UPTAKE AND EFFECTIVENESS OF ELIMINATION OF MOTHER TO CHILD TRANSMISSION (EMTCT) OF HIV SERVICES IN KANO STATE, NIGERIA

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DECLARATION

I hereby declare that this work is the product of my research efforts undertaken under the supervision of Dr A.M Jibo and Prof. Mohammed Kabir, and has not been presented anywhere for the award of a degree or certificate. All sources have been duly acknowledged.

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CERTIFICATION

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LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Clinic
ARV	Anti Retroviral
ART	Anti Retroviral Therapy
AKTH	Aminu Kano Teaching Hospital
CDC	Center for Disease Control
CFW	Conceptual Frame Work
CHEWS	Community Health Extension Workers
DKGH	DawakinKudu General Hospital
DBS	Dry Blood Sample
DNA	Deoxyribonucleic acid
EMTCT	Elimination of Mother to Child Transmission of HIV
HAART	Highly Active Antiretroviral Therapy
HCT	HIV conselling and testing
HIV	Human Immunodeficiency Virus
LGA	Local Government Area

MMSH	Murtala Muhammad Specialist Hospital
MTCT	Maternal to Child Transmission of HIV
MOH	Ministry of Health
NDHS	National Demographic and Health Survey
NGOs	Non-Governmental Organizations
NVP	Nevirapine
PACTG	Paediatric Aids Clinical Trial Group
EMTCT	Prevention of mother to child transmission of HIV
PNC	Post natal clinic
PCR	Polymerase Chain Reaction
RNA	Ribonucleic Acid
SD NVP	Single Dose Nevirapine
UNGASS	United Nations General Assembly Special Session
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
WSGGH	Waziri Shehu Gidado General Hospital
WB	World Bank

WHO	World Health Organization
ZDV	Zidovudine

Abstract

Children constitute approximately one eight of new HIV infections worldwide between 2013 and 2014, most of which occur in sub-Saharan Africa through vertical transmission. Developed countries have significantly decreased MTCT rates to as low as 2%. There are few published studies on services' provision in the country and almost none on evaluation of the services offered especially in Kano. The study therefore aimed at studying the uptake and effectiveness of EMTCT services in Kano. Facility based cross-sectional study involving both quantitative and qualitative methods, was conducted between June-August 2016. Secondary data on PMTCT was also reviewed.A total of 331 mother infant pairs were interviewed, and a two year (2014-2015) EMTCT service record review was conducted. Three FGDs were also conducted with health care personnel from the three facilities. Quantitative data was analyzed using STATA statistical software version 11, while qualitative data was transcribed and analyzed using thematic framework analysis. The prevalence of HIV infection among pregnant women attending ANC was 0.6% in 2014 and 0.5% in 2015. Majority of the respondents (97.3%) received HCT. Uptake of infant ARV prophylaxis was also found to be high, with 94.3% and 96.7% of the exposed infants having received 72 hours and six week infant nevirapine prophylaxis respectively. MTCT rate was found to be 1.1% at six weeks and 4.7% at twelve months**.** Following logistic regression, there was significant association between ANC attendance, infant NVP prophylaxis within the first 72hrs of life and NVP prophylaxis for six weeks, ($p<0.05$).Majority (94.0%) of respondents were satisfied with EMTCT services received at the study facilities.
Although uptake of EMTCT services and client satisfaction are high, and EMTCT services were found to be effective, MTCT rates can be considerably lower if service gaps are addressed appropriately.

CHAPTER ONE

INTRODUCTION

1.1 Background

Human Immunodeficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS) is a disease of serious public health impact as its effect cuts across all age groups and gender. Human immunodeficiency virus (HIV) infection and the incurable disease, Acquired immune deficiency syndrome (AIDS), present major global health problems. Approximately 37 million people worldwide are currently living with HIV, 25.8 million of which reside in Sub Saharan Africa.[1]According to United Nations Agency for the Control of AIDS (UNAIDS) and World Health Organization¹(WHO),[1,2]approximately two million individuals worldwide were newly infected with HIV between 2013 and 2014 including over 200,000 children (<15 years). Most of these children live in sub-Saharan Africa and were infected by their HIV-positive mothers during pregnancy, childbirth and breastfeeding.[3]

The etiological agents of HIV/AIDS have been identified as HIV-1 and HIV-2,[3] belonging to the Lentivirus group of Retroviridae family of viruses. HIV 1 is implicated in sub-Saharan Africa and throughout the world. HIV 1 can be divided into three groups; M, N, and O. The pandemic is dominated by Group M, which is composed of subtypes A – J.[3]HIV 2 is mostly found in India, West and Central Africa and some parts of Europe. However, both viruses produce the same pattern of illness, though HIV 2 causes aslower progression of disease than HIV 1.[3,4] It is important for tests to detect the HIV subtypes that are present in the region for more accurate diagnosis.

The lentivirus groups of retroviruses are associated with many diseases including wasting disease, neurological disorders, rapid and long latency malignancies, immunodeficiency as well as long term viraemia in the absence of any obvious clinical disease.[3,5]

HIV is transmitted through unprotected sexual contact with an infected partner, exposure of broken skin or mucous membrane to infected blood or body fluids, transfusion with HIV infected blood, injection with contaminated objects and from mother to child during pregnancy, child birth and breastfeeding.[5]

Currently, there is still no cure for AIDS or a vaccine that will prevent HIV infection.[3] However, antiretroviral drugs (ARVs), are available for the treatment of HIV is infection. They prevent the virus from replicating and slow the progress of the disease. It was estimated that about 12.9 million people living with HIV were receiving antiretroviral therapy (ART) globally by the end of 2013, majority of which were receiving ART in low- and middle-income countries.[6] In 2010, Nigeria had the largest ART programme in Sub-Saharan Africa, with over 300,000 persons on antiretroviral therapy.[4]

Human immunodeficiency virus infection and AIDS are leading causes of morbidity and mortality amongst women and children, particularly in the sub-Saharan African countries. Mother-to-child transmission (MTCT) of HIV-l is the most important mode of HIV acquisition in infants and children.However, the timing and mechanisms of transmission are multifactorial and remain incompletely understood.[5] Transmission of HIV-l can occur in-utero, intra-partum, and postnatal through breastfeeding,[3,5] and the risk of MTCT ranges from 20% to 45%.[7]Since nearly all HIV infections in children are acquired from their mothers; the global epidemiology of HIV in children reflects that of HIV in women.

Without treatment, about half of HIV infected children will die before their second birthday, but with specific interventions, the risk of MTCT can be reduced to less than 2%, and 5% or less in non-breastfeeding and breastfeeding populations respectively.[8]

Elimination of mother-to-child transmission (EMTCT) of HIV has been at the forefront of global HIV prevention activities since 1998, following the success of the short-course zidovudine and single-dose nevirapine clinical trials. To prevent the transmission of HIV from mother to baby, the United Nations General Assembly in 2001 set a target for 80% of pregnant women and their children to have access to essential prevention, treatment and care by 2010, so as to reduce the proportion of infants infected by HIV by 50%.[9]In December 2013, the UNAIDS Programme

Coordinating Board called on UNAIDS tosupport country- and region-led efforts toestablish new targets for HIV treatment scale-upbeyond 2015. In response, stakeholderconsultations on new targets were held inall regions of the world.Following that, a final,ambitious, but achievable target (90-90-90 target) was set with the aim of ending the AIDS epidemic by 2030. The targets are: By 2020, 90% of all people living with HIVwill know their HIV status.By 2020, 90% of all people with diagnosedHIV infection will receive sustainedantiretroviral therapy.By 2020, 90% of all people receivingantiretroviral therapy will have viralsuppression.stakeholders at the global consultation also endorsed the 90-90-90 approach for children,including confirmation of the current goal ofensuring timely testing and treatment of 100% of allHIV-exposed newborns.[10]

The WHO produced the PMTCT strategic vision 2010-2015 so as to illustrate its ongoing commitment to the PMTCT-related goals of the United Nations General Assembly Special Session (UNGASS) and to strengthen support for EMTCT within the context of the Millennium Development Goals. Several Governmentsincluding the federal government of Nigeria,[11]have

come up with National Guidelines on PMTCT. There are currently three available options for PMTCT based on the WHO guideline: Options A, B and B+.

"Option A" involves the administration of zidovudine (ZDV) to the mother during pregnancy and nevirapine (NVP) to the child during breastfeeding, for women without advanced HIV disease, while women with advanced disease will be placed on lifelong 3-drug antiretroviral therapy. "Option B" involves administration of ART during pregnancy and breastfeeding to women without advanced disease and lifelong ART with advanced disease. "Option B+" involves the administration of lifelong ART for all pregnant/breastfeeding HIV-infected women irrespective of their eligibility for treatment for their own disease.[7] The use of ARVs either through options A, B or B+ confers significant protection against maternal to child transmission of HIV. According to the Nigerian Government; "The drug regimen of choice for prophylaxis is now HAART with the option of the AZT-based regimen for the facilities that do not have the capacity to monitor clients on triple therapy. The Guidelines also advocate breastfeeding as the preferred infant feeding option with ARVs taken by either the mother or baby. ARV intervention is to begin as early as 14 weeks gestation and last till cessation of breastfeeding".[9]

Progress has been made in preventing mother-to-child transmission of HIV and keeping mothers alive globally over the decades. According to WHO, in 2013, 67% of pregnant women living with HIV in low- and middle-income countries (970,000 women) received ART to avoid transmission of HIV to their children. This is up from 47% in 2010.[2]

Uptake of EMTCT services in sub-Saharan Africa is generally on the increase. Nigeria is still lagging behind, with current level of HIV testing among pregnant women attending ANC (54.4%) being much lower than other SSA countries like Uganda (81.5%) and Mozambique

(69.4%),[12] though significant variations exist between States in the country. In Kano for instance, an HCT uptake as high as 98% was reported among women attending ANC at AKTH from 2004 to 2006.[13]Several factors affect uptake of the services by clients; stigma and discrimination experienced by HIV-seropositive mothers, financial constraints in couples, involvement of traditional birth attendants in antenatal care and delivery of HIV-infected women, unawareness of HIV-seropositive status by pregnant women, poor health system, and the lack of funding for EMTCT services at private and rural health facilities are major barriers preventing the use of EMTCT services.[14] In Nigeria in particular, family contexts matter with decisions and actions towardsEMTCT service uptake, particularly with disclosure and non-disclosure of sero-positive status, fertility intentions and infant feeding choices, distance from clinic as well as socioeconomic dependence on male partners.[15]The success of EMTCT services can be greatly improved if most of these factors are addressed.

There are several approaches to assessing the effectiveness and impact of national EMTCT programmes. Indicators or outcome measures for EMTCT effectivenessinclude: the level of new paediatric HIV infections, the rate of mother-to-child transmission ofHIV, maternal survival and health, child survival and health, HIV-free survival, effect on health services,and cost-effectiveness.[16] In addition, these measures can also be used to assess the coverage of EMTCT interventions, such as ARVs during pregnancy and breastfeeding, which will provide another source to validate and improve national EMTCT programme data.In order to track changes over time and to compare estimates from different sites, it is recommended that all evaluations monitor outcomes at six weeks and 18 months postpartum.[16] Additional outcome data at 12, 24, and36 months could also be collected, depending on resources and purpose. Outcome at six weeks reflects peripartum transmission and impact of antenatal interventions including HIV

testing and provision of antiretroviral drugs (ARVs) (either lifelong antiretroviral therapy (ART) or prophylaxis) and also gives a linkwith timing for early infant diagnosis (EID).

1.2 Problem Statement

Of the 36.9 million individuals living with HIV in 2014, 25.8 million are in sub Saharan Africa and 50% and 9% of these are women and children below the age of 15years respectively.[1]Sub Saharan Africa and other low and middle income countries accounted for about 430 000 and 370000 new paediatric infections in 2008 and 2009 respectively,and in 2014, 190, 000 children were newly infected with HIV in sub Saharan Africa alone.Nigeria accounts for 9% of global HIV burden with an annual HIV positive birth rate of 56 681 in 2010.[9]Most of the world's 22 countries with highest estimated number of pregnant women living with HIV are in Sub Saharan Africa, Nigeria inclusive.[17,18]HIV remains the leading cause of death in women of reproductive age globally.[19]Maternal to child transmission remains the major route for paediatric infection. Over 90% of the 190 000 new paediatric infections in sub Saharan Africa occur through Mother to child transmission.[2] Without treatment, about half of HIV infected children will die before their second birthday. However, with specific interventions, the risk of MTCT can be reduced to less than 2% and 5% in non-breastfeeding and breastfeeding populations respectively.[8]

High income countries are on the verge of eliminating new paediatric HIV infections and HIV-related maternal deaths as a result of access to timely preventive services.

Despite the progress in the use of ARVs, less than 50% of HIV infected individuals are accessing ARVs globally. In sub Saharan Africa where about 26 Million people are HIV infected, only 10.7 Million are accessing ARVs. Moreover, 1.2 Million and 790, 000 people died from AIDS related disease globally and in sub Saharan Africa in 2014.[1]

Thus much work needs to be done inEMTCT. Even in countries that are rapidly scaling up EMTCT services, the major challenge is to provide more effective ARV interventions, including the provision of antiretroviral treatment (ART) for pregnant women and mothers eligible for treatment, and to demonstrate the impact of these interventions by a decrease in paediatric infections, HIV-free survival, and improved maternal and child health. This can only be feasible with effective monitoring and evaluation of existing services.

1.3 Justification

While there is abundant information about the efficacy of EMTCT interventions to reduce perinatal transmission, our current understanding of their effectiveness (i.e. the prophylactic benefit of a PMTCT intervention when implemented in real practice) is lacking. Despite National EMTCT guidelines, few high-prevalence countries have ongoing universal, country-level monitoring of EMTCT services and their successes, Nigeria not excluded. Kano State is one of the most populous states in the country and it is one of the "12+1" high burden, high priority states in Nigeria that were selected to receive additional focus for EMTCT. has a lot of partners involved in providing EMTCT services in the state; Presidential Emergency Plan for AIDS Relief (PEPFAR), Institute of Human Virology, Nigeria (IHVN), Family Health International-360 (FHI-360) etc. A lot of resources are being invested in EMTCT. Yet, few studies have assessed the effectiveness of the services offered in various parts of the country, especially at secondary health facilities, to see the progress so far towards attaining the EMTCT targets. Closing this public health knowledge gap is critical to both national and global success in the fight against paediatric AIDS, and can only be achieved through the development of international consensus around EMTCT effectiveness rnonitoring.[11]

Our study therefore, seek to find out how effective are the EMTCT services offered at secondary health facilities in reducing new paediatric HIV infections in Kano State.

1.4 Research Questions

1. What is the prevalence of HIV infection among pregnant women attending antenatal clinic at secondary health facilities in Kano State?
2. Whatproportion of pregnant women attending ANCat secondary facilities in Kano State, accept HIV/EMTCT services?
3. What proportion of HIV exposed infants become HIV infected at six weeks and twelve months of age?
4. How satisfied are clients, with EMTCT services provided at secondary facilities in Kano State?

1.4 Objectives of the Study

1.4.1 General objective

To determine the uptake and effectiveness of EMTCT services, in secondary health facilities in Kano State.

1.4.2 Specific objectives

1. To determine the prevalence of HIV infection among pregnant women attending antenatal clinic at secondary facilities in Kano State.

2. To determine the proportion of HIV positive mothers who receive EMTCT interventions during pregnancy, labour and delivery in Kano state.

3. To assess the six week and twelve month maternal to child transmission rates of HIV in Kano state.

4. To assess client satisfaction with EMTCT services provided at secondary facilities in Kano state.

CHAPTER TWO

LITERATURE REVIEW

2.1 Sources of Information for the Study

Sources of information for this study include both published and unpublished materials from electronic and non-electronic sources. Published journal articles were searched from PUBMED, AJOL, GOOGLE SCHOLAR, and HINARI data base. Search terms used while searching for electronic data include Uptake/Utilisation/Acceptability, Outcome/Effectiveness, Monitoring/Evaluation and EMTCT/prevention of mother to child transmission of HIV**.** Electronic books, bulletins, Manuals, and Reports of international organizations were accessed. Non electronic materials like textbooks, grey literature, lecture notes were also used. Only articles published within the last 10 years were used, with the exception of those articles on historical background of HIV and EMTCT. Materials accessed for information were referenced using the Vancouver referencing format.

A narrative literature review was employed. The review aimed at summarizing and critiquing existing workson EMTCTas well as identifying gaps or inconsistencies in body of knowledge and is ideal when research questions are well focused.[20]Review of literature was carried out using the funnel approach, citing international, regional then national studies where applicable. This was done in line with the study objectives.

2.2 Conceptual Framework

A conceptual framework refers to a graphical or diagrammatic presentation used in research to outline the possible course of action or to present a preferred approach to an idea or thought.

