

**FACTORS INFLUENCING PREVENTION OF MOTHER TO CHILD HIV
TRANSMISSION PROGRAM IN NAKURU DISTRICT, KENYA**

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**A Thesis submitted in partial fulfillment of the requirements for the award of the degree
of Master of Public Health in the School of Health Sciences of Kenyatta University**

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*Factors influencing
prevention of mother*



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Declaration

I Jonathan Njogu Mwangi declare that this thesis is my original work and it has not been presented for a degree or other awards in any other University.



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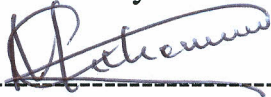


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DEDICATION

Special dedication to my wife Tabitha and children Elizabeth, Sarah, Esther and Timothy for moral support and encouragement they were spices that enabled me complete my studies.

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ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
ANC	Ante Natal Care
ART	Anti Retro Viral Therapy
ARV	Anti Retro Viral
DHIS	District Health Information Service
DMOH	District Medical Officer of Health
DNA	Deoxy Ribonucleic Acid
ELISA	Enzyme-Linked Immuno Sorbent Assay
FGD	Focus Group Discussions
Gp	Glycoprotein
HIV	Human Immunodeficiency Virus
IAP	International Association of Physician
IATT	Inter Agency Task Team
KAIS	Kenya AIDS Survey
MCH	Maternal Child Health Clinic
MOE	Ministry of Education
MOH	Ministry of Health
NAM	National AIDS Manual
NASCOP	National AIDS and Sexually Transmitted Diseases Control Program
OP	Office of the President
PACTG	Pediatrics AIDS Clinical Trials Group
PCEA	Presbyterian Church of East Africa

PCR	Polymerase Chain Reaction
PMTCT	Prevention of Mother to child HIV transmission
RNA	Ribonucleic Acid
ROK	Republic of Kenya
SPSS	Scientific Package for Social Science
UNAIDS	Joint United Nations Program for HIV and AIDS
UNFPA	United Nations Fund for Population Activities
UNGASS	United Nations general Assembly Special Session on AIDS
UNICEF	United Nations International Children's Education Fund
USA