioral, and programmatic perspectives. Adv Nutr. 2011;2(3):225–43.

20. Perspectives P, Young SL, Mbuya MNN, Chantry CJ, Geubbels EP, Israel-ballard K, et al. Current Knowledge and Future Research on Infant Feeding in the Context of HIV : Basic , Clinical. Society [Internet]. 2011;2(6):225–43. Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3090166&tool=pmcentrez&rendertype=abstract

21. Shayo EH, Våga BB, Moland KM, Kamuzora P, Blystad A. Challenges of disseminating clinical practice guidelines in a weak health system: the case of HIV and infant feeding recommendations in Tanzania. Int Breastfeed J [Internet]. 2014;9(1):1–13. Available from: http://www.internationalbreastfeedingjournal.com/content/9/1/188

22. Moland K, de Paoli MM, Sellen DW, van Esterik P, Leshabari SC, Blystad A, et al. Breastfeeding and HIV: experiences from a decade of prevention of postnatal HIV transmission in sub-Saharan Africa. Int Breastfeed J. 2010;5(1):10.

23. Blystad A, van Esterik P, de Paoli MM, Sellen DW, Leshabari SC, Moland KMI. Reflections on global policy documents and the WHO's infant feeding guidelines: lessons learnt. Int Breastfeed J [Internet]. 2010 Jan [cited 2015 Mar 1];5:18.

Available from:
http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2987852&tool=pmcentrez&rendertype=abstract

24. Joint United Nations Programme on HIV/AIDS (UNAIDS). Global AIDS Response progress reporting: monitoring the 2011 political declaration on HIV/AIDS: guidelines on construction of core indicators: 2012 reporting. Vasa. 2011;1–233.

25. WHO. PMTCT strategic vision 2010–2015 : preventing mother-to-child transmission of HIV to reach the UNGASS and Millennium Development Goals. World Heal Organ. 2010;1–40.

26. Both JMC, Van Roosmalen J. The impact of prevention of mother to child transmission (PMTCT) programmes on maternal health care in resource-poor settings: Looking beyond the PMTCT programme-a systematic review. BJOG: An International Journal of Obstetrics and Gynaecology. 2010. p. 1444–50.

27. Boateng D, Kwapong GD, Agyei-Baffour P. Knowledge, perception about antiretroviral therapy (ART) and prevention of mother-to-child-transmission (PMTCT) and adherence to ART among HIV positive women in the Ashanti Region, Ghana: a cross-sectional study. BMC Womens Health. 2013;13(1):2–8.

28. Okoli JC, Lansdown GE. Barriers to successful implementation of prevention-of-mother-to-child-transmission (PMTCT) of HIV programmes in Malawi and Nigeria: A critical literature review study. Pan Afr Med J. 2014;19.

29. Marembo J, Zvinavashe M, Nyamakura R, Shaibu S, Mogobe KD. Factors influencing infant-feeding choices selected by HIV-infected mothers: Perspectives from Zimbabwe. Japan J Nurs Sci. 2014;11(4):259–67.

30. Saloojee H, Cooper P a. Feeding of infants of HIV-positive mothers. Curr Opin Clin Nutr Metab Care. 2010;13:336–43.

31. Sefene A, Birhanu D, Awoke W, Taye T. Determinants of exclusive breastfeeding practice among mothers of children age less than 6 month in Bahir Dar city administration, Northwest Ethiopia; a community based cross-sectional survey. Sci J Clin Med. 2013;2(6):153–9.

32. Maru Y, Haidar J. Infant feeding practice of HIV positive mothers and its determinants in selected health institutions of Addis Ababa ,. Ethiop J Heal Dev. 2009;23(MAY):107–14.

33. Ukegbu AU, Ebenebe EU, Ukegbu PO, Onyeonoro UU. Determinants of breastfeeding pattern among nursing mothers in Anambra State, Nigeria. East African journal of public health. 2011. p. 226–31.

34. Victor R, Baines SK, Agho KE, Dibley MJ. Determinants of breastfeeding indicators among children less than 24 months of age in Tanzania: a secondary analysis of the 2010 Tanzania Demographic and Health Survey. BMJ Open. 2013;3:1–8.