A conceptual framework for evaluating effectiveness of a PMCT service is shown below

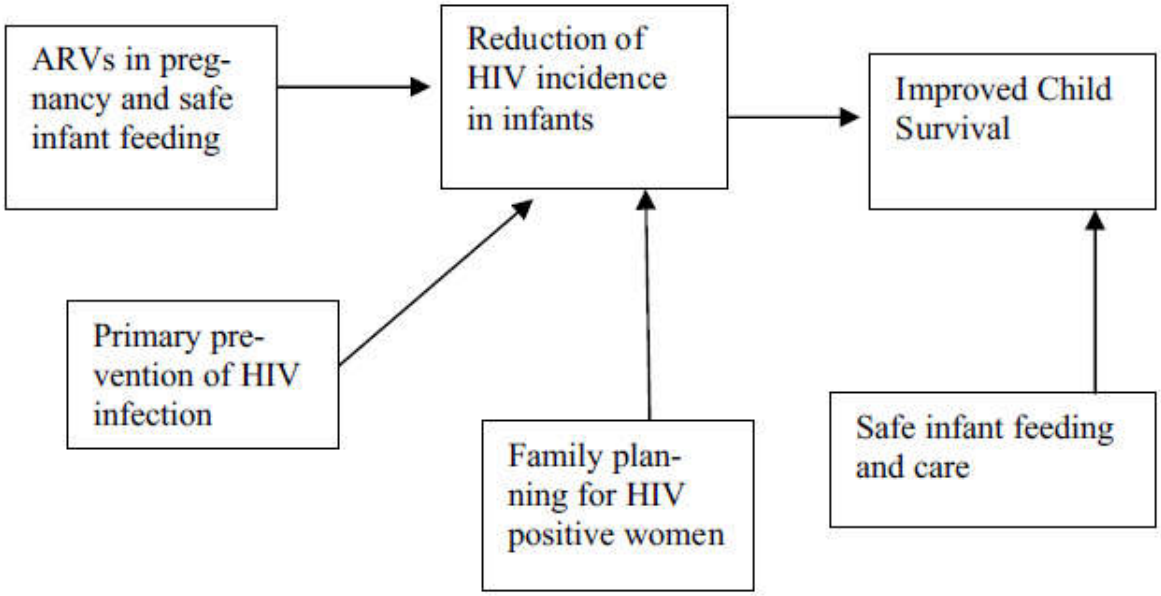

Figure 1: Framework for EMTCT Assessment[21]

The framework starts from the right with the long-term goal of such programmes: increased survival of children**.** In Sub-Saharan countries where nearly all HIV infection is from MTCT, reductions in transmission can occur through;

- Primary prevention of HIV in men and women
- Improvements in family planning for HIV positive women
- Safe obstetric practices
- Provision of ARVs in pregnancy and
- Practice of safe infant feeding after birth

Central to providing an effective service is the utilization of EMTCT services. This critically depends upon community and health service factors. Thus for a EMTCT service to be effective, there has to be; increased demand for the services, availability of quality services and functioning management systems**.** These factors are outlined in figure below.

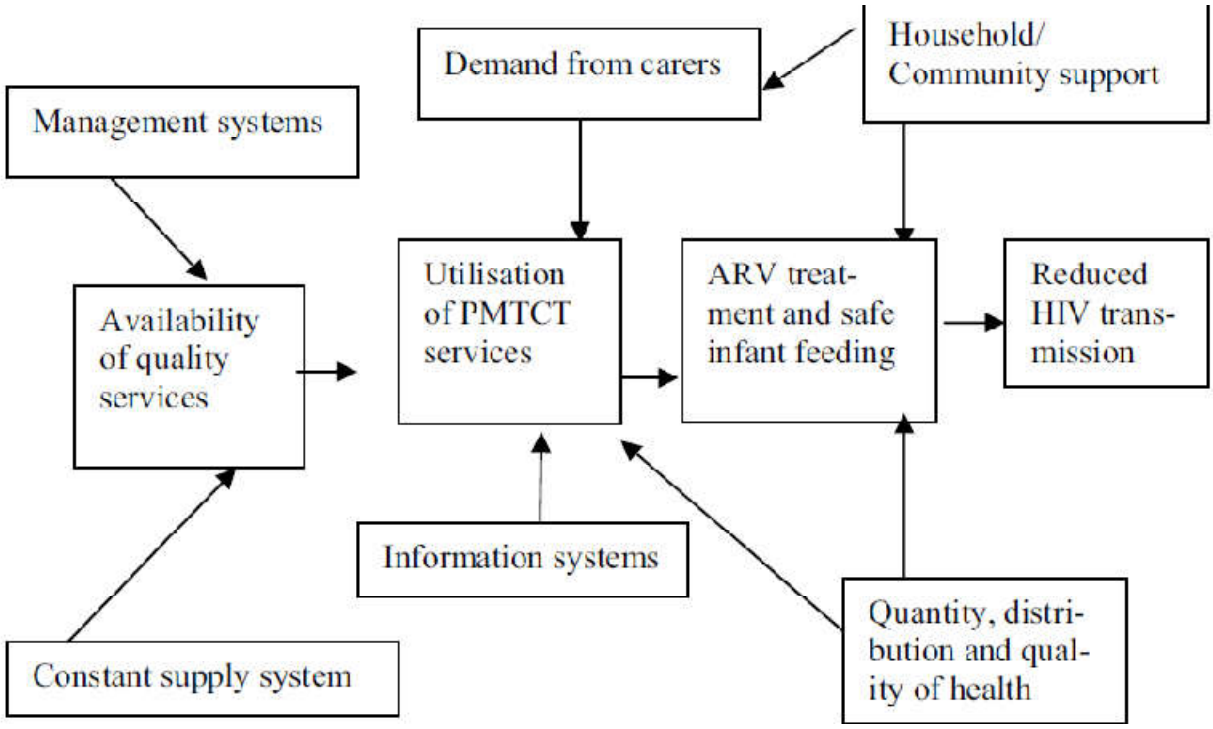

Figure 2: Inputs required for EMTCT Programme[21]

In summary, to be effective, a EMTCT program has to fulfill the following conditions[21]:

- Operational strategies and availability of financial resources
- Availability of quality of services and human resources

- Availability of key resources and management systems as well as
- Access and continued use of service

Operational strategies and availability of financial resources: This includes; Policies, planning, protocols and co-ordination between the different management levels that are necessary for an operational intervention. This must be supported by adequate financial resources.

Quality of the services and human resources: Theseare major elements of the final effectiveness of the intervention. Standard operational protocols have to be well designed and followed. Personnel must be positive, empathic and compassionate and must meet the criteria for counseling. Human resource issues including availability of trained personnel, quality of training programmes and quality of follow up after training must be addressed.

Availability of key resources and management systems: An uninterrupted supply of HIV test kits, ARVs and laboratory supplies must be guaranteed. This requires either procurement through the usual channels of drug supply or the establishment of a parallel system e.g. when funding for ARV is channeled through an organisation such as Red Cross. This in turn requires functioning management systems.

Access and continued use of service: Women have to be able to get to the place where testing, counseling and treatment by ARV is offered. For example, requesting all pregnant women to go to the district hospital outpatient ward for the first and second antenatal visit can increase the difficulty of seeking care, as the amount of travel time and cost of transportation increase. The costs for the family should not be an obstacle for women to access the intervention. Obstacles such as stigma and fear of disclosure should also be minimized. Once they have accessed the

service women need to return to obtain the result of their HIV test. Then they need to go back for each of the important subsequent steps. Finally, they need to comply with their treatment.

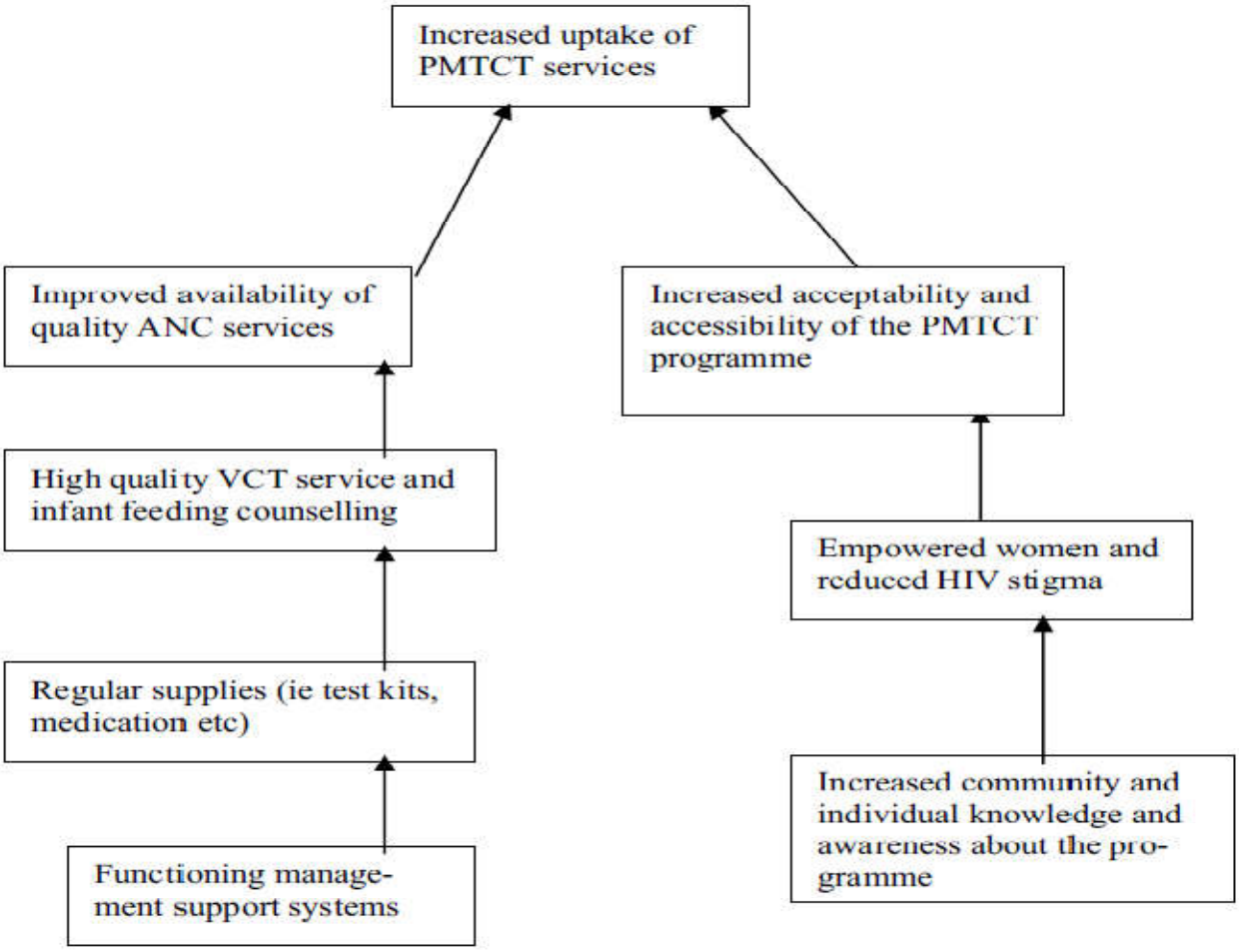

Figure 3: Factors affecting uptake of EMTCT[21]

2.3 Background on Origin of HIV

The isolation of the first non-human primate (simian)immunodeficiency virus in 1985 (SIVMAC) from a rhesusmacaque (Macaca mulatta), fuelled speculation that human AIDS originated in monkey.[22] The human AIDS viruses human immunodeficiency virus type 1 (HIV-l)

and type 2 (HIV-2) are a form of cross-species (zoonotic) infections. These viruses (HIV-1 and HIV-2) share a common evolutionary origin with primate lentiviruses known as Simian immunodeficiency viruses (SIV).[23]

The Chimpanzee (P. t. troglodytes) has been found to be the primary reservoir for HIV-1 and has been the source of at least three independent introductions of the Chimpanzee Simian immunodeficiency virus (SIVcpz) into the human population.[24] All HIV-1 strains known to infect manare closely related to one of the two SIVcpz lineages that are found in P. t. troglodvtes.[24]

Five reasons have been used to substantiate zoonotic transmission of primate lentiviruses to humans and include: first, phylogenetic relatedness of simian and human lentiviruses; second, similarities in viral genome organization between the chimpanzees and humans; third, prevalence of the virus in the natural host; fourth geographic coincidence; and fifth existence of plausible routes of transmission of the lentivirus from primate to humans.[25]

The reservoir of HIV-2 has been identified as a primate called the "sooty mangabey" (Cercocebus atys). It is genomically indistinguishable and phylogenetically related to Simian immunodeficiency virus (SIVsm) that was found in substantial numbers of wild-living sooty mangabeys, whose natural habitat coincides with the epicenter of the HIV-2 epidemic.[25]Close contact between sooty mangabeys and humans is common, because these monkeys are hunted for food and kept as pets. Zhiwei et al, described the first evidence of a geographic association between naturally occurring SIVsm and HIV-2 in West Africa to be based on clustering between viruses from household pets in some WA countries (Liberia and Sierra Leone), and those in persons from nearby villages within the same country.[26]

However, it is important to note that the origin ofHIV-1 is much less certain than that of HIV-2.Despite similarities in sequence and genomic organization with(SIVcpz)),[27] a wide spectrum of diversity exists between HIV-1 and viruses found in chimpanzees.[28] An apparent low prevalence of SIVcpz infection in wild-living animals and the presence of chimpanzees in geographic regions of Africa where AIDS was not initially recognized have casted doubt on chimpanzees as natural host and reservoir forHIV-1.

The origin of HIV remains a mystery. Attempts to solve it may disclose information about the evolution of lentiviruses in different species and, perhaps lead to the discovery of as yet unknown lentiviruses in humans. The future prevention of AIDS is the real challenge, but understanding the origins of HIV and the reasons why simian immune deficiency viruses are not pathogenic in their natural hosts may eventually help in controlling HIV.[22]

2.4 Proportion of Pregnant Women Infected with HIV

According to the 2010 National HIV Sero-prevalence Sentinel Survey conducted by the WHO in conjunction with the Federal Ministry of Health Nigeria,[29] the prevalence of HIV amongst pregnant women attending antenatal clinics in Nigeria was 4.1%. The North West zone had the lowest urban prevalence of 2.7%, with Kano State having a prevalence of 3.4%.[29] However, the national HIV prevalence rate obtained in National Human Immunodeficiency Virus and Acquired Immunodeficiency Syndrome and Reproductive Health Survey, 2012 (plus II), conducted by the Federal Government of Nigeria was 3.4%.[30]This survey was conducted on members of households rather than women attending ANC in Hospitals. The decrease in the HIV

prevalence obtained may be a result of decrease in the rate of new infections, better HIV care, and availability of ARVs etc. However, Hospital surveys are likely to give higher prevalence rates than household surveys.

A further significant decrease in HIV prevalence among pregnant women in Nigeria was shown in the 2014 Antenatal Clinic (ANC) Sentinel Survey which revealed a prevalence rate of 3.0% across the country, with high variability across the zones. It was highest in the north central zone (5.8%), and lowest in the North West (1.9%).[31] Kano State had a prevalence rate of 2.2%, which was significantly lower than 3.4% obtained in 2010.

The incidence of HIV infection from surveillance and research data is generally believed to be declining in many countries across sub-Saharan Africa (SSA). SSA remains the continent most affected by HIV and AIDS with an estimated 22.9 million people living with HIV and accounting for more than two-thirds of new HIV infections globally (UNAIDS 2010).According to WHO, UNAIDS and UNICEF report: Towards universal access: scaling up priority HIV/AIDS interventions in the health sector progress report 2008 Uganda, the estimated proportion of HIV-infected pregnant women that receive any kind of ARVs for EMTCT in Uganda was found to be 34% in 2007 and 53% in 2009.[32]

2.5 Uptake of PMTCT Services

Uptake of EMTCT services though on the increase, still needs to be improved. Many factors influencethe uptake of EMTCT services by pregnant women globally, some of which include educational level, knowledge about EMTCT, pre-test counseling, socio-economic status, skilled attendant at service point, accessibility of the service etc. In Nigeria in particular, factors such as

disclosure and non-disclosure of sero-positive status to spouses, fertility intentions, infant feeding choices, distance from clinic as well as socioeconomic dependence on male partners have been shown to affect uptake of EMTCT services.[33]Several studies have been done to determine uptake of EMTCT services.

A Systematic Review and Meta-Analysis titled; The Uptake of Prevention of Mother-to-Child HIV Transmission Programs in China, in 2015 revealed that there were bigger gap of uptake of EMTCT programs between income levels, and cities with a low income level had a higher percentage of initiating ART in HIV-positive women (80%) and ARP (antiretroviral prophylaxis) in exposed infants (85%) compared to cities with high-middle income (57% and 65%, respectively).[34]

A randomised controlled trial conducted in 89 clinics in Kinshasa, Democratic Republic of Congo by Yotebieng M etal, between April 2013 and August 2014, aimed to determine whether small, increasing cash payments, which were conditional on attendance at scheduled clinic visits and receipt of proposed services can increase the proportions of HIV-infected pregnant women who accept available EMTCT services and remain in care in Sub Saharan Africa. The study found that among women with newly diagnosed HIV, small, incremental cash incentives resulted in increased retention along the EMTCT cascade and uptake of available services (81% in the intervention group and 72% in the control group were retained in care at 6 weeks post partum). This suggests that cash incentives may increase uptake and retention in care.[35]

A cross-sectional study by Gunn etal in 2016, titled "Antenatal care and uptake of HIV testing among pregnant women in sub-SaharanAfrica", used Demographic and Health Survey datasets and weighted crude and adjusted logistic regression models to explore factors that influenced

HIV testing as part of ANC services.Pooled results showed that 60.7% of women received HIV testing as part of ANC. Ugandan women had the highest rate of HIV testing as part of ANC (81.5%) compared with women in Mozambique (69.4%), Nigeria (54.4%) and Congo (45.4%).[12]

In Nigeria, a prospective study of all antenatal clinic attendees and women who delivered at the University of Nigeria Teaching Hospital, Enugu, between March and September 2005, by Onah and colleagues found the uptake of Voluntary counseling and testing (VCT) to be 3.9% among antenatal clinic attendees who had only group counseling, and 96.1% among those who had both group and individual pre-test counseling.[33]Galadanchi etal also found VCTUptake for HIV by pregnant women who were group counseled, in aEMTCTprogramme at Aminu Kano Teaching Hospital, Nigeria to be 97.3% between 2004 and 2006.[13]

2.6 Proportion of HIV Exposed Infants Who Are HIV Positive

Though HIV 1 and 2 are believed to originate from Africa, United Sates and Europe are the fore-runners when it comes to issues of HIV prevention, treatment and care. There is a widening gulf between the effectiveness of interventions for preventing mother to child transmission (EMTCT) of HIV in sub-Saharan Africa and other regions of the world.[36]

According to the Joint United Nations Progromme on HIV/AIDS (UNAIDS) report of 2014, there were approximately less than 500 (200-500) new HIV infections among children in Western and Central Europe and North America in 2014. In the same report, there were an estimated 1.4 million (1.2 million-1.5 million) new HIV infections in sub-Saharan Africa which accounts for 70% of the global total of new HIV Infections.[1]

EMTCT in the United States and Europe has been one of the major success stories in the global human immunodeficiency virus (HIV) pandemic. Prior to effective perinatal HIV interventions, about 1 in 4 babies born to HIV infected women became infected. However today, an HIV-infected pregnant woman in the United States or Europe receiving highly active antiretroviral therapy (HAART) and with an undetectable viral load has only about 1- 2% chance of transmitting HIV to her infant.[37] Sub Saharan African countries mostly employ strategies like; use of 2 antiretrovirals such as short-course zidovudine/lamivudine or ZDV plus single dose NVP at labour/delivery and maternal HAART during the last trimester of pregnancy, at labour, and for up to 6 months following delivery with a goal of minimizing maternal viral load in plasma and breast milk among others.These are not as effective as lifetime HAART for any HIV positive pregnant woman used in High income countries.

In China, A Systematic Review and Meta-Analysis, on the Uptake of Prevention of Mother-to-Child HIV Transmission Programs conducted in 2015 using 57 cross sectional studies estimated that the mean HIV-positive rate of exposed infants was 4.4%, and 71.0% of HIV-positive women were initiated on antiretroviral therapy and the percentage for initiating antiretroviral prophylaxis (ARP) in exposed infants was 78.3% and only 31.3% of women with HIV and less than 1% of exposed infants received the combination of three antiretroviral drugs.[34]

Following the recommendation of lifetime HAART as the treatment option for HIV infected pregnant womenrequiring antiretroviral for their own health, a study conducted in West Africa, Cote d'Ivore revealed that the probability of confirmed peri-partum HIV infection was 1.0% and 3.1% in a group of HIV pregnant women receiving HAART for their own disease and pregnant women receiving short course antiretroviral (scARV) EMTCT regimen respectively. Following breast feeding, the cumulative HIV infection rate at 12 months was 5.7% (3.3% in the HAART

group and 7.5% in the scARV group).[38]This suggests that the HAART confers more benefit or is more effective for EMTCT.

Currently, some countries in Sub Saharan Africa (SSA) like Nigeria use HAART as the drug regimen of choice for prophylaxis, with the option of the AZT-based regimen for the facilities that do not have the capacity to monitor clients on triple therapy. A retrospective study was conducted on HIV-infected women who were enrolled during antenatal care or at labor/delivery between January 1, 2010 and December 31, 2012 in Jos North-central Nigeria, to demonstrate the impact of the nationally approved "Option B" on MTCT outcomes. This study found that only 6 of the 996 (0.7%) HIV exposed children, born to the women on Option B were confirmed to be HIV infected at 18 months of age.[39]

Another study was conducted in Nigeria by Emmanuel A. etal at Makurdi, to compare HIV free survival according to early infant feeding practices of children born to HIV positive mothers on EMTCT between June 2008 and December 2011. This study found that overall HIV-free survival rate at 3 months was 94.4%, which declined significantly to 87.1% at the 18 months of age. Postnatal- HIV-infection rates of 1.5% in EBF (exclusive breast feeding), 0.2% in EBMS (exclusive breast milk substitute) and 12.6% in MF (mixed fed) groups were obtained at 3 months. By 18 months of age, the post-natal-HIV-infection rates of rose to 7.0%, 4.3% and 27.1% for EBF, EBMS and MF groups respectively.[40]

2.7 Evaluation of Effectiveness of EMTCT Interventions

Impact assessment activities should be part of every country's plans for the elimination of mother-to-child-transmission of HIV (EMTCT). Different measures can be used to assess the

effectiveness and impact of national EMTCT programmes. These include: the level of new paediatric HIV infections, the rate of mother-to-child transmission of HIV, maternal survival and health, child survival and health, HIV-free survival, effect on health services, and cost-effectiveness.[16]

Several methodologies can be employed to measure the impact of EMTCT programmes. These include: surveys and surveillance activities which may be immunization clinic based, household surveys or demographic surveillance sites (DSS); Use of HIV sentinel and population based surveillance data as well as programme data in a demographic model to estimate results; Analysis of programme data and collection of cohort data.[16]

Several National and International studies have been carried out to demonstrate the effectiveness of various antiretroviral agents in EMTCT beginning in 1994, with the announcement of the result of the Paediatric Aids Clinical Trial Group 076 in United States. This was a major breakthrough in EMTCT. The study was a double-blinded, randomized, placebo-controlled trial conducted by Cannor EM et al, which included an intensive regimen of oral zidovudine (ZDV) given prenatally, intra-partum, and postpartum. This regimen was found to decrease perinatal transmission risk by two thirds when compared with placebo.[41] Elective caesarean delivery was shown to be associated with a 50% reduction in transmission in both a randomized European trial and a large metaanalysis.[37]

Internationally, following the results of PACTG 076, a number of randomized trials were undertaken to see whether simpler short-course regimens deliverable in resource-limited settings could also significantly reduce the risk of perinatal HIV transmission. The first of these studies' results were announced in 1998 and included 2 CDC short-course ZDV trials in Thailand and

West Africa, in which pregnant women were given either oral ZDV or placebo from 36 weeks through labor/delivery. In the Thailand CDC trial in which HIV-infected women did not breast-feed and infants were formula fed, the findings reported in 1998 were that this short-course Zidovudine regimen reduced transmission by 50%,[42] whereas in the West African setting of Cote d'ivoire where HIV-infected women breast-fed, 3-month transmission was reduced by 37%.[43]

The PETRA study was a 4-armed study that compared use of 2 drugs, ZDV and 3TC, with placebo. The findings were that the longest arm of the PETRA trial, in which HIV infected pregnant women received ZDV /3TC from 36 weeks through delivery and 1 week postpartum and their newborns also received l week of ZDV/3TC, had the least transmission rate at 6 weeks post-partum. The two drug regimen was found to be highly efficacious at 6 weeks when compared with placebo, with a 67% reduction in HIV transmission.[44]

In Uganda, a simpler regimen tested in the HIVNET 012 trial used a single dose of nevirapine (SD NVP) given to the mothers at labour onset and to their newborns. This regimen was found to be highly effective and deliverable. It reduced transmission by 42% when compared with an ultra-short course of ZDV given at labour onset and for 1 week postpartum to mothers and their new-born.[45] Building on the two successful regimens, a study in Thailand combined the short course ZDV regimen from 28 weeks gestation with SD NVP plus 1 week of ZDV to the infant and reduced transmission to 2%. This combined, 2-drug strategy in Thailand among non-breast feeding women was found to be as effective in reducing transmission as the HAART interventions being used in the United States and Europe. When used in breastfeeding setting in West Africa, the regimens of ZDV or ZDV/3TC in the last trimester plus SD NVP at labour to the new-born demonstrated a transmission rate of about 6-9%.[45]

A model was constructed by Larsson and colleagues in 2015, based on a study conducted in Iganga-Mayuge, in Uganda between 2008 and 2010, titled: "Prevention of mother-to-child transmission of HIV in rural Uganda: Modeling effectiveness and impact of scaling-up EMTCT services", Several scenarios were modeled, assuming increased uptake of specific EMTCT components and measuring the impact on MTCT rates. This study found that HIV infections in children could be reduced by 28% by increasing HIV testing capacity at health facilities to ensure 100% testing among women seeking ANC, and that providing ART to all women who received ARV prophylaxis will give an 18% MTCT reduction.[46]

The "First population-level effectiveness evaluation of a national programme to prevent HIV transmission from mother to child", conducted in South Africa found an overall early mother-to-child transmission (MTCT) rate of 3.5% (95% CI 2.9% to 4.1%). After controlling for other factors, groups 1b and 2a (azidothymidine prophylaxis >10weeks (1b) and <10 weeks (2a))had similar MTCT to 1a (triple ARV treatment). Maternal to child transmission was higher in group 2b (incomplete ARV prophylaxis). Within group 3a (no antenatal ARVs), early MTCT was highest among breastfeeding mothers 11.50% (4.67% to 18.33%) for exclusive breast feeding, 11.90% (7.45% to 16.35%) for mixed breast feeding, and 3.45% (0.53% to 6.35%) for no breast feeding.[47]

In other to find out the impact of the WHO "Option B" on reducing MTCT, a retrospective, observational study of HIV-infected pregnant women and their exposed infants who accessed EMTCT services at Jos University Teaching Hospital, North-central Nigeria was conducted between January 2010 and December 2012. It found that 84.1% of the HIV exposed children tested HIV negative at 18 months and that MTCT rate at 18 months was only 0.7%. Mother-to-child transmission (MTCT) of HIV by 18 months was found to be lower among women on ART

before pregnancy compared to those women who started ART/Triple ARV prophylaxis during pregnancy/delivery, (0.4%; 3/700 vs 2.0%; 3/150 P=0.05).[38]

Over the years, previous AIDS targets have been seeking to achieveincremental progress in the response to the AIDS epidemic in terms of decreasing rate of new HIV infections in both adult and children, increasing treatment coverage worldwide and improving quality of life and survival of people living with HIV. Since 2011,following the United Nations declaration on HIV and AIDS, policies to prevent mother-to-child transmission of HIV (PMTCT) shifted from maternal antiretroviral (ARV) treatment or prophylaxis contingent on CD4 cell count to lifelong maternal ARV treatment.[48]Eliminating mother-to-child transmission of HIV (EMTCT)has been the global priority since 2011 when the "Global Plan towards Elimination of New HIV Infections among Children by 2015 and Keeping their Mothers Alive" was developed through aconsultative process by a high level GlobalTask Team convened by UNAIDS.This plan covers all low- and middle-incomecountries, but focuses on the 22 countrieswith the highest estimated numbers ofpregnant women living with HIV, Nigeria inclusive. Several countries have come up with strategies geared towards EMTCT. United States, emphasizing an "opt-out" HIV retesting in pregnant women through state laws, has been proposed as a strategy that can be considered in areas of high HIV incidence,in order to reach the goal of eliminating perinatal HIV transmission.[49] In Nigeria, NACA constituted a PMTCT scale-up technical committee in Dec, 2011, which identified 12 states plus the FCT which constitute 70% of PMTCT burden in Nigeria for increased focus. In 2013, the "President's Comprehensive Response Plan for HIV/AIDS in Nigeria, 2013-2015"was launched with the goal of accelerating the implementation of key interventions over a two year period and bridge existing service access gaps. Specifically, the plan aimed to avail 80 million men and women aged 15 and older knowledge of their HIV

status; enroll an additional 600,000 eligible adults and children on ART; provide ART for 244,000 HIV pregnant women for the prevention of mother to child transmission of HIV (PMTCT); provide access to combination prevention services for 500,000 most at risk populations and4 million young person's and activate 2,000 new PMTCT and ART service delivery points across the country.[50]

As the world is making progress towards elimination of mother-to-child transmission of HIV, poor coverage of PMTCT services in Nigeria remains a major challenge, and in order to address this, Nigerian states need to rapidly close PMTCT coverage gaps at facility and population levels. In this regard, a scale up exercise was organized in eight high burden states which included rapid health facility assessment and impact modeling between Feb and May 2013 as well as drawing up data-driven smart scale-up state operational plans to achieve eMTCT by 2015. This resulted to 8% to 50% increase in facility coverage,246% increase in the number of pregnant women and their families who have access to HIV testing and counseling in the context of PMTCT and a 152% increase in access to anti-retrovirals for PMTCT in these eight states between October 2013 and October 2014.[51]

The aim inthe post-2015 era is nothing but ending the AIDS epidemic by 2030. This is pivoted on a new, final, ambitious, but achievable target aimed at ensuring that 90% of all people living with HIV know their HIV status, 90% of all people with diagnosedHIV infection receive sustainedantiretroviral therapy and 90% of all people receivingantiretroviral therapy have viral suppression come 2020.[10]HIVtreatment is a unique tool in the AIDS response, preventing illness and death,averting new infections and saving money. Ashopes for ending the AIDS epidemic dependin large measure on the world's ability toprovide HIV treatment to all who need it, in arights-based approach, final targets foruniversal treatment access are critical.

CHAPTER THREE

METHODOLOGY

3.1 Description of the Study Area

Kano State of the Federal Republic of Nigeria formally came into being on April 1, 1968. It is situated in a semi-arid region located between latitudes 10.3^{o}N to 13^{o}N and longitude 7.400E and 10.390E. Kano city is at 472.45 meters above sea level, and has an estimated population of over 9 million, made up of about 51% males and 49% females.[52]The state is bordered by Jigawa State in the north-east, Katsina State in the north-west and Kaduna State is on the southern boundary. It has a total land area of 2060 square kilometers with 1, 754, 200 hectares agricultural and 75,000 hectares forest vegetation and grazing land.

The state is noted for its fairly stable climate with relatively minor changes in temperature and humidity, with an average annual rainfall of 140mm, lasting from May to October and about 65 rainy days yearly. The hottest months are April and May, while December and January are usually the coldest. Kano State is in the North-west geo-political zone of the country. The political and administrative structure is made up of the state capital, 44 Local Government Areas (LGAs).Kano is the largest commercial centre in Northern Nigeria. Majority of the people are subsistent farmers growing millet, guinea-corn, maize, and rice. Other occupations include Trading from small to large scale, animal husbandry and cattle rearing, civil service and Arabic/ Qur'anic teaching. The workforce in Kano State is predominantly male.

The population is predominantly rural with about a quarter living in the eight urban metropolitan Local Governments Areas (LGAs) consisting of Dala, Fagge Gwale, Kano Municipal, Kumbotso, Nassarawa, Tarauni and Ungogo LGAs. Majority of the people are Hausa and Fulani

with few other ethnic groups such as Yoruba, lgbo, Kanuri, Nupe, Igala and Egbira. The predominant religion is Islam with a few Christians and traditional religion practitioners. The family structure is mostly polygamous and extended family households are the norm.

Kano State is one of the"12+1" high burden, high priority states in Nigeria, that received additional focus for EMTCT following the "President's Comprehensive Response Plan for HIV/AIDS in Nigeria (PCRP) 2013-2015)" . As of June 2013, 106 facilities provided ARVs to HIV positive pregnant women.The health sector in the state is headed by the Honorable Commissioner. It Has the Health Services Management Board (HSMB) and a State Primary Health Care Management board (PHCMB). The state has threetertiary health facilities, 36 state owned secondary health facilities and 1,250 Primary Health Care Facilities as stated in the Kano strategic health development plan 2010-2015. The secondary facilities are regulated by the HSMB while the PHCs are regulated by the PHCMB. There are 290 health facilities offering HCT/EMTCT services spread across the 44 LGAs of the state in 2014.[53] The primary (61), secondary (24) and tertiary (2) facilities offer comprehensive ART/ EMTCT services, while the comprehensive health centers (CHC) and health posts (HP), offer only HCT and EMTCT services. Of the twenty four secondary health facilities, MMSH, WSGGH and DKGHlocated in Kano municipal, Ungogo and Dawakin kudu Local Government Areas (LGAs) respectivelywere randomly selected to constitute the study sites. Secondary facilities were chosen as study sites because they are the major sources of health care for the people residing in the urban areas and also serve as the first referral units for all the PHCs, CHCs and HPs that are distributed across all wards in the state. The services rendered are also more affordable than those of tertiary facilities, and this serves as a pull factor for majority of the population.