35. Jamieson DJ, Kayira D, Knight RJ, Ph D, Ahmed YI, Kamwendo DD, et al. Maternal or Infant Antiretroviral Drugs to Reduce HIV-1 Transmission. 2010;2271–81.

36. UNAIDS/WHO. AIDS Epidemic Update 2007. Unaids, Who. 2007;1.

37. Pat Kieffer M, Greiner T, Newell ML, Coovadia H, Cortina-Borja M, Rollins N, et al. Mortality of infants born to HIV-infected mothers in Africa [3] (multiple letters). Lancet. 2005. p. 120–2.

38. Shapiro RL, Smeaton L, Lockman S, Thior I, Rossenkhan R, Wester C, et al. Risk factors for early and late transmission of HIV via breast-feeding among infants born to HIV-infected women in a randomized clinical trial in Botswana. J Infect Dis. 2009;199(3):414–8.

39. Victora CG, Barros AJD, Fuchs SC, de Francisco A, Morris J, Hall AJ, et al. Effect of breastfeeding on infant and child mortality due to infectious diseases in less developed countries: a pooled analysis. Lancet. 2000;355(9202):451–5.

40. WHO Advice R. WHO ;HIV and infant feeding Revised Principles and Recommendation. World Heal Organ. 2009;(November).

41. Lallemant M, Jourdain G, Le Coeur S, Mary JY, Ngo-Giang-Huong N, Koetsawang S, et al. Single-dose perinatal nevirapine plus standard zidovudine to prevent mother-to-child transmission of HIV-1 in Thailand. N Engl J Med. 2004;351(3):217–28.

42. Centers for Disease Control and Prevention (CDC). Achievements in public health. Reduction in perinatal transmission of HIV infection--United States, 1985-2005. MMWR Morb Mortal Wkly Rep. 2006;55(21):592–7.

43. Taha TE, Hoover DR, Kumwenda NI, Fiscus S a, Kafulafula G, Nkhoma C, et al. Late postnatal transmission of HIV-1 and associated factors. J Infect Dis. 2007;196(1):10–4.

44. Shapiro RL, Thior I, Gilbert PB, Lockman S, Wester C, Smeaton LM, et al. Maternal single-dose nevirapine versus placebo as part of an antiretroviral strategy to prevent mother-to-child HIV transmission in Botswana. AIDS. 2006;20(January):1281–8.

45. Magnano San Lio M, Mancinelli S, Palombi L, Buonomo E, Altan AD, Germano P, et al. The DREAM model's effectiveness in health promotion of AIDS patients in Africa. Health Promot Int. 2009;24(1):6–15.

46. Shapiro RL, Hughes MD, Ogwu a, Kitch D, Lockman S, Moffat C, et al. Antiretroviral regimens in pregnancy and breast-feeding in Botswana. N Engl J Med. 2010;362(24):2282–94.

47. Okanda JO, Borkowf CB, Girde S, Thomas TK, Lecher SL. Exclusive breastfeeding among women taking HAART for PMTCT of HIV-1 in the Kisumu Breastfeeding Study. BMC Pediatr. 2014;14:280.

48. Kilewo C, Karlsson K, Ngarina M, Massawe A, Lyamuya E, Swai A, et al. Prevention of mother-to-child transmission of HIV-1 through breastfeeding by treating mothers with triple antiretroviral therapy in Dar es Salaam, Tanzania: the Mitra Plus study. J Acquir Immune Defic Syndr. 2009;52(3):406–16.

49. Taha TE, Kumwenda NI, Gibbons A, Broadhead RL, Fiscus S, Lema V, et al. Short postexposure prophylaxis in newborn babies to reduce mother-to-child transmission of HIV-1: NVAZ randomised clinical trial. Lancet. 2003;362(9391):1171–7.

50. Nielsen-Saines K, Watts DH, Veloso VG, Bryson YJ, Joao EC, Pilotto JH, et al. Three postpartum antiretroviral regimens to prevent intrapartum HIV infection. N Engl J Med. 2012;366(25):2368–79.

51. Taha TE, Li Q, Hoover DR, Mipando L, Nkanaunena K, Thigpen MC, et al. Postexposure prophylaxis of breastfeeding HIV-exposed infants with antiretroviral drugs to age 14 weeks: updated efficacy results of the PEPI-Malawi trial. J Acquir Immune Defic Syndr. 2011;57(4):319–25.

52. Coutsoudis A, Dabis F, Fawzi W, Gaillard P, Haverkamp G, Harris DR, et al. Late postnatal transmission of HIV-1 in breast-fed children: an individual patient data meta-analysis. J Infect Dis. 2004;189(12):2154–66.

53. Zunza M, Mercer GD, Thabane L, Esser M, Cotton MF. Effects of postnatal interventions for the reduction of vertical HIV transmission on infant growth and non-HIV infections: A systematic review. Journal of the International AIDS Society. 2013.

54. Rollins N, Mahy M, Becquet R, Kuhn L, Creek T, Mofenson L. Estimates of peripartum and postnatal mother-to-child transmission probabilities of HIV for use in Spectrum and other population-based models. Sex Transm Infect [Internet]. 2012;88 Suppl 2:i44–51. Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3512432&tool=pmcentrez&rendertype=abstract

55. Kuzma J. Knowledge, attitude and practice related to infant feeding among women in rural Papua New Guinea: a descriptive, mixed method study. Int Breastfeed J. 2013;8:16.

56. Laar AS, Govender V, Laar SA. Factors influencing the choices of infant feeding of HIV-positive mothers in Southern Ghana: The role of counsellors, mothers, families and socio-economic status. J AIDS HIV Res [Internet]. 2011;3(July):129–37. Available from: 0427396353t_feeding_choices.pdf

57. Mahaka HT, Chakombera E. Knowledge, attitudes and practices on infant feeding options among HIV positive mothers. Cent Afr J Med. 2008;54(9-12):51–3.

58. Oche MO, Umar AS, Ahmed H. Knowledge and practice of exclusive breastfeeding in Kware, Nigeria. Afr Health Sci. 2011;11(3):518–23.

59. Kaliwile C, Michelo C. Determinants of Adherence to the Exclusive Breastfeeding Option among HIV Positive Mothers in Eight Selected Health Centres in Lusaka District. 2010;37(4):195–204.

60. Onah S, Osuorah DIC, Ebenebe J, Ezechukwu C, Ekwochi U, Ndukwu I. Infant feeding practices and maternal socio-demographic factors that influence practice of exclusive breastfeeding among mothers in Nnewi South-East Nigeria: a cross-sectional and analytical study. Int Breastfeed J [Internet]. 2014;9:6. Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4032632&tool=pmcentrez&rendertype=abstract

61. National Population Commission (NPC) [Nigeria] and ICF Macro. National Demographic and Health Survey. Niger Demogr Heal Surv 2008. 2009;187–96.

62. Bertram D. Likert Scales… are the meaning of life : Univ Calagary, Dep Comput Sci. 2007;pages.cpsc.ucalgary.ca/~saul/wiki/uploads/CPSC681/.

63 Kish, Leslie. 1965. Survey Sampling. New York: John Wiley and Sons, Inc. M

64 Ogbonna C, Daboer JC. Current knowledge and practice of exclusive breastfeeding among mothers in Jos, Nigeria. Niger J Med 2007;16(3):256-60.

65. Salami LI. Factors influencing Breast feeding practices in Edo State, Nigeria. African Journal of Food Agriculture Nutrition and Development. 2006;6:2.

66. Nigeria Demographic and Health Survey. National Population Commission and ICF. Macro. Calverton, Maryland, USA. NPC and ICF Macro; 2008.

67. Ali A, Layla A, Fouad H, Sadeq A, Saif A. Effect of Mothers' Nutritional Knowledge and Attitudes on Omani Children's Dietary Intake. Oman Medical Journal. 2011; 26(4):253

68. Mustaphi LF, Mbhenyane XG, Amey AKA. Infant feeding practice of mothers and the nutritional status of infants in the Vhembe District of Limpopo Province. S Afr J Clin Nut. 2008;21:2.

69. Okolo SN, Adewunmi YB, Okonji MC. Current Breastfeeding Knowledge, Attitudes and Practices of Mothers in 5 Rural Communities in Savannah Region of Nigeria. African Journal of Food, Agriculture, Nutrition and Development; 1999

70. Gabriele A, Shettimo F. Child malnutrition and mortality in developing countries: Evidence from a cross-country analysis. Analyses of Social Issues and Public Policy.2008;8:1.

APPENDICES

APPENDIX 1

QUESTIONNAIRE ON KNOWLEDGE, ATTITUDE AND ADHERENCE TO RECOMMENDED INFANT FEEDING IN HIV POSITIVE MOTHERS IN ABUJA, NIGERIA

SECTION A: SOCIO-DEMOGRAPHIC INFORMATION

1. Date of enrollment: ----------

2. How old are you? (Mother's age as at last birthday)----------years

3. How many children have you ever born? (including the index baby):----------

4. What is the highest level of formal school that you attended?
   (a) None [ ] (b) Primary completed [ ] (c) Secondary completed [ ]
   (d) Post-Secondary [ ]

5. Current Marital Status: (a) Married[ ] (b)Never married[ ]
   (c).Single parent/divorced [ ]

6. What is the highest level of formal school your Husband attended?
   (a) None [ ] (b) Primary completed [ ] (c) Secondary completed [ ]
   (d) Post-secondary [ ]

7. What is your occupation?
   (a) Trader/Artisan [ ] (b) Farmer [ ] (c) Civil servant [ ]
   (d) Housewife/Unemployed [ ]

8. What is your monthly income? _____

9. What is your Husband's Occupation?
   (a)Trader/Artisan [ ] (b) Farmer [ ] (c) Civil servant [ ] (d) Unemployed [ ]

10. What is your Religion? (a) Islam [ ] (b) Christianity [ ] (c) Traditional [ ]

11. Household:

    a. What is the total number of the members of the household? _____
    b. Are you the head of the household? (a)Yes [ ] (b) No [ ]
    c. If 'No' to 10.b. above, what is your relationship to the head of the household?
       (a) Wife (one only) [ ] (b) Wife (one among several) [ ] (c) Daughter [ ]
       (d) House (maid) servant [ ] (e) Others (please specify)_____

d. What is the main source of drinking water for the members of your household?
(a) Pipe borne/tap Water [ ] (b) Bottled/Sachet water [ ]
(c) Covered well/spring [ ]
(d) River/pond [ ] (e) Rain water [ ] (f) Others specify)_____

12. What is the HIV status of your partner?
(a) Positive [ ] (b) Negative [ ] (c) Unknown [ ] (d) Refused to test [ ]
(e) Dead [ ]

13. Have you disclosed your status to your current partner? (a) Yes [ ] (b) No [ ]

14. Has any of your relations been diagnosed as HIV positive? (a) Yes [ ] (b) No [ ]

15. If yes, who? (a) Mother [ ] (b)Mother-in-law [ ] (c) Father [ ]
(d) Father-in-law [ ] (e) Siblings [ ] (f) Friend [ ]
(g) Others (specify)_____

SECTION B: ANTENATAL CARE OF THE PREGNANCY

16. During your last pregnancy, did you attend antenatal care (ANC) in any health institution?
(a) Yes [ ] (b) No [ ] **If 'No', please proceed to Question 22**

17. How old was the pregnancy when you went for (ANC)? Gestation age in month: _____

18. Which health institution did you go? (a) Teaching Hospital [ ] (b) General Hospital [ ] (c) PHC/MCH [ ] (d) Catholic Hospital or other Mission Hospital [ ]
(e) Private Clinic [ ]

19. How many times have you attended the antenatal care in that particular health facility? № of antenatal visits?_____

20. During antenatal care visits, were you counseled about infant feeding?

(a) Yes [ ] (b) No [ ]

21. Were you informed about the following during ANC visits?
a. Breast feeding and HIV? Yes [ ] No [ ]
b. About bottle feeding? Yes [ ] No [ ]
c. About supplementary feeding? Yes [ ] No [ ]
d. About replacement feeding? Yes [ ] No [ ]

22. How was your baby delivered?
(a) Spontaneous Vaginal Delivery [ ] (b) Elective Caesarean Section [ ]
(c) Emergency Caesarean Section [ ] d. Home [ ]
(e) Others (specify)_____

23. Where was your last child delivered?
(a) Teaching Hospital [ ] (b) General Hospital [ ] (c) PHC/MCH [ ]
(d) Catholic Hospital or other Mission Hospital [ ] (e) Private Clinic [ ]
(f) Home [ ]

24. When did you start ART?
(a) Before pregnancy [ ] (b) From 1st trimester [ ] (c) From 2nd trimester [ ]
(d) From 3rd trimester [ ] (e) During labour [ ] (f) After delivery [ ]
(g) No ART at any time [ ]

SECTION C: KNOWLEDGE ON INFANT FEEDING OPTIONS

I am going to read out some statements about infant feeding. For each statement, please tell me whether you think it is true, false or you don't know.

25. HIV infections can be transmitted from HIV infected mother to her baby through breast milk. (a) True [ ] (b) False [ ] (c) Don't know [ ]

26. Exclusive Breastfeeding prevents childhood illnesses. (a) True [ ] (b) False [ ]
(c)Don't know [ ]

27. Exclusive Breastfeeding with extended ARVs for 12 months can reduce transmission to baby? (a) True [ ] (b) False [ ] (c) Don't know [ ]

28. Giving only breast milk is adequate to babies in the 1st 6 months for all women.
(a) True [ ] (b) False [ ] (c) Don't know [ ]

29. Formula feeding increases transmission of HIV from an infected woman to her baby. (a) True [ ] (b) False [ ] (c) Don't know [ ]

30. To Breast feed and formula feed together is good? (a) True [ ] (b) False [ ]
(c) Don't know [ ]

31. Formula feeding is expensive than breastfeeding. (a) True [ ] (b) False [ ]
(c) Don't know [ ]

32. Giving both breast milk and complimentary food starting from the 6th month is good. (a) True [ ] (b) False [ ] (c) Don't know [ ]

SECTION D: ATTITUDE TO INFANT FEEDING OPTIONS ON HIV

S/N	QUESTION	Strongly agree	Agree	Neither agrees nor disagree	Disagree	Strongly disagree
33.	Is it easy to Exclusive Breastfeeding with extended ARV for 12 months?					
34.	Is it easy to Exclusive Formula Feeding?					
35.	Is it easy to do Mixed Feeding?					

SECTION E: INFANT FEEDING PRACTICE

36. Did you ever breastfed your child? Yes [ ] No [ ]**(If 'No', please skip to Question 41)**

37. When did you give breast to your child after birth?
Within first hour [ ] Within first 8 hours [ ] After 8 hours [ ]

38. Did your infant receive any thing to drink or eat before the first breast feeding?
Yes [ ] No [ ] **(If 'No', please skip to Question 41)**

39. What food or fluid provided? **(more than one answer is possible don't read the choices probe for more)** Ogi [ ] Water [ ] Tea [ ] Others (specify) _____

40. Why did you provide these foods or fluids? **(Probe for more)**
(a) Neigbour's Advice [ ] (b) Insufficient breast milk [ ]
(c) Husband's imposition [ ] (d) Mother's illness [ ] (e) Infant illness [ ]

41. Have you ever practiced exclusive replacement feeding? Yes [ ] No [ ]

42. Why do you prefer exclusive replacement feeding? _____

43. What kind of replacement food do you give your child?
(a) Commercial infant formula [ ] (b) Home prepared formula [ ]
(c) Fresh animal milk, full cream (pasteurized or powdered milk) [ ]
(d) All, alternately [ ]

44. How many tins of formula milk do you use per week? _____tins

45. Have you seen demonstration about preparation of replacement feeding?
Yes [ ] No [ ]

46. Who demonstrated? (a) Health worker [ ] (b) Neighbours [ ]
(c) Support Group Worker [ ] (d) Others specify _____

47. Who decides how and what to feed the infant? (a) Myself only [ ]
(b) My husband [ ] (c) My husband and me [ ] (d) My mother-in- law [ ]
(e) Others (specify)_____

48. Have you started complementary feeding? Yes [ ] No [ ] **(If 'No', please skip to Q 50)**

49. At what age of the child did you start complementary food? _____ months

50. Are you currently on ARVs? Yes [ ] No [ ]

51. Are you currently breast feeding your child? Yes [ ] No [ ]**(If 'No', please skip to Q. 57)**

52. At what age of your child do you intend to stop breast feeding? (a) 6 months [ ]
(b) 7-12 months [ ] (c) 13-18 months [ ] (d) 19- 24 months [ ]

53. Have you completely stopped breast feeding? Yes [ ] No [ ]

54. How old was your infant when you stopped breast feeding?

(a) ----------days (b) ----------weeks (c) --------months

55. Why did you stop breast feeding your child?

(a) Infants no longer wanted to breast feed [ ]
(b) To encouraged infant to eat solid food [ ]
(c) Pregnancy [ ]
(d) Fear of transmission of HIV [ ]
(e) Mother can afford replacement feeding [ ]
(f) Advised by health providers [ ]
(g) Infant too sick to breast feed [ ]
(h) Mother too sick to breast feed [ ]
(i) Advised by husband [ ]
(j) Advised by other person [ ]
(k) Others (specify) _____

56. Did you encounter any problem when you stopped breast feeding? Yes [ ] No [ ]

57. What did you give to your child within the last 24 hours?
(a) Breast milk only [ ] (b) Breast milk while mother is taking ARV [ ]
(c) Formula Milk [ ] (d) Breast milk while child is on ARV [ ]
(e) Others (specify) _____

SECTION F: REASONS FOR INFANT FEEDING CHOICE OF HIV-POSITIVE MOTHERS

58. What are your reasons for choosing exclusive breastfeeding? **(Multiple answers allowed)**

(a) Cannot afford to buy formula [ ] (b) Breastfeeding prevents babies from infections [ ]
(c) Health workers/counselors' influence [ ] (d) Fear of stigmatization [ ]
(e) (e)family influence [ ] (f) Others (specify)_____

59. What are your reasons for choosing exclusive formula feeding? **(Multiple answers allowed)**

(a) Can afford formula [ ] (b) To reduce risk of transmission [ ]
(c) Health workers/counselors' influence [ ] (d) Husband [ ]
(e) Family influence [ ] (f) Others (specify) _____

60. What are your reasons for Exclusive Breastfeeding with ARVs? **(Multiple answers allowed)**

(a) Cannot afford to buy formula [ ] (b) ARVs will prevent babies from infections [ ]
(c) Health workers/counselors' influence [ ] (d) Fear of stigmatization [ ]
(e) Husband's imposition [ ] (f) Others (specify)_____

61. Do you practiced mixed feeding? What did you add to milk (breast or formula)?

(a) Water [ ] (b) Agbo (traditional medication) [ ] (c) Multivite syrup [ ]
(d) Tea [ ] (e) Ogi (pap) [ ]

62. At what age did you start mixed feeding and for how long? _____

63. Do you belong to any support group? (a) Yes[ ] (b) No[ ]

64. What infant feeding option was recommended to you in the support group?

(a) Exclusive Breastfeeding [ ] (b) Exclusive replacement feeding [ ]
(c) Exclusive Breastfeeding with extended ARV for 12 months feeding [ ]
(d) Others (specify)_____

SECTION G: CHILD'S HEALTH STATUS

65. How old is your baby? _____ (age in months)

66. What is your baby's sex: (a) Male [ ] (b)Female[ ]

67. What is the HIV status of your baby at 6 weeks?
(a) Negative [ ] (b) Positive [ ] (c) Indeterminate [ ] (e) Not done [ ]

68. What is the HIV status of your baby at 3 months?
(a) Negative [ ] (b) Positive [ ] (c) Indeterminate [ ] (e) Not done [ ]

69. What is the current HIV status of the baby?
(a) Negative [ ] (b) Positive [ ] (c) Indeterminate [ ] (e) Not done [ ]

70. Did your baby receive ART prophylaxis? (a) Yes [ ] (b) No[ ]

71. If yes when? (a) At less than 72 hrs of life[ ] (b) at between 72 hrs and 1week [ ] (c) At more than 1 week after birth[ ]

Thank you for your participation.

APPENDIX 2

INFORMATION SHEET AND INFORMED CONSENT FORM

Title of Study: Knowledge, Attitude and Adherence to Recommended Infant Feeding in HIV Positive Mothers in Abuja, Nigeria

Researcher: Amina Mohammed (Nigeria Field Epidemiology and Laboratory Training Program Resident, Abuja)

You have been selected to participate in a research study on Assessment of Knowledge Attitude and Adherence to Infant feeding in HIV positive Mothers in Abuja, Nigeria. The purpose of the study is to determine the Adherence of HIV positive mothers to Infant feeding with Extended ARV and what factors affect the decision to exclusively breastfeed or exclusive formula feed, and also what factors affect the adherence to the feeding practice. Although this study will not benefit you directly, the information obtained may help to identify the real problems and challenges that HIV positive women face in feeding their children and thus help to improve the efficacy of future programmes for HIV positive mothers.

There will be no risks or discomforts to you in sharing your own information. Your participation will mean that you will meet with the researcher/research assistants for an interview lasting 25 minutes. You will be able to discuss issues in your home language. I will keep a record of who has participated in the study. Your name will not be on the questionnaires, so that the data will not be linked to your name. All data will be stored in a secured place and no one except the research team will have access to your interviews. Your identity will not be revealed when the study is reported or published. Your HIV status will likewise be protected, and you will receive all of the same services as all other women participating in the PMTCT programme. If you have any questions about the study or about participating in the study, please feel free to ask me (Amina Mohammed). You may contact me on +2347039113599; E-mail-aminaliman1@yahoo.co.uk).

Your participation in the study is totally voluntary; you are under no obligation to participate. You have the right to withdraw at any time if you want to, without repercussion or penalty. You have the right to refuse to give information or to ask for clarification about the purpose of the study. The study and its procedures have been approved by the Research Committees of Federal Capital Territory, Abuja.

I have discussed the above points with the subject. It is my opinion that the subject understands the risks, benefits and obligations involved in participating in this project.

Signature of investigator …….

Date……..……..

PARTICIPANT'S INFORMED CONSENT FORM

I……, after being fully aware of my right and privileges and having been informed about the study in a language that I understand, and realizing no risk associated to this study and the benefits of participating in the study, hereby give my consent.

…….. ……

Signature/Date Thumb print/Date

……...

Witnessed by

APPENDIX 3

ETHICAL CLEARANCE

FEDERAL CAPITAL TERRITORY
HEALTH RESEARCH ETHICS COMMITTEE
Research Unit, Room 10, Block A Annex, HHSS
FCT Secretariat No. 1 Kapital Street Area 11, Garki, Abuja - Nigeria

Name of Principal Investigator	Dr. Amina Mohammed
Address of Principal Investigator:	Nigeria Field Epidemiology & Laboratory, No. 50 Haile Sellaise Street, Asokoro – Abuja
Date of receipt of valid application:	09/11/2015

Notice of Research Approval
Protocol Approval Number: FHREC/2015/01/74/23-11-15

Study Title: Assessment of Prevalence and Determinants of Adherence to the Provision of Infant Feeding Guidelines By HIV Positive Mothers in Abuja.

This is to certify that the FCT Health Research Ethics Committee (FCT HREC) has fully approved the research described in the above stated protocol.

Approval Date: - 23/11/2015
Expiration Date: - 22/11/2016

Note that no activity related to this research may be conducted outside of these dates. Only the FCT HREC approved informed consent forms may be used when written informed consent is required. They must carry FCT HREC assigned protocol approval number and duration of approval of the study.

The National Code of Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations, and with the tenets of the code. The FCT HREC reserves the right to conduct compliance visit to your research site without prior notification.

Modifications: Subsequent changes are not permitted in this research without prior approval by the FCT HREC.

Problems: All adverse events or unexpected side effects arising from this project must be reported promptly to FCT HREC.

Renewal: This approval is valid until the expiration date. If you are continuing your project beyond the expiration date, endeavor to submit your annual report to FCT HREC early, and request for renewal of your approval to avoid disruption of your project.

Closure of Study: At the end of the project, a copy of the final report of the research should be forwarded to FCT HREC for record purposes, and to enable us close the project.

Desmond Emereonyeokwe
For: Secretary, FCT HREC
November 23, 2015

APPENDIX 4

INFANT FEEDING TERMS

EBF is defined as the receipt of only breast milk (either directly from the breast or expressed); only oral rehydration solution, drops, and syrups (vitamins, minerals or medicines) are permitted).
Mixed feeding is the receipt of both breast milk and other solids or liquids, including water and nonhuman milks, before 6 months of age.
Complementary feeding is the appropriate addition of other solids, semisolids and liquids to a breastfeeding Six months of age.
Replacement feeding means that the infant receives no breast milk but is fed with formula or other breast milk substitutes.