A total of 41, 677 (MMSH-25955, WSGGH-5773 and DKGH-9949) women attended ANC at the study sites between January 2014 and December 2015. Of these, 219 pregnant women were enrolled into PMTCT(MMSH-151, WSGGH-39 and DKGH-29).During the same period, 309 HIV exposed babies were accessing PMTCT services at the facilities, three of whom1 were HIV positive and currently receiving ART at the facilities.

The model of PMTCT employed by the study facilities, is the option B+,which involves administration of lifelong HAART for all pregnant and breastfeeding HIV infected women irrespective of their eligibility for treatment for their own disease, as directed by the Federal Ministry of Health, Nigeria in the 2010 National guideline on PMTCT.[9]Every month, an average of 833, 144 and 24 EMTCT clients are being are being followed up at MMSH, WSGGH and DKGH respectively.

3.2 Study Design

The study was a descriptive cross-sectional study, using sequential mixed method of data collection, involving both quantitative and qualitative methods. A secondary data reviewwas also performed on records of EMTCT activities offered at the study sites.

3.3 Study Population

The respondents of the study included HIV positive mothers and their infants attending postnatal clinics at the selected facilities, as well as healthcare workers involved in rendering the services,

viz: In-charges of HIV/EMTCT units, ANC/PNC nurses, labour ward nurses, laboratory and record staff as well as ART pharmacists.

3.4 Inclusion Criteria

- HIV positive mothers and their infants attending postnatal clinics at the above sites.
- Supervisors of the HIV-EMTCT units, nurses, record staff and ART pharmacists.

3.5 Exclusion Criteria

- HIV positive mothers whose babies died before early infant diagnosis
- HIV positive mothers whose children are less than six weeks or greater than 18 months of age.
- HIV positive mothers and their children attending post natal clinics in hospitals other than the study sites.
- Healthcare worker other than In-charges, laboratory, record or pharmacy staff in the HIV-EMTCT units.

3.6 Sample Size Determination

The sample size for this study was calculated using the Fishers formula for descriptive cross-sectional studies.[54]

We therefore used the prevalence rate of 27.1%[40] obtained from a previous study to calculate the minimum sample size required for the study.

$$n = \frac{Z^2Pq}{d^2}$$

Where:

n = minimum sample size for the study

Z= Standard normal deviate corresponding to 95% confidence interval (C.I) =1.96

P = Proportion of HIV exposed infants who are HIV positive from birth to 18months of age from previous study= 27.1%= 0.271

q = Complementary Probability which is 1-p

d = Degree of precision which is set at 0.05

Therefore

$$n = \frac{(1.96)\ 2 \times (0.271 \times 0.729)}{(0.05 \times 0.05)}$$

$$n = \frac{0.7589427}{0.0025}$$

n= 303.58

n= 304

A non-response rate of 10% was expected. Thus, in order to obtain the required sample size that will take care of possible non-response rate of 10% (x) and also increase precision, the minimum sample size was multiplied by a factor:$100/100\text{-}x$[54]

100/100-10= 1.09. 304x1.09= 331.36

Hence 331 respondents were recruited for the study.

3.7 Sampling Technique

A two stage sampling was done.

Stage 1: Selection of three health facilities from the list of State owned secondary health facilities offering comprehensive HIV/EMTCT services in Kano by balloting. The facilities selected were; Murtala Muhammad Specialist Hospital,(MMSH) Waziri Shehu Gidado General Hospital (WSGGH) and Dawakin Kudu General Hospital,(DKGH).

Stage 2: Selection of respondents from these three facilities which was done proportionate to monthly attendance of clients at the facilities. Approximately 833, 142 and 24EMTCT clients attend MMSH, WSGGH and DKGH respectively every month. Monthly attendance was divided by required sample size and multiplied by 100, to obtain sample required from each facility. Based on that approximately 252, 60 and 19 respondents were recruited from MMSH, WSGGH and DKGH respectively. Recruitment of respondents from the three facilities done using systematic sampling as follows:

- List of all clients attending each facility in a month was obtained, and constituted the sampling frame for that facility. The sampling frames were 833 (MMSH), 142 (WSGGH) and 24 (WSGGH).
- The sampling frame was divided by the sample size required for that facility to obtain a sampling interval, which was 3, 2 and 1 for MMSH, WSGGH and DKGH.
- A random number was selected between 1&5 by balloting, to obtain the starting point on each day of data collection. Following random selection of first respondent, every fourth, third and other person that came to MMSH, WSGGH and DKGH respectively

wererecruited for the study. The procedure was repeated during each data collection day until the required sample size for each facility was obtained.

3.8 Study Instruments

Four study instruments were used.

1. Semi structured interviewer administered questionnaire (Appendix1). This was used to obtain information on HIV status of the mother, type of ART regimen used by the mother, adherence to ARVs, number of PNC visits, HIV status of infant etc. The study instrument contained four sections. Section A covered socio demographic information of respondents. Section B will obtain information on HIV counseling and testing and HIV status of respondents and spouses. The third section will source for information on number of ANC visits, time of maternal commencement on prophylaxis and the type of prophylaxis used if patient is not eligible for ARVs for her own disease. Section D of the questionnaire obtained information on place of delivery, postnatal visits, HIV status of child and infant prophylaxis received. The questionnaire was adapted partly from a similar study conducted in Umuahia hospitals[43] and another from a study conducted in a hospital in Ethiopia.[44] The questionnaire was pre-tested on 50 PNC follow up clients in another secondary health facility not selected for this study. This helped to identify ambiguous questions that needed revisiting.

2. Structured questionnaire for exit interview (Appendix 3), to assess client satisfaction with EMTCT services.

3. A checklist for data abstraction from EMTCT sites (Appendix 11), to review number of pregnant women who were booked for ANC, had HCT and received results, number of pregnant women who tested positive for HIV between January 2014 to December 2015.

4. An FGD guide (Appendix 6), was also used to facilitate discussion with health care personnel listed above so as to obtain information on their knowledge about EMTCT, EMTCT services provided,and uptake of the services by clients, availability of EMTCT materials and also suggestions on how to improve the services.

3.9 Procedure for Data Collection

3.9.1 Recruitment and training of peer interviewers

Two Hausa speaking female community health extension workers, CHEWS and three medical students were recruited as research assistants to assist in the data collection process. A one day training was conducted by myself for the peer interviewers. This included reading through the questionnaires and checklist, understanding the questions and standardization of Hausa language translations of certain terms that may be necessary in the research and the assent process. Emphasis was laid on ensuring that the responses were filled and labeled legibly, and that confidentiality was not breached.

3.9.2 Data abstraction

A checklist was used to abstract data from various registers. A two year (Jan-2014 to Dec-2015) review of EMTCT registers and delivery service records was done. Adherence of service providers to the national EMTCT guideline was assessed and the number of clients served, proportion of clients who accepted the EMTCT counseling and testing service, proportion of

clients who had HIV positive results and those who got prophylaxis (uptake of EMTCT) was obtained.

3.9.3 Questionnaire administration

An interviewer administered questionnaire was then administered to the mother-infant pairs at the facilities. Two hundred and fifty two mother-infant pairs (average of 30 per week) were recruited and interviewed at MMSH during clinic follow up days, until the required sample size was obtained. At the same time sixty mother-infant pairs were recruited (average of 7 per week) from WSGGH.Patient turn-out was very poor at DKGH, at thus a meeting was scheduled with clients following their monthly gatherings at "Matage" PHC. Respondents were then recruited using the technique described above, and then interviewed.After two scheduledmeetings, the required sample size from DKGH (19) was obtained.Each respondent was made to grant permission to participate in the study by signing an informed consent form prior to commencement of interview.

3.9.4 Exit interview

An exit interview was then conducted for all the 331 mothers-infant pairs recruited above (252, 60 and 19 from MMSH, WSGGH and DKGH respectively)using the structured exit interview questionnaire.

3.9.5 Focus group discussion

Three FGD were first scheduled and then conducted with healthcare workers, one at each study site following completion of questionnaire administration and exit interviews. Eachgroup was composed of nine people viz: In-charge of HIV/EMTCT unit, two ANC/PNC nurses, laboratory personnel, a record staff, the ART pharmacist, the researcher, a moderator and a time keeper.Each FGD lasted for an hour. During the discussion, each healthworker was given an

opportunity to air his/her own view on each theme raised.Procedure of data collection was completed over a period of three months.

3.10 Data Management and Analysis

Spot checks on questionnaires were done to ensure quality data at the end of each data collection day. The quantitative data obtained from the study tools wereimputed by the investigator into excel spread sheet sorted, and cleaned, and where necessary, resort was made to survey instrument to verify inconsistent or missing data. Analysis was done using STATA statistical software version 11. Frequency distributions of socio demographic variables were generated and presented in form of tables and charts for easy apprehension. Quantitative variables such as age of mothers and infants, CD4 count etc, were summarizedusing mean, standard deviation, median and range where applicable.Qualitative variables such as HIV status of mothers, maternal to child transmission rate at six weeks and twelve months, and EMTCT service uptake were presented as proportions and percentages as appropriate. EMTCT services were considered effective when 6 weeks MTCT rates are less than 2% as found in United states and Europe.[37]Bivariate analysis was then conducted using Chi square or Fisher's exact to determine association between uptake of various EMTCT services and maternal to child transmission rate at 12 months of age. Factors significantly associated with maternal to child transmission following bivariate analysis were then subjected to multivariate analysis using logistic regression to obtain adjusted odds ratio and 95% confidence interval for risk factors of maternal to child transmission at 12 months.An alpha level of significance of 5% was used throughout the analysis.

Qualitative interviews were recorded, transcribed verbatim, translated where necessary and then coded using thematic domains, before being presented in a table. Content analysis was then performed. Responses by all discussants were coted verbatim except for similar responses which were merged together. The thematic domains were then inserted into various subsections of chapter four to complement information obtained from the quantitative data instruments. The information obtained from the interview was also triangulated with findings from the quantitative data instrument and also previous studies.Client satisfaction was assessed using Likert scale[55] rated from 1-5for each item to assess satisfaction with EMTCT services. Ten items were used to assess satisfaction and each respondent was allocated a score from 10 to 50.Respondents who scored 40 and above were considered to be satisfied, 20 and below; dissatisfied and a score of 30 was considered to be neutral.

3.11 Ethical Clearance

The study proposal was submitted to Kano State and Aminu Kano TeachingHospital Ethical committees, and Ethical clearance for the study was obtained before commencement of data collection. An introduction letter was obtained from Department of community medicine to the Chairman of the selected LGA where the secondary health facilities were located. Permission was sought from the Chief Medical Directors (CMDs) of the secondary health facilities where the study was conducted. Similarly all respondents willing to participate in the study were provided with detailed information about the study and were asked to sign an informed consent form (Appendix 8), which was also translated into Hausa (Appendix 9), for respondents who do not understand English. All information obtained was treated confidentially.

3.12 Limitations of the Study

The study was conducted successfully completed though not without limitations, some of which are listed below:

1. Incomplete data from the registers at some of the facilities, made secondary data from the hospitals incomplete.
2. Difficulty recruiting mother-infant pairs at DKGH due to lack of designated clinic days for follow up of HIV positive mothers and their children.
3. Concerning the FGDs, participants may bar their opinion, because of the heterogeneous nature of the discussants, comprising of nurses, community health extension workers (CHEWS) etc.

In other to overcome some of these limitations, the following were done.

1. Every discussant was given equal opportunity during the FGD.
2. Mother infant pairs were invited for the study through phone calls, during scheduled monthly meetings of HIV positive patients and some questionnaires were administered over the phone where mothers were not permitted to come to the facility by their spouses.

CHAPTER FOUR

RESULTS

This research was a descriptive cross sectional study involving quantitative and qualitative data collection methods, that was conducted with the aim of determining the effectiveness of EMTCT of HIV services offered at secondary health facilities in Kano state.Three hundred and thirty one mother-infant pairs accessing care at MMSH, WSGGH and DKGH were interviewed. An FGD was also conducted with healthcare providers at the facilities.The outcome variable for assessing effectiveness was the rate of MTCT at six weeks and following cessation of breast feeding, (12 months). The total number of questionnaires administered for the study was 400. A total of 331 questionnaires were filled and returned, giving a response rate of 331/400, (82.8%).

4.1 Socio Demographic Characteristics of Respondents

Table 1a: Socio Demographic Features of Respondents

Socio demographic features	**Frequency n=331**	**Percent %**
Maternal age		
< 20 years	56	16.9
21-35 years	201	60.7
>35 years	74	22.4
Educational status		
Primary	108	32.6
Secondary	119	36.0
Tertiary	29	8.8
Islamic education	75	22.6

Table 1b: Socio Demographic Features of Respondents

Socio demographic features	Frequency n=331	Percent %
Address		
Urban	247	74.6
Rural	84	25.4
Occupation		
Petty trader	237	71.6
Civil servant	20	6,0
Student	15	4.5
Merchant	32	9.7
Unemployed	27	8.2
Parity		
0-4	223	67.4
≥5	108	32.6

Maternal age ranged between 18-40 years, with a mean age of 29± 6.63 years.Most of the mothers were married (77.6%), Hausa by tribe (80.7%), reside in urban areas (74.6%) and have at least primary education (77.4%). Majority of the women engaged in one form of petty trading or another (71.6%). Mean parity was 4.0±2.1, with 223(67.4%) of respondents having less than five children.

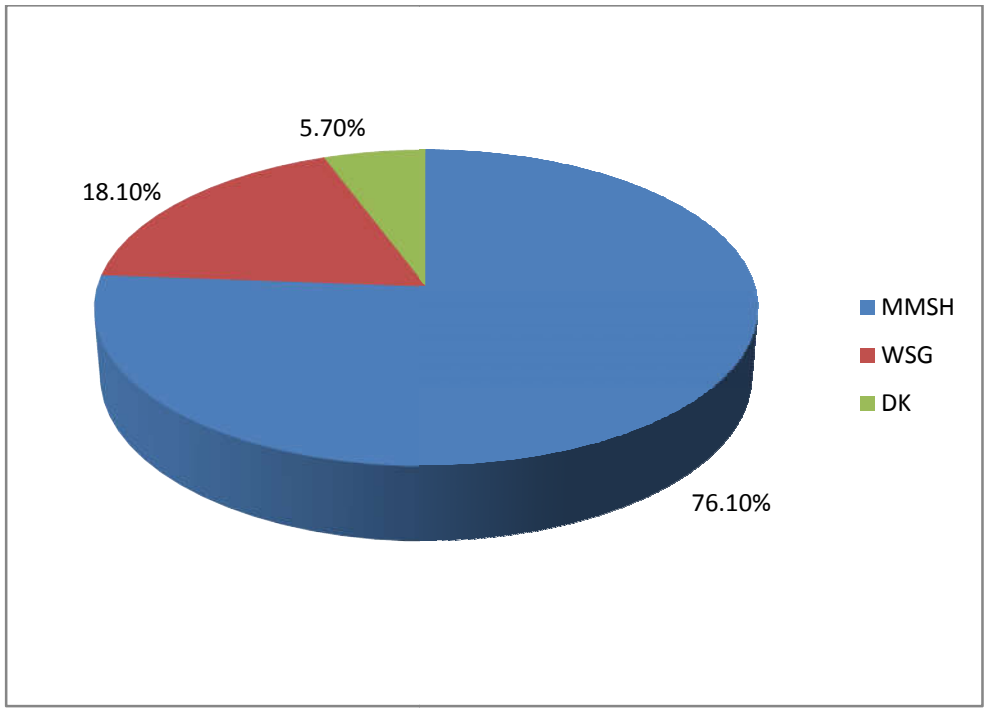

Figure 4: Distribution of respondents bystudy sites

Majority of respondents were from Murtala Muhammad Specialist Hospital (76%), while only about 6% were from Dawakin Kudu General Hospital.

4.2 HIV Screening and Status of Mothers

4.2.1 Summary of Antenatal Attendance

Following review of EMTCT records at the study sites, 19946 women (MMSH + DKGH, WSGGH not EMTCT approved in 2014) were booked for ANC, group counseled and tested for HIV. Of these, 112 women tested positive for HIV-1. The proportion of pregnant women infected with HIV was 0.6% in 2014. In 2015, a total of 21,731 women

(MMSH+WSGGH+DKGH) had HCT, of which 107 were found to be sero-positive for HIV-1. Thus, the proportion of pregnant women infected with HIV in2015 was 0.5%.

4.2.2 ANC Attendance of Respondents

Table 2: ANC Attendance of respondents

Parameter / Response	**Yes**		**No**		**Total**	
	frequency	**(%)**	**frequency**	**(%)**	**frequency**	**(%)**
Mother attended ANC	325	(98.2)	6	(1.8)	331	(100.0)
Mother had HIV counseling	325	(98.2)	6	(1.8)	331	(100.0)
Mother had HIV testing and received result	322	(97.3)	9	(2.7)	331	(100.0)

Majority of respondents, (98.2%) attended ANC during the pregnancy of the index child, and 97.3% had HCT and received result. All the women interviewed were HIV positive, 83 (25.08%) had HIV negative spouses, while 50 (15.11%) do not know the status of their spouses.

Of the respondents, 4 (1.21%) and 2 (0.60%) were diagnosed post-partum and during labour and delivery respectively.Only about a third (39.0%) of the respondents knew their last cd4 count. Mean CD4 count was 527cells/ul of blood. All the respondents are currently on HAART;

Truvada 187 (56.5%) (tenofovir+lamivudine+efavirence) and Combipak,144 (43.5%) (zidovudine+lamivudine+nevirapine).

4.3 Uptake of EMTCT Interventions

4.3.1Maternal commencement onEMTCT interventions

Table 3: Time of Maternal Commencement onHAART

ART Commencement	Frequency	Percent %
Before pregnancy	169	51.1
During pregnancy	134	40.5
Labour and delivery	2	0.6
Postpartum	26	7.9
Total	331	100.0

All the mothers interviewed are currently on HAART. The table above shows the time at which the mothers were commenced on HAART. All the three hospitals are adopting the 2010 National EMTCT guideline, and thus, the type of maternal prophylaxis used is HAART. Majority of the

clients (91.6%), were commenced either before or during the index pregnancy. A small proportion of the mothers, (7.9%), were commenced after delivery of the index child.

4.3.2HIV prophylaxis in exposed children

Table 4: HIV Prophylaxis in Exposed Children

Variable	Frequency n=331	Percent %
Baby had 72 hr NVP prophylaxis		
Yes	312	94.3
No	19	5.7
Baby had six week NVP prophylaxis		
Yes	320	96.7
No	11	3.3
Baby had six week DNA PCR		
Yes	287	86.7
No	44	13.3
Received Six week PCR result		
Yes	276	96.2
No	11	3.8
Baby had six month DNA PCR		
Yes	49	14.8
No	225	68.0
Not eligible	57	17.2
Received Six month PCR result		
Yes	48	98.0
No	1	2.0
DNA PCR at 12 months (after weaning)		
Yes	129	39.0
No	47	14.2
Not eligible	155	46.8
Received 12 month PCR result		
Yes	127	98.5
No	2	1.5
Feeding option in first 6 months of life		
Exclusive breastfeeding	219	66.2
Breast milk substitute	3	0.9
Mixed feeding	109	32.9

Most mothers, (91.5%), attended post natal clinics within the first week of delivery. There was high uptake of infant ARV prophylaxis, with 94.3% and 96.7% of the children having received 72 hours and six week infant nevirapine prophylaxis respectively.None of the hospitals offer DBS on HIV exposed infants at birth. Uptake of six weeks and 12 months HIV testing was also found to be high, while that at six months was found to be very low. Of the 331 HIV exposed children, 287(86.7%) had six week DNA PCR test of which 276 (83.4%) received their result. At six months of age, only 49 (17.8%)of the 274 eligible children had DNA PCR, 48 (98%) of whom received their test result.One hundred and twenty nine, 129 (73.3%) of the 176 children weaned at 12 months had HIV test done following cessation of breastfeeding. Of these, 127 (98.5%) received their test results. Uptake of exclusive breast feeding (EBF), was also found to be high, as most of the children (66.2%) were exclusively breast fed during the first six months of life.

Table 2a: HIV Prophylaxis in Exposed Children across Study Sites

EMTCT Service	MMSH,n=252f (%)	WSGGH,n=60f (%)	DKGHn=19f (%)	TOTAL,n=331 f (%)
Baby received NVP within first 72hrs				
Yes	242 (96.0)	53 (88.3)	17 (89.5)	312 (94.3)
No	10 (4.0)	7 (11.7)	2 (10.5)	19 (5.7)
Baby received six week NVP prophylaxis				
Yes	246 (97.6)	56 (93.3)	18 (94.7)	320 (96.7)
No	6 (2.4)	4 (6.7)	1 (5.3)	11 (3.3)
Baby had six week DNA PCR test				
Yes	223 (88.5)	49 (81.7)	15 (79.0)	287 (86.7)
No	29 (11.5)	11 (18.3)	4 (21.0)	44 (13.3)

Table 5b: HIV Prophylaxis in Exposed Children across Study Sites

EMTCT Service	MMSH,n=252		WSGGH,n=60		DKGHn=19		TOTAL,n=331	
	f	(%)	f	(%)	f	(%)	f	(%)
Received six week DNA PCR result								
Yes	217	(97.3)	45	(91.8)	14	(93.3)	276	(96.2)
No	6	(2.7)	4	(8.2)	1	(6.7)	11	(3.8)
Baby had six month DNA PCR test								
Yes	27	(10.7)	17	(28.3)	5	(26.3)	49	(14.8)
No	178	(70.6)	36	(60.0)	11	(57.9)	225	(68.0)
Not eligible	47	(18.7)	7	(11.7	3	(15.8)	57	(17.2)
Received six month DNA PCR result								
Yes	26	(96.3)	17	(100.0)	5	(100.0)	48	(98.0)
No	1	(3.7)	0	(0.0)	0	(0.0)	1	(2.0)
Baby had HIV test at 12 months								
Yes	103	(40.9)	20	(33.3)	6	(31.6)	129	(39.0)
No	22	(8.7)	17	(28.3)	8	(42.1)	47	(14.2)
Not eligible	12	(50.3)	23	(38.3)	5	(26.3)	155	(46.8)
Received 12 months HIV test result								
Yes	102	(99.0)	19	(95.0)	6	(100.0)	127	(98.5)
No	1	(1.0)	1	(5.0)	0	(0.0)	2	(1.5)
Feeding option in first 6 months of life								
Exclusive breast feeding	166	(65.9)	40	(66.6)	13	(68.4)	219	(66.2)
Breast milk substitute	3	(1.2)	0	(0.0)	0	(0.0)	3	(0.9)
Mixed feeding	83	(32.9)	20	(33.3)	6	(31.6)	109	(32.9)

Uptake of EMTCT services across the three hospitals was similar, though slightly higher in MMSH than the other hospitals. Ninety six (96%) of babies from MMSH received infant nevirapine within first 72 hours of life, compared to 88.3% and 89.5% at WSGGH and DKGH

respectively. Proportion of HIV exposed babies who had nevirapine for six weeks was also high and comparable across all three hospitals. Most of the HIV exposed babies had DNA PCR test done at six weeks, (89%, 82% and 79% from MMSH, WSGGH and DKGH respectively).

Six week HIV transmission rate at MMSH was found to be 1.4%, while none of the HIV exposed babies from WSGGH and DKGH who had six week DNA PCR were infected. Six month DNA PCR testing was low in all the three hospitals, in WSGGH and DKGH, (28% and 26% respectively), compared to 11% at MMSH. Of the babies that had HIV testing six weeks following cessation of breast feeding (12 months HIV test), 2.8%, 1.7% and 0.0% were found to be HIV positive at MMSH, WSGGH and DKGH respectively. Exclusive breast feeding rate was approximately 65% in all the three facilities.

4.4 Effectiveness of EMTCT Interventions

4.4.1 Characteristics of HIV exposed children

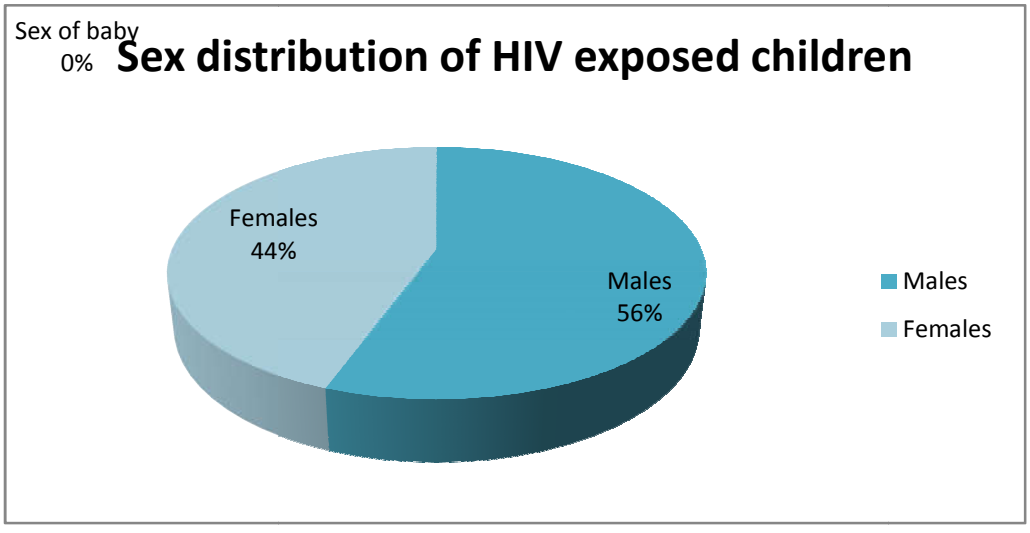

Figure 5: Sex Distribution of HIV Exposed Children

Greater than half of the HIV exposed children weremales (56%).

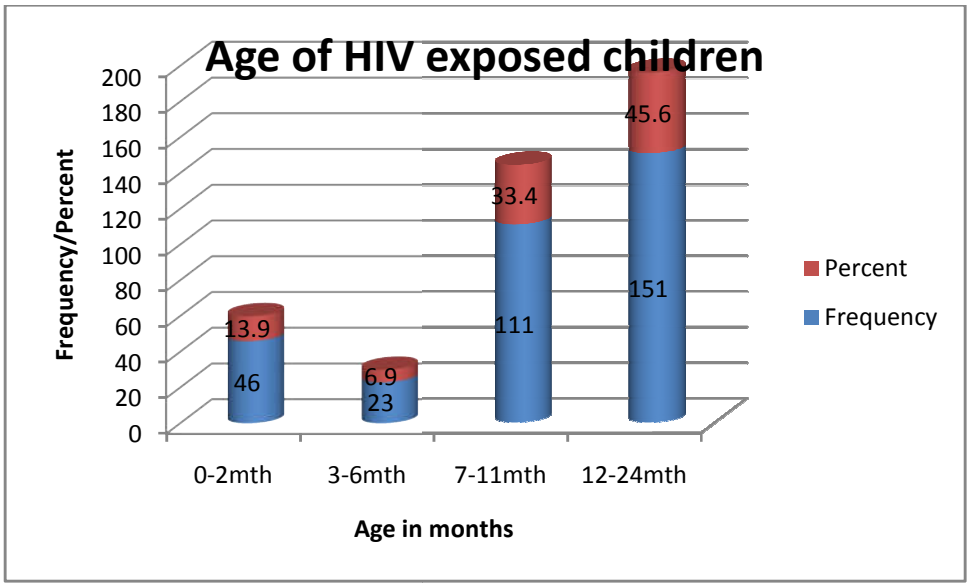

Figure 6: Age Distribution of HIV Exposed Children

Majority of the children were between the ages of 12 to 24 months, with a mean age of 11.17±6.21 months.

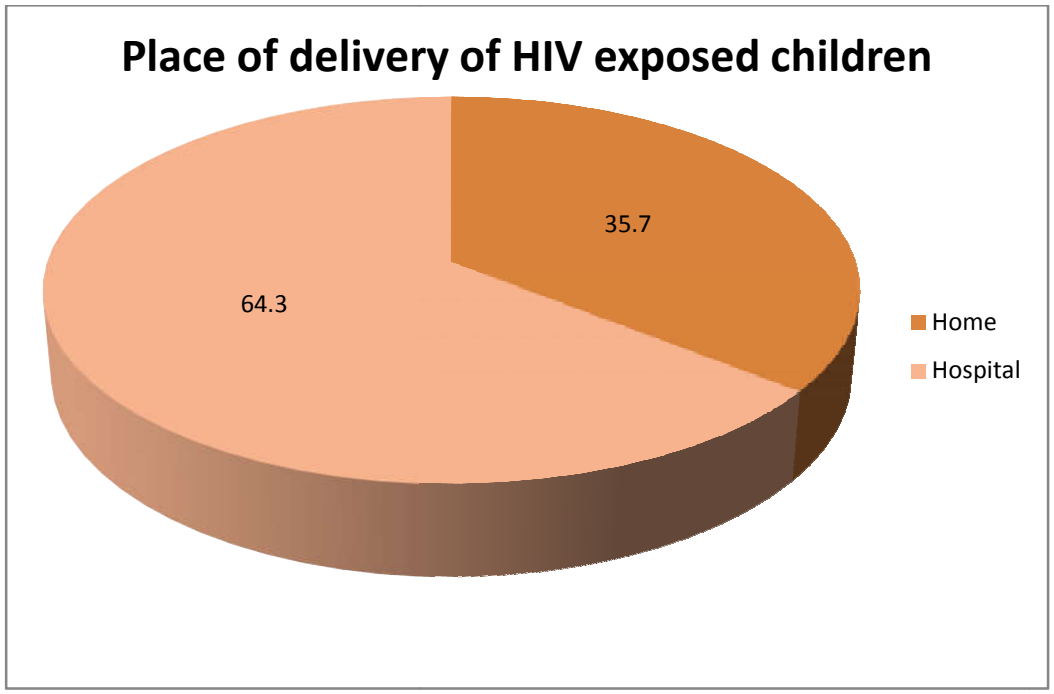

Figure 7: Place of Delivery of HIV Exposed Children

Majority of the children (64.3%), were delivered in a hospital as shown in the figure above.

4.4.2 HIV Status of Exposed Children

Table 6: HIV Status of Exposed Children

Variable	Frequency n=331	Percent %
Baby had six week DNA PCR		
Yes	287	86.7
No	44	13.3
Six week PCR result		
Positive	3	1.1
Negative	273	98.9
Baby had six month DNA PCR		
Yes	49	14.8
No	225	68.0
Six month PCR result		
Positive	3	6.3
Negative	45	93.7
HIV testat 12 months (after weaning)		
Yes	129	39.0
No	47	14.2
***Post weaning PCR result**		
Positive	8	6.3
Negative	119	93.7
Baby on ARVs		
Yes	14	4.2
No	317	95.8

*Excluding children who tested positive following sixth week and sixth month DNA PCR test. For cumulative 12 month transmission rate, see text below.

None of the hospitals offer DBS on HIV exposed infants at birth.

Prevention of mother to child transmission of HIV services (EMTCT) were found to be effective. Of the 276 children that received their test result following six week DNA PCR test, 3 were HIV positive, and the **"six week" HIV transmission rate was found to be 1.1%.** At six months of age, 48out of 49 children that had DNA PCR received their test result, and an additional three

babies became HIV positive. Among 129 (39%) of the children that had HIV test after weaning, an additional 8 (6.3%) of the 119 (36%) that received their test result were found to be HIV positive. Overall, 314 (94.9%) of children were ever tested for HIV, of whom 301 (90.9%) received their test result, 14 of which were HIV positive. Thus, **12 month HIV transmission rate was found to be 4.7%**. All 14 HIV positive children are currently on ARVs.

Following secondary data review however, the rate of MTCT of HIV was 1.8% in 2014, (MMSH alone, no records for other facilities) and 3.6% in 2015 (MMSH+WSGGH, no records at DKGH).

4.4.2Factors affecting the rate of MTCT of HIV

Table 7: Factors affecting rate of Maternal to Child Transmission of HIV at Six Weeks

SN	Parameter	HIV positive		HIV negative	
		n=3	(%)	n=273	(%)
1	**Attended ANC**				
	Yes	2	(0.73)	273	(99.3)
	No	1	(100)	0	(0.0)
2	**Commencement of Maternal ART**				
	^Before delivery	1	(0.4)	260	(99.6)
	!After delivery	2	(13.3)	13	(86.7)
3	**Place of delivery**				
	Home	1	(1.1)	89	(98.9)
	Hospital	2	(1.1)	184	(98.9)
4	**Seventy two hr NVP prophylaxis**				
	Yes	3	(1.1)	267	(98.9)
	No	0	(0.0)	6	(100.0)
5	**Six week NVP prophylaxis**				
	Yes	3	(1.1)	275	(98.9)
	No	0	(0.0)	1	(100.0)
6	**Post natal hospital attended**				
	MMSH	3	(1.4)	214	(98.6)
	WSGGH	0	(0.0)	45	(100.0)
	DKGH	0	(0.0)	14	(100.0)
7	**Feeding option in first 6 months**				
	*Non mixed feeding	1	(0.5)	184	(99.5)
	Mixed feeding	2	(2.2)	89	(97.8)

^Before delivery = Before pregnancy + During pregnancy

! After delivery = labour and delivery + Post-partum

*Non mixed feeding = Exclusive breastfeeding + Breast milk substitute.

Cells were collapsed to facilitate analysis with Chi square or Fisher's exact.

Most of the cells had few or no entries which made bivariate analysis not feasible. However, maternal ANC attendance and time of maternal commencement on HAART were found to be associated with MTCT of HIV at six weeks.(p =0.01 and 0.001 respectively).

Table 8: Factors affecting Rate of MTCT of HIV at 12 months (following cessation of breastfeeding)

SN	Parameter	HIV pos N=8 (%)	HIV neg N=119 (%)	Test statistic	Odds Ratio	Confidence Interval [95%]	p value
1	**Attended ANC**						
	Yes	4 (3.3)	119 (96.7)	Fishers exact			P=0.0001
	No	4 (100.0)	0 (0.0)				
2	**Commencement of Maternal ART**			X^2=39.472			P=0.0001
	^Before delivery	2 (1.7)	111 (98.2)				
	!After delivery	6 (42.9)	8 (57.1)				
3	**Place of delivery**			X^2=3.80	4.0	0.72-26.82	P=0.0511
	Home	5 (12.5)	35 (87.5)				
	Hospital	3 (3.5)	84 (96.5)				
4	**Seventy two hour NVP prophylaxis**			X^2=59.81	116.0	12.2-1399.2	P=0.0001
	Yes	2(1.7)	116 (98.3)				
	No	6 (66.7)	3 (33.3)				
5	**Six week NVP prophylaxis**						
	Yes	2 (1.7)	119 (98.3)	Fishers exact	Not feasible		P=0.0001
	No	6 (100)	0 (0.0)				
6	**Post natal hospital attended**			X^2	Not valid		
	MMSH	7 (6.9)	95 (93.1)				
	WSGGH	1 (5.3)	18 (94.7)				
	DKGH	0 (0.0)	6 (100.0)				
7	**Feeding option in first 6 months**						
	*Non mixed feeding	2 (2.8)	71 (97.2)	X^2=4.05	4.73	0.8-49.3	P=0.0441
	Mixed feeding	6 (13.3))	45 (86.7)				

^Before delivery = Before pregnancy + During pregnancy

! After delivery = labour and delivery + Post-partum

*Non mixed feeding = Exclusive breastfeeding + Breast milk substitute.

Cells were collapsed to facilitate analysis with Chi square or Fisher's exact.

With prolonged exposure through breast feeding, the rate of MTCT increases significantly as highlighted earlier. We found a significant association between MTCT rate and ANC attendance; (p=0.0001), time of commencement of maternal ART ;(p=0.0001), place of delivery;(p=0.05), nevirapine prophylaxis within first 72 hours of life;(p=0.0001), six week nevirapine prophylaxis (p=0.0001) and infant feeding option within the first six months of life, (p=0.04).

4.4.3 Multivariate Analysis of Factors affecting the Rate of MTCT of HIV

Several factors as shown above: ANC attendance; time of maternal commencement on HAART; place of delivery; nevirapine prophylaxis within first 72 hours of life; six week nevirapine prophylaxis; infant feeding option within the first six months of life, were significantly associated with MTCT of HIV following bivariate analysis.

. We therefore subjected these parameters to multivariate analysis using logistic regression.

Table 9: Multivariate Analysis of Factors affecting the Rateof MTCT of HIV

HIV status following cessation of breast feeding	**Confidence interval**	**Odds ratio**	**P value**
Antenatal attendance	-	-	0.000
Time of maternal commencement on HAART	0.64-63.14	6.40	0.11
Delivery place	0.01-5.40	0.17	0.31
NVP within first 72hours hours	-	-	0.000
Six week NVP prophylaxis	-	-	0.000
Feeding option within first six months	0.18-1059.12	13.74	0.24

Following logistic regression, we found that ANC attendance, infant NVP within the first 72 hours of life and six week NVP prophylaxis were highly protective against MTCT,(p= 0.000). There was no significant association between time of maternal commencement on HAART, place of delivery and feeding option in the first six months of life.

4.5 Client Satisfaction with EMTCTServices

4.5.1 Clients' knowledge and source of information on EMTCT

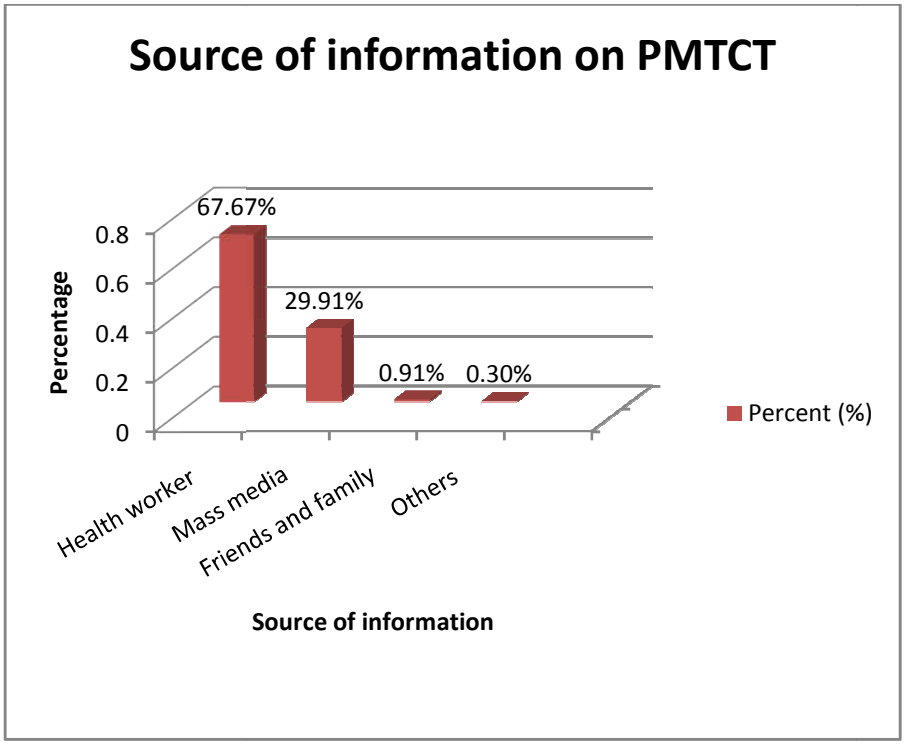

Figure 8: Source of Information on EMTCTamongRespondents

Almost all respondents (98.79%) knew about EMTCT. Health workers at health facilities serve as the main source of information on EMTCT to clients with 67.7% of the mothers hearing about EMTCT for the first time at the health facility as shown in the figure below.

Respondents reported having heard of EMTCT from health workers, mass media and family and friends among others. By far, health workers served as the major source of information for respondents on EMTCT.

4.5.2 Time spent by clients before and during HIV counseling

Table 10: Time Spent by Clients at Study Sites before and during Counseling

S/N	Time spent at Hospital	Before counseling n	(%)	During counseling n	(%)
1.	**MMSH**				
	<15 min	74	(29.4)	110	(43.7)
	15-30min	84	(33.3)	90	(35.7)
	30min-1hr	48	(19.1)	30	(11.9)
	>1hr	46	(18.3)	22	(8.7)
2.	**WSGGH**				
	<15 min	12	(20.0)	18	(30.0)
	15-30min	22	(36.7)	39	(65.0)
	30min-1hr	12	(20.0)	2	(3.3)
	>1hr	14	(23.3)	1	(1.7)
3.	**DKGH**				
	<15 min	1	(5.3)	3	(15.7)
	15-30min	13	(68.4)	12	(63.2)
	30min-1hr	3	(15.7)	4	(21.1)
	>1hr	2	(10.5)	0	(0.0)

Majority of the clients (36%) spend 15-30 minutes before being attended to at the study sites, and the modal duration of counseling session was 15-30 minutes. This finding was consistent in all facilities, as 33%, 37% and 68% of respondents from MMSH, WSGGH and DKGH respectively, reported having spent 15-30minutes at the facility before being attended to. Likewise, 36%, 65% and 63% of respondents from MMSH, WSGGH and DKGH said the counseling sessions lasted for about 15-30mins.

About 95.8% of the clients had the counseling done in their spoken language and most (67.1%) had pre and posttest counseling offered by different health workers.

Counselor preference varied among various respondents. Majority (51.1%) of the clients, however, reported that they prefer a counselor of same sex. All respondents reported that HIV counseling received was beneficial and wish to recommend service to others.

4.5.3 Client satisfaction scores

Table 11: Client's Satisfaction with EMTCT Services

Parameter /Satisfaction	**Very dissatisfied**	**Dissatisfied**	**Neutral**	**Satisfied**	**Very satisfied**
	F (%)	**F (%)**	**F (%)**	**F (%)**	**F (%)**
Waiting room comfort	28 (8.5)	9 (2.7)	32 (9.7)	118 (35.7)	144 (43.5)
Waiting time	13 (3.9)	23 (7.0)	63 (19.0)	73 (22.1)	159 (48.0)
Counseling room comfort	1 (0.3)	3 (0.9)	50 (15.1)	64 (19.3)	213 (64.4)
Counseling room privacy	1 (0.3)	1 (0.3)	9 (2.7)	75 (22.7)	245 (74.0)
Counseling time	0 (0.0)	1 (0.3)	9 (2.7)	55 (16.6)	266 (80.4)
Counselor's respect for client	0 (0.0)	0 (0.0)	17 (5.14)	80 (24.2)	234 (70.7)
Provider's confidentiality	0 (0.0)	1 (0.3)	33 (10.0)	79 (23.9)	218 (65.9)
Explanation of different issues	1 (0.3)	1 (0.3)	30 (9.1)	101(30.5)	198 (59.8)
Counselor's competence	0 (0.0)	4 (1.2)	21 (6.3)	87 (26.3)	219 (66.16)
Overall satisfaction	0 (0.0)	2 (0.6)	18 (5.4)	82 (24.8)	229 (69.2)

Table 12: Satisfaction Scores for Clients

Parameter/Score	**10- 20**		**30**		**40-50**	
	Dissatisfied		**Neutral**		**Satisfied**	
	n	**(%)**	**n**	**(%)**	**n**	**(%)**
Waiting room comfort	37	(11.2)	32	(9.7)	262	(79.1)
Waiting time	26	(7.9)	63	(19.0)	232	(70.1)
Counseling room comfort	4	(1.2)	50	(15.1)	277	(83.7)
Counseling room privacy	2	(0.6)	9	(2.7)	320	(96.7)
Counseling time	1	(0.3)	9	(2.7)	321	(97.0)
Counselor's respect for client	0	(0.0)	17	(5.1)	314	(94.9)
Provider's confidentiality	1	(0.3)	33	(10.0)	297	(89.7)
Explanation of different issues	2	(0.6)	30	(9.1)	299	(90.3)
Counselor's competence	4	(1.2)	21	(6.3)	306	(92.5)
Overall satisfaction	2	(0.6)	18	(5.4)	311	(94.0)

Majority of clients scored 40 and above for the various parameters used to assess satisfaction. About 94% of the respondents were satisfied with all theparameters mentioned above, though about 11.2% and 7.9% were dissatisfied with counseling room comfort and waiting time respectively.

4.6 Focused Group Discussion with Healthcare Personnel

Three sets of FGDs were conducted with healthcare workers, one at each facility, following the completion of questionnaire administration. It was aimed at assessing the knowledge of healthcare workers on EMTCT as well as complementing the information obtained from the respondents. The results of the FGDs are presented in the table below:

Table 13: Focused Group Discussion with Healthcare Personnel

Themes	**Murtala Muhammad Specialist Hospital**	**Waziri Shehu Gidado General Hospital**	**Dawakin Kudu General Hospital**
Elimination of mother to child transmission of HIV	The health workers at MMSH perceived EMTCT as any intervention that is done to prevent transmission of HIV virus from mother to child. A discussant said *"it means when a mother comes for ANC, she should have HCT, commenced on ARVs if she is positive, couple counseling and use of condom"*. Another discussant said, *"even family planning is EMTCT". A discussant said, "it involves giving a child NVP at birth, then for six weeks, doing a DBS at six weeks and commencing child on septrin until result is out. If positive,*	Health worker at WSGGH generally believe that it is a way of preventing child form getting infected with the disease. A discussant said, *"it is a wholistic manner on how to care for mother and child from pregnancy upto 18 months of age"*. A discussant said *"it involvesHCT, doing CD4, commencement on therapy and attaching client to a mentor mother"*. Another discussant said *"it means testing a woman in labour"*. A discussant also said, *"it is giving six weeks NVP, PCR at six weeks then continuing septrin for 18 months"*.	A discussant said, *"EMTCT starts from pregnancy until child is & years of age"*. Another said "*it involves HIV counseling, testing and commencement of mother on ARVs if CD4 is <350"* while another said *"it is the commencement of mother on HAART irrespective of the CD4 count.* A discussant said that *"EMTCT involves infant NVP prophylaxis, DNA PCR test and exclusive breastfeeding for first 6 months of life and testing the child after weaning"*.

	*commence on ARVs and if negative, continue septrin until weaning."*A discussant said, *"EMTCT means exclusive breast feeding for six months and weaning at one year".*		
EMTCT services offered	When asked on available EMTCT services at MMSH, discussants gave the following list. *"ANC, HIV counseling and testing, CD4 count, first and second line ART, infant nevirapine, counseling on exclusive breastfeeding social support clients".*	When asked on available EMTCT services at WSGGH, a discussant said, ". Other services listed by various discussants include, *"ANC and HCT, ART, infant prophylaxis, CD4 test, exclusive breastfeeding and records and M&E"*	At DKGH, respondents also gave a list of EMTCT services offered, which included, *"family planning, HIV counseling and testing, ART, CD4 testing and other supportive investigations".*
Use of available EMTCT services by clients	A discussant said, *"Yes, I can say up to 75% of clients use the available services because we miss some at labour room due to lack of test kits".* A discussant also said, *"Almost all women agree to HCT at ANC because we tell them that no ANC for them if they refuse, so even those that abscond do comeback".*	A discussant said, *"Yes, once we counsel the women at ANC and Labour room, all agree to be tested".* Another discussant said*, "I think about 95% of clients use the services just that some women do not come back to test their children after weaning".*	A discussant said, "*Yes they do, but once they deliver, they only go to the pharmacist to get their drugs. We don't see them again".* Another discussant said, *"About 95% of clients use the services offered to them"*
Available EMTCT materials in the hospitals	Regarding available EMTCT materials; A discussant said "we *have several registers: pre ART, EMTCT enrollment, child follow-up and transfer registers, as well as referral linkage*	Regarding available EMTCT materials; A discussant said, *"we have registers viz: EMTCT enrollment, general ANC, ART, admission, labour and delivery as well as child follow up registers".* A	Regarding available EMTCT materials; A discussant said, *"we have Determine and Stat pack test kits".* Another said, *"we have several registers viz; HIV positive, HCT, adherence, exclusive breastfeeding,*

	slips". A discussant said, "*we also have test kits, client education materials"*. Another discussant said *"we have all our drugs; first and second line ARVs, Nevirapine syrup, and septrin, both adult and paediatric"*.	discussant from ANC clinic said, *"we have test kits, client education materials and family planning devices"*. *"We also have first line ARVs, nevirapine syrup and septrin"*, said another discussant.	*partner, child follow and EMTCT register"*. Another discussant said, *"we also have drugs such as HAART, septrin and infant nevirapine"*.
Availability of trained EMTCT personnel	A discussant from ART unit said, *"yes I have have attended several training seminars on EMTCT"*. Two other discussants also said, *"yes I have attended training seminars on EMTCT"*. Other discussants said, *"we have not had formal training, only step down training and learning on the job"*.	A discussant said, *"I have attended several training seminars organized by IHVN on EMTCT and will be attending another in few weeks to come"*. Another discussant said, *"most of us have not had formal EMTCT training except step down training from those that have attended"*. Another discussant said, *"I have also attended seminar on EMTCT monitoring and evaluation"*.	A discussant said, *"only two of us had attended EMTCT training organized by FHI and it is almost two years now since I had my last training, but we do give step down training to those that did not attend"*. A discussant said," *I had training on ART about 6 months ago"*. Another discussant said, *"when it is time for training, only the 'Ogas' that are not even EMTCT staff attend"*.
Are EMTCT material and staff adequate	A discussant said, *"some are adequate, like ANC staff, pharmacy drugs and test kits at ANC"*. Another discussant said, *"our main problem is in labour room; no test kits, personal protective devices and staff are grossly inadequate"*.	There was a chorus, "No". A discussant said, *"we have enough staff compared to the patients we see"*. Another discussant said, *"In labour room, we lack delivery kits, surgical gloves, and are facing serious manpower shortage"*. Another discussant said, *"most of the reagents supplied for CD4 testing are expired"*.	A discussant said, *"some are adequate and some are not"*. A discussant said, *"we have all the registers and staff are manageable"*. Another discussant said, *"we need more test kits and drugs especially nevirapine syrup"*. Another said, *"there are inadequate consumables such as gloves" and we do not have a paeditric weighing scale"*.
Do you give equal services	All discussants replied "*Yes*". Another discussant	All discussants replied, "*Yes*". A discussant said, *"we give*	All discussants replied, "yes we give

to all clients irrespective of ethnicity and religion	said, *"No exception, they are all equal".*	*equal services to all patients, no matter where they come from".*	
Factors that could influence effectiveness of services provided	A discussant said, "the issue of test kits and nevirapine syrup in labour room needs to be addressed as a lot of HIV positive mothers are missed at this stage". Another said,"*regular training of staff, even it be step-down training is needed". A discussant also said that, "regular meeting between staff of various units rendering EMTCT services is needed".* Another discussant also said, *"more finance is needed to enable client tracking".*	A discussant said, *"we need infant nevirapine and personal protective materials at labour and delivery room".* Another discussant said, *"we need more finance so as to enable client tracking, in case of loss to follow up".* A discussant said, *"creating a dedicated follow up clinic day for EMTCT clients is important, as most mothers are lost to follow up after delivery".*	A discussant said, *"there should be constant training and re training of staff and a designated EMTCT medical officer should be provided".* Another discussant said that, *"there need be effective chain of communication in terms of periodic meeting of all the staff in various EMTCT units of the hospital, so as to discuss progress and challenges".*

Following the discussion, it is evident that most of the health workers knew what EMTCT entails, however their knowledge on current national guideline on maternal commencement on ARVs needs to be updated as a healthworker at DKGH still believes a mother will be commenced on ARVs only when her CD4 count is less than 350 c/ml. All the facilities have basic EMTCT materials, but lack capacity to offer viral load and DNA PCR testing. There is high uptake (> 75%) of EMTCT services in all the three facilities and all the health workers reported offering equal services to all clients with no discrimination what so ever. Most of the health workers reported they needed more staff as well as training and retraining on EMTCT,especially at WSGGH and DKGH.Despite the range of EMTCT services offered,

service gaps exist as test kits are lacking in labour rooms of MMSH and DKGH, none of the facilities offer DBS test to HIV exposed neonates at birthand infant follow up services could still be improved especially at DKGH.

CHAPTER FIVE

DISCUSSION

This study found that the EMTCT services offered at secondary facilities in Kano state were effective, with an overall maternal to child transmission rate of 1.1% and 4.7% at six weeks and twelve months respectively across the three facilities. Several factors: ANC attendance; time of maternal commencement on HAART ;place of child delivery;nevirapine prophylaxis within first 72 hours of life;six week nevirapine prophylaxis and infant feeding option within the first six months of life were found to be associated with MTCT. Following logistic regression, ANC attendance, infant NVP within the first 72 hours of life and six week NVP prophylaxis were highly protective against MTCT of HIV.

This study found that 0.6% and 0.5% of pregnant women in Kano state were infected with HIV in 2014 and 2015 respectively (secondary data).The prevalence HIV infection among pregnant women obtained in this studyis much lower than the 2.2% reported for Kano State during the 2014 ANC Sentinel survey.[31]Findings are also significantly lower than the National prevalence of 4.1% and 3.4% reported for the country in 2010 and 2012 respectively.[29,30]This could be a result of better health care, increased availability of ARVs, decrease in rate of new infections as well as increase in ANC attendance and uptake of EMTCT services, reflecting the general downward trend in prevalence of HIV across the Nation.[29,30,31] Another plausible explanation could be that majority of respondents for this study reside in urban areas, attend antenatal and also receive EMTCT interventions.

There was high uptake of HCT services, as 97.3% of the mothers were counseled, tested and also received their result during the pregnancy of the index child. All the mothers are currently on

HAART, either as treatment for their own disease or as prophylaxis as directed by the 2010 national EMTCT guideline. The study also found similarly high uptake of the services from information obtained during an FGD with the health workers- *"About 95% of clients use the services offered to them",* (DKGH). Findings from this study are comparable to that of a study at Aminu Kano Teaching Hospital (AKTH),[13] where 97.3% of pregnant women were group counseled and agreed to undergo the test, and considerably higher than findings from National Demographic and health survey (NDHS), 2013,[56]which reported that the percentage of women who received HIV counseling, HIV testing and received result during ANC was 22.8% in Kano with an average of 11.4% in North West zone.Findings are also significantly higher than the 54.4%reported by Gunn etal for Nigeria using pooled data from demographic surveys in 2016,[12]as well as findings from a study in Uganda which estimated that the proportion of HIV-infected pregnant women that receive any kind of ARVs for EMTCT in Uganda was 34% in 2007 and 53% in 2009.[32]

The high uptake obtained could a true increase, reflecting increased awareness about HIV, better attitude of health workers, decrease in rate of stigmatization against people living with HIV,etc. However, it may a result of the nature of the study, being a facility rather than a community based surveyand that respondents are mainly from urban areas and thus more likely to be aware of HIV. Community based surveys like theNDHS encompasses both rural and urban population alike, and may give a better picture of the situation on ground.All respondents are currently on triple ARV regimen, 56.5% on Truvada (tenofovir+lamivudine+efavirence) and 43.5% on Combipak, (zidovudine+lamivudine+nevirapine), though majority were commenced before the index pregnancy.This is line with the 2010 National guideline on PMTC which advocates the commencement of every pregnant woman found to be HIV positive on lifelong ART.

There was high uptake of infant ARV prophylaxis, with over 90% of the children having received 72 hours and six week infant nevirapine prophylaxis respectively. This is much higher than findings obtained in China, in 2015,[34] where 78% of the HIV exposed children received infant nevirapine prophylaxis. However, the percentage of children who had HIV testing following cessation of breast feeding (73.3%) was lower than that at six weeks (86.7%). This is also the information obtained from the health workers during the FGD, where some of them said; *"I think about 95% of clients use the services just that some women do not come back to test their children after weaning".* WSGGH. These findings may be as a result of lost to follow ups, lack of adequate counseling of mothers on need for the test following weaning, financial constraints on the side of mothers and lack of incentives to motivate the mothers to come back for the test. The very low rate of six month HIV testing (17.9%) may be attributable to the fact that it is not routinely done at MMSH where most of the respondents are accessing care.

Looking at the high uptake of ANC/HCT and early infant prophylaxis (>90%), it could be said, that Kano state is heading towards achieving the state's eMTCT targets, that were set in alignment with the goals and targets contained in global and national emtct plans including the PCRP, 2013-2015, which were: Reducing by 50% HIV incidence among women of reproductive age (WRA), increasing access to quality HIV counseling and testing to at least 90% of pregnant women, increasing to 90% ARV prophylaxis for PMTCT for all HIV-positive pregnant women and breastfeeding infant-mother pairs and increasing the provision of early HIV diagnosis services to at least 90% of all HIV exposed infants, among others all come 2015.[57]A pertinent issue however, is still the poor access to maternal and child health (MCH) interventions, particularly PMTCT interventions, as only 55.5% of pregnant women accessed ANC, while

18.9% delivered in hospital in Kano state in 2011.[57] Furthermore, the human resource capacity for delivery of quality PMTCT services need to be strengthened.

The study found an MTCT rate of 1.1% and 4.7% at six weeks and 12 months post-partum. Review of EMTCT records at the facilities showed six week MTCT rates of 1.8% and 3.6% in 2014 and 2015 respectively among infants of mothers accessing care at the facilities. These findings are higher than transmission ratesof 0.7% obtained at Jos University Teaching Hospital (JUTH) in North-central Nigeria, between January 2010 and December 2012.[10] This may be attributable to factors such as lack of test kits in labour room (MMSH and DKGH), lack of NVP syrup in labour room and post-natal wards, which will increase transmission rate in previously undiagnosed mothers. The fact that JUTH is a teaching hospital, having complete EMTCT package and better trained personnel may also explain the lower MTCT rates obtained.

The six week transmission rate of 1.1% obtained in the study is however comparable to early transmission rates of 1.0% in cote d'ivore[38]and United States and Europe of 1-2%[37] among non-breastfeeding mothers. The MTCT rate of 4.7% obtained following cessation of breastfeeding was also comparable to that 3.3% among mothers on HAART in cote d'ivore[38] and 4.4% in China were 71% of the mothers were on HAART.[34]This implies that the shorter the duration of exposure through breast milk, the lesser the risk of MTCT. Due to financial, hygiene and social issues however, it is difficult or impossible to prevent mothers from breastfeeding their babies. Postnatal- HIV-infection rates of 0.5% in non-mixed fed (exclusive breastfeeding and breastmilk substitute) and 2.2% in MF (mixed feeding) were obtained at six weeks. The postnatal HIV infection rates rose to 2.8% and 13.3% in non-mixed fed and mixed feeding groups following cessation of breastfeeding. This is comparable to findings obtained at Makurdi[40] between 2008 and 2011, where Postnatal- HIV-infection rate at three months was 1.5% in EBF (exclusive

breast feeding), 0.2% in EBMS (exclusive breast milk substitute) and 12.6% in MF (mixed fed) vs 7.0%, 4.3% and 27.1% for EBF, EBMS and MF groups respectively.

Mother-to-child transmission (MTCT) of HIV was found to be lower among women on ART during pregnancy compared to those women who started ART/Triple ARV prophylaxis post-partum, both at six weeks of age (0.0%; 0/112 vs 7.7%; 1/13 p=0.0001) and at 12 months following weaning (0.0%; 0/51 vs 46.2%; 6/13 P=0.0001). This is in keeping with the JUTH study.

Almost all the minimum resources required of anEMTCT approved site were available, except for the lack of test kits and infant nevirapine at the labour wards of MMSH and DKGH as well as inadequate staff in all the hospitals. One of the discussants at MMSH said, "*our main problem is in labour room; no test kits, personal protective devices and staff are grossly inadequate*".This is comparable to findings at Umuahia hospitals[58] were majority of the hospitals have highly adequate to moderately adequate materials and staff.

Most of the respondents (93%) were satisfied with EMTCT services offered at the study sites. This is comparable to satisfaction rate of 90% obtained in Ethiopia in 2015.[59]

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study found the prevalence of HIV infection among pregnant women attending ANC to be 0.6% (MMSH and DKGH) in 2014, and 0.5% (MMSH, WSGGH and DKGH) in 2015. There was high uptake HCT as 97.3% of the respondents were counseled tested and received their result during ANC. Uptake of infant ARV prophylaxis was also found to be high, with 94.3% and 96.7% of the exposed infants having received 72 hours and six week infant nevirapine prophylaxis respectively. Prevention of Mother to Child Transmission of HIV (EMTCT) services were found to be effective as MTCT rate of 1.1% and 4.6% was obtained at six weeks and 12 months respectively. Several factors such as ANC attendance; time of maternal commencement on HAART ; place of child delivery; nevirapine prophylaxis within first 72 hours of life; six week nevirapine prophylaxis and infant feeding option within the first six months of life were found to be associated with MTCT of HIV. Following logistic regression, ANC attendance, infant NVP within the first 72 hours of life and six week NVP prophylaxis were highly protective against MTCT of HIV. Almost all (94.0%) of respondents were satisfied with the EMTCT services received at the study facilities.

5.2 Recommendations

Following results of the study, the following recommendations were put forward.

1. Increased supply of EMTCT materials and ensuring adequate distribution of the materials in all hospital units offering one EMTCT service or another by the state government and EMTCT implementation partners.

2. All EMTCT facilities should be provided with necessary materials and staff to perform necessary to at least take DBS sample from HIV exposed neonates immediately after delivery, by the state government and implementing partners.
3. Providing more staff especially Doctors and junior health staff like CHEWS and social workers at EMTCT facilities, as suggested by the health workers during the FGDs.
4. Providing designated clinic days for client follow up in all hospitals offering EMTCT services as well as increased client education on need to disclose status to health workers during labour and delivery and need for child follow up visits.
5. Adequate training and retraining of EMTCT staff through formal training of supervisors and step down training to smaller cada staff.
6. There should be an ongoing evaluation of EMTCT services offered at all health facilities at state and federal levels.

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Appendix 1: Questionnaire for Interview with Mother-Infant Pairs Accessing Care at StudySites

S/N

1.0SECTION A

1.1 Which hospital do you attend for postnatal follow up?

1.2 Dawakin Kudu Gen. Hosp ( ) MMSH ( ) Waziri Gidado ( )

1.3 How old are you? < 20 years ( ) 21 – 35 years ( ) > 35 years ( )

1.4 Educational status?

Primary ( ) Secondary ( ) Tertiary ( ) Islamic education ( )

1.5 Marital status Married ( ) Single ( ) Divorced ( ) Widowed ( ) Seperated ( )

1.6 Tribe Hausa ( ) Fulani ( ) Yoruba ( ) Igbo ( ) Others, specify ( )

1.7 Where do you live? (optional)…….

2.0 SECTION B

2.1What is your parity ( )

2.2 When was your last child birth? 0-8weeks ( ) 2-6months 6-12months ( ) 12-24months

2.3 Did you attend ANC during your last pregnancy? Yes ( ) No ( )

2.4 Did you have an HIV counseling done? Yes ( ) No ( )

2.5 Did you have an HIV test done? Yes ( ) No ( )

2.6 What is your HIV status? Positive ( ) Negative ( )

2.7 What is your husband's HIV status Positive ( ) Negative ( ) Do not Know ( )

If no ANC

2.8 When was HIV testing done? Labour and delivery ( ) Post partum ( )

3.0 SECTION C

3.1 Are you currently on antiretroviral therapy? Yes ( ) No ( )

If on ART

3.2 When were you commenced on the drug/drugs? Before pregnancy ( ) during pregnancy ( )

Labour and delivery ( ) Post partum ( ).

3.3 Which antiretroviral drugs are you on? ( ) gotten from patient hand card.

3.4 What was your last CD4 count? ( ) Do not Know ( )

If not on ART

3.5 Did you receive any ARV prophylaxis in your last pregnancy? Yes ( ) No ( )

3.6 When where you commenced on the ARVs? 14-28weeks ( ) 30 -term ( ) Labour ( )

3.7 Which ARV prophylaxis did you receive? Single dose Nevirapine ( ) Zidovudine + Nevirapine ( )

3.8 Are you still on ARV prophylaxis? Yes ( ) No ( )

3.9 If no, when was ARV prophylaxis stopped? ( )

4.0 SECTION D

4.1 How many pregnancies have you taken to term?

4.2 How old is your baby? 8weeks ( ) 2-6months 6-12months ( ) 12-24months

4.3 vWhat is the sex of your baby? Male ( ) Female ( )

4.4 Where did you deliver the child? Home ( ) Hospital ( )

4.5 When was your first PNC visit? ( ) weeks after delivery

4.6 Did the baby receive any ARV prophylaxis within first 72 hours of life? Yes ( ) No ( )

4.7 Did the baby have a DNA PCR test done at 6 week? Yes ( ) No ( )

4.8 If yes, what was the result? Positive ( ) Negative ( )

4.9 Did the baby have a DNA PCR test done at 6 months? Yes ( ) No ( )

4.10 If yes, what was the result? Positive ( ) Negative ( )

4.11 Did the baby have a DNA PCR test done after weaning? Yes ( ) No ( )

4.12 If yes, what was the result? Positive ( ) Negative ( )

4.13 Is the baby currently on any ARVs? Yes ( ) No ( )

4.14 How many scheduled PNC visits have you had following your last child birth? ( )

4.15 What infant feeding option are you practicing? Exclusive breastfeeding ( ) Mixed feeding ( )

Breast milk substitute ( )

Appendix 2: (Hausa Version of Appendix 1)

YANAYIN KARBUWA TARE DA INGANCIN AYYUKAN KARE YADUWAR CUTAR KANJAMAU A ASIBITOCIN MATAKI NA BIYU A GARIN KANO

QUESTIONNAIRE FOR STRUCTURED OBSERVATION OF PNC CONSULTATION SESSIONS

TAMBAYOYI

S/N

1.0 SHASHI NA A

1.1 Wane asibiti kike zuwa domin duba yaro bayan haihuwa?

Dawakin Kudu Gen. Hosp ( ) MMSH ( ) Waziri Gidado ( )

1.2 Shekarunki nawa? < 20 years ( ) 21 – 35 years ( ) > 35 years ( )

1.3 Matakin ilimi?

Primary ( ) Secondary ( ) Gaba da sakandare ( ) Islamiyya kawai ( )

1.4 Aure

Matar aure ( ) Ba a taba aure ba ( ) Aure ya mutu ( ) Miji ya rasu ( ) Yaji ( )

1.5 Yare

Hausa ( ) Fulani ( ) Yoruba ( ) Igbo ( ) Waninsu, sunan ( )

1.6 A ina kike da zama?

(Ba dole ba)……..

2.0 SHASHI NA B

2.1 Haihuwar ki nawa? ( )

2.2 Yaushe haihuwarki ta karshe ? sati 0-8 ( ) wata 2-6 wata 6-12 ( ) wata 12-2 ( )

2.3 Kin yi awo a cikin ki na karshe? E ( ) A'a ( )

2.4 An yi miki bayani a kan cutar HIV? E ( ) A'a ( )

2.5 An yi miki gwajin HIV? E ( ) A'a ( )

2.6 Shin kinada cutar HIV? E ( ) A'a ( )

2.7 Shin mijinki yana da cutar HIV? E ( ) A'a ( ) Ban sani ba ( )

Idan baki yi awon ciki ba,

2.8 Yaushe aka yimiki gwajin HIV? Lokacin nakuda ( ) Bayan na haihu ( )

3.0 SHASHI NA C

3.1 Shin yanzu kina kan maganin HIV ? E ( ) A'a ( )

Idan ba kya kan maganin

3.2 Yaushe kika fara shan magungunan? Kafin na samu juna biyu ( ) Sanda inada da juna biyu ( )

Lokacin nakuda ( ) Bayan na haihu ( ).

3.3 Wadanne magungunan kike sha ( ) a duba katinta na asibiti?.

3.4 Nawa ne awon CD4 dinki na karshe? ( ) Ban sani ba ( )

Idan fa ba kya kan magani,

3.5 Shin an baki maganin kariyar yaro daga HIV sanda kina da juna biyu? E ( ) A'a ( )

3.6 Yaushe ne kika fara shan maganin kariyar? Sati 14-28 ( ) Sati 30 -term ( ) Labour ( )

3.7 Wane irin maganin kariya aka baki? Single dose Nevirapine ( ) Zidovudine + Nevirapine ( )

3.8 Shin har yanzu kina kan maganin kariya? E ( ) A'a ( )

3.9 Idan ba kya kai, yaushe ne kika daina sha? Sati ( )

4.0 SHASHI NA D

4.1 How many pregnancies have you taken to term?

4.2 Shekarun yaronki nawa? Sati 8 ( ) Wata 2-6 Wata 6-12 ( ) Wata 12-24

4.3 Mene ne jinsin jaririnki? Namiji ( ) Mace ( )

4.4 A ina aka haifi yaron ? Gida ( ) Asibiti ( )

4.5 Bayan sati nawa da haihuwa kika dawo asibiti domin a duba lafiyarku? Sati ( )

4.6 Shin an bawa jariri maganin kariya cikin awa 72 da haihuwa? 72 hours of life? E ( ) A'a ( )

4.7 Shin an yi mishi gwajin DNA PCR a sati a sati 6 ? E ( ) A'A ( )

4.8 Idan an yi, menene sakamakon? Yana da HIV ( ) Babu HIV ( )

4.9 Shin yaronki yana kan maganin HIV yanzu? E ( ) A'a ( )

4.10 Sau nawa kuka zo asibiti da yaronki bayan kin haihu? ( )

4.11 Wane abinci kike bawa yaronki? Mama zalla ( ) Mama da wani abincin ( )

Madara kawai babu shayarwa ( )

Appendix 3: Exit Interview Questionnaire for Postnatal Women

S/N

1.0 Socio demographics

1.1 Age in years < 20 ( ) 21-35 ( ) >35 ( )

1.2 Religion Islam ( ) Christianity ( ) Others (specify)

1.3 Ethinicity Hausa ( ) Fulani ( ) Igbo ( ) Yoruba ( ) Others (specify)

1.4 Educational status Primary ( ) Secondary ( ) Tertiary ( ) Islamic education ( )

1.5 Marital status Married ( ) Single ( ) Divorced ( ) Widowed ( )

1.6 Occupation House wife ( ) civil servant ( ) Student ( ) Merchant ( ) Unemployed ( )

1.7 Place of residence Urban ( ) Rural ( )

2.0 Source of information about the EMTCT service and clients experience at the EMTCT site

2.1 Did you know about EMTCT service before? Yes ( ) No ( )

2.2 If yes, source of information about the EMTCT service Health worker ( ) Mass media ( ) Friends and family ( ) others ( )

2.3 How long did you wait to see the healthcare provider? <15mins ( ) 15-30mins ( ) 30mins -1hr ( ) >1hr ( )

2.4 How much time did the counseling session last? <15mins ( ) 15-30mins ( ) 30mins -1hr ( ) >1hr ( )

2.5 Was the counseling given by the same counselor in pretest and post test counseling? Yes ( ) No ( )

2.6 Did the counselor speak the same language as you? Yes ( ) No ( )

2.7 Would you have preferred to have a counselor that is? Younger ( ) Older ( ) Different sex ( ) No preference ( )

2.8 Do you think the counseling and testing service was beneficial? Yes ( ) No ( )

2.9 Would you recommend the service to others? Yes ( ) No ( )

3.0 Client satisfaction with EMTCT services

Questions	**Very dissatisfied**	**Dissatisfied**	**Neutral**	**Satisfied**	**Very satisfied**
4.1 How do you rate your satisfaction? with the waiting room comfort?					
4.2 How do you rate your satisfaction with the waiting time (within a short period of time)?					
4.3 How do you rate your satisfaction with the counseling room comfort?					
4.4 How do you rate your satisfaction with the privacy of the counseling room?					
4.5 How do you rate your satisfaction with the adequacy of time for counseling?					
4.6 How do you rate your satisfaction with					

the counselors respect for you?

4.7 How do you rate your satisfaction with the service providers confidentiality and trustworthiness?

4.8 How do you rate your satisfaction with the counselors explanation about different issues?

4.9 How do you rate your satisfaction with the counselors competence?

4.10 How do you rate your overall satisfaction with the service?

Appendix 4:(Hausa Version of Appendix 2)

TAMBAYOYI GA MATAN DA SUKA ZO AKA DUBA SU BAYAN SUN HAIHU

S/N

1.1 Shekarunki nawa? < 20 ( ) 21-35 ( ) >35 ( )

1.2 Menene addininki Islama ( ) Christa ( ) Sauran (specify)

1.3 Yarenki Hausa ( ) Fulani ( ) Igbo ( ) Yoruba ( ) Sauran (specify)

1.4 Matakin ilimi Primary ( ) Secondary ( ) Gaba da sakandare ( ) Islamiyya ( )

1.5 Aure Matar aure ( ) Ba'a taba aure ba ( ) Aure ya mutu ( ) Miji ya rasu ( )

1.6 Sana'a Matar gida ( ) ma'aikaciyar gwamnati ( ) Daliba ( ) Saye da sayarwa ( ) Babu sana'a( )

1.7 Ina kike da zama Birni ( ) Kauye ( )

2.0 Source of Information about the EMTCT Service and Clients Experience at the EMTCT Site

2.1 Kin taba jin labarin EMTCT a da? E ( ) A'a ( )

2.2 Idan E ne, to a ina kika taba jin bayani akan EMTCT Ma'aikaciyar lafiya ( ) Kafafan yada labarai ( ) Yan uwa da abokan arziki ( ) Saura ( )

2.3 Yaya tsahon jiran da kika yi kafin ki ga ma'aikaciyar lafiya? <15 mins( ) 15-30 mins ( ) 30 mins -1 hr >1hr ( )

2.4 Minti nawa akayi ana yi miki bayani? <15 mins( ) 15-30 mins ( ) 30 mins -1 hr >1hr ( )

2.5 Ma aikaciya day ace ta yi miki bayani kafin da kuma bayan an yi gwaji? E ( ) A'a ( )

2.6 Ya renku daya da wacce tayi miki bayani akan EMTCT? E ( ) A'a ( )

2.7 Shin zaki fi so ace wadda ta yimiki bayani ta zama? Bata kai haka shekaru ba( ) Ta fi haka shekaru ( ) Ba jinsinku daya ba( ) Ba ki damu ko wace ba ( )

2.8 A ganinki wannan bayani dakuma gwaji yana da amfani? E ( ) A'a ( )

2.9 Shin za ki so ki gayyato wasu dan suzo ayi musu suma? E ( ) A'a ( )

3.0 Gamsuwar Mara lafiya da yanayin yadda aka duba ta

Tambayoyi	**Kwata Kwata Ban gamsu, Ban gamsuba, ba laifi, Na gamsu,**	**Na agamsu Kwarai**
3.1 Kwatanta gamsuwarki da yanayin Dakin taro?		
3.2 Kwatanta gamsuwarki da tsahon lokacin jira kafin a kirak		
3.3 Kwatanta gamsuwarki da yanayin dakin bayani ?		
3.4 Kwatanta gamsuwarki da dakin bayani wajen kare sirrinki?		
3.5 Kwatanta gamsuwarki da tsahon lokacin bayani?		
3.6 Kwatanta gamsuwar kida ya yadda mai bayani ta mutunta ki ?		
3.7 Kwatanta amincewar ki da mai bayani wajen kare sirrinki.		
3.8 Kwatanta gamsuwarki da yadda aka yi miki bayani akan masaloli iri iri?		

3.9 Kwatanta gamsuwarki da kwarewar

mai bayani akan aikinta?

3.10 Kwatanta gamsuwarki da dukkan aikin?

Appendix 5: Checklist for EMTCTSites

Name of Site……

1.0 Record unit

1.1Monthly summary forms ( )

1.2 Counselling Register ( )

1.2 General ANC register ( )

1.3 EMTCT enrollment register ( )

1.4 Labour and delivery register ( )

1.5 Laboratory log book ( )

1.6 ANC-EMTCT appointment card ( )

1.7 Paediatric follow up register ( )

1.8 7Refferal linkage slip ( )

1.9 DNA PCR machine ( )

1.10 CD4 Machine ( )

1.11 Microscopes ( )

1.12 Reagents ( )

2.0 ANC/PNC Clinic

2.1 Separate counseling room ( )

2.2 Test kits ( )

2.3 Nevirapine (tablets/syrup) ( )

3 Antiretrovirals ( )

2.4 Disposables (syringes, cottn wool, gloves) ( )

2.5 EMTCT guideline ( )

2.6 EMTCT performance standard ( )

2.7 Client education materials ( )

2.8 Birth preparedness check list. ( )

3.0 Labour and delivery ward

3.1 Running water in labour room ( )

3.2 Electricity in labour room ( )

3.3 Test kits in labour room ( )

3.4 Nevirapine (tablets/syrup) in labour room ( )

3.5 Antiretrovirals ( )

3.6 Basic obstetric care materials, (delivery couches, consumables, oxytocin) ( )

3.7 Infection prevention tools (gloves, aprons, autoclave, goggles, sharp boxes. ( )

4.0 Pharmacy

4.1 Antiretrovirals ( )

4.2 Co-trimoxazole ( )

4.3 Infant Nevirapine (syrup/tablet) ( )

4.4 Paracetamol ( )

Appendix 6:Focused Group Discussion (FGD) / Key Informant Interview (KII) Guide

FGD/KII guide on Evaluation of Prevention of Mother To Child Transmission (EMTCT) of HIV and AIDS Programme in Secondary Health Facilities in Kano.

1.1 What is EMTCT all about?

1.2 Which EMTCT services do you have in this hospital?

1.3 Do the clients use the services as expected?

1.4 What materials do have in this hospital for EMTCT?

1.5 Do you have trained EMTCT service providers in this hospital?

1.6 Are the EMTCT service providers and materials adequate for the programme?

1.7 Do you give equal services to the clients irrespective of their age, location and level of education?

1.8 What factors do think influence the use of EMTCT services?

Appendix 7: (Hausa Version of Appendix 5)

Hira tare da Tambayoyi ga ma'aikatan asibitocin da ake bincike akansu akan yanayin karbuwa tare da ingancin ayyukan kare yaduwar cutar kanjamau daga uwa zuwa ga jaririnta

1.1 Me kuka sani game da hanyoyin kare yaduwar cutar kanjamau daga uwa zuwa ga jaririnta?

1.2 Wane ire iren hanyoyin kare yaduwar cutar kanjamau daga uwa zuwa ga jaririnta kuke gudanarwa a wannan asibitin?

1.3 Shin mutane suna amfani da wadannan hanyoyin yadda ya kamata?

1.4 Wadanne ire iren kayan aiki ne daku a wannan asibitin na gudanar da ayyukan kare yaduwar cutar kanjamau daga uwa zuwa ga jaririnta?

1.5 Shin kuna da ma'aikata wadanda suka samu horo akan gudanar da ayyukan kare yaduwar cutar kanjamau daga uwa zuwa ga jaririnta ?

1.6 Shin kuna da isassun ma'aikata da kuma isassun kayan aikin gudanar da ayyukan kare yaduwar cutar kanjamau daga uwa zuwa ga jaririnta?

1.7 Shin kulawa daya kuke bawa duk wadanda suka zo muku, ba tare da la'akari da banbance banbancen shekaru, mazauna ko kuma matakin iliminsu ba?

1.8 Wadanne abubuwa ne sukan iya sa ayi amfani da hanyoyin kare yaduwar cutar kanjamau daga uwa zuwa ga jaririnta?

Appendix 8: Consent for Client Participation in Research

Department of Community Medicine

Aminu Kano Teaching Hospital,

PMB 3452

Kano

Dear Respondent,

CONSENT FOR PARTICIPATION IN RESEARCH

This study, titled "Uptake and Effectiveness of EMTCT Services in Secondary Health Facilities in Kano" is designed to assess the level of utilization as well as the impact of EMTCT services that are being offered at some secondary health facilities in Kano. It is aimed at identifying the loop holes and offering recommendations on how to improve the service for the overall well being of you and your baby. It requires your full cooperation and genuine response which will be treated confidentially. Your name is therefore not required in any part of the questionnaire.

You are kindly required to sign below if you consent to participate in the study.

Thanks for your co-operation.

Yours sincerely,

Dr Maryam A. Idris

…….

Client Signature

Appendix 9 (Hausa Version of Appendix 8)

Department of Community Medicine,

Aminu Kano Teaching Hospital,

PMB 3452

Kano

Zuwa ga Yar'uwa,

TAKARDAR NUNA YADDAR ZAMA DAYA DAGA CIKIN WADANDA ZA A YI BINCIKE AKANSU

Wannan bincike mai taken "Yanayin amfani, da kuma ingancin ayyukan kare yaduwar cutar kanjamau daga uwa zuwaga jaririnta a wasu asibitoci a Kano" an kirkiro shi ne domin a duba karbuwa tare da sakamakon ayyukan kare yaduwar cutar kanjamau da ake gudanar wa a wasu asibitoci a cikin garin Kano.Wannan binciko zai taimaka wurin gano inda matsaloli suke domin a bada shawarwari akan hanyoyin da za'a kawar da wadannan matsalolin don inganta rayuwar kid a ta jaririnki. Ana bukatar cikakken hadin kanki, da kuma bada amsoshi na gaskiya ga tambayoyin da aka yi miki. Ana tabbatar miki da cewa za 'a kare sirrinki, saboda haka, babu inda za'a sa sunanki akan tambayoyin da za'a yi miki. Muna so kisa hannu a kasa idan kin yadda ayi wannan bincike a kanki.

Mun gode da bada hadin kanki. Taki, Mai bincike

Dr Maryam A. Idris

…….

Client Signatue

Appendix 10: Application for Ethical approval for Conduct of Research

Department of Community Medicine,

Aminu Kano Teaching Hospital,

PMB 3452

Kano

The Chairman,

Research Ethics Review Committee,

AKTH

Through:

The Head of Department,

Community Medicine

AKTH

Sir,

APPLICATION FOR AN ETHICAL APPROVAL TO CONDUCT A RESEARCH

I wish to apply for the above subject matter on my proposed MPH thesis titled "uptake and effectiveness of prevention of mother to child transmission (EMTCT) services in secondary health facilities in kano". This is a pre-requisite for the conduct of the study. Attached to this letter are copies of the research proposal.

Thank you in anticipation.

Yours Sincerely

Maryam A. Idris

Appendix 11: Checklist for Data Abstraction from EMTCT Sites

UPTAKE AND EFFECTIVENESS OF PREVENTION OF MOTHER TO CHILD TRANSMISSION (EMTCT) SERVICES IN SECONDARY HEALTH FACILITIES IN KANO

CHECKLIST FOR DATA ABSTRACTION FROM EMTCT SITES

Name of Facility…….

	2013	2014	2015
Total number of clients enrolled			
Total number of clients who had EMTCT counseling			
Clients tested for HIV			
Total number of HIV positive clients			
Number of clients who received any form of prophylaxis			
Clients who had skilled attendant at delivery			
Total number of HIV exposed babies delivered in the facility			
Total number of HIV positive babies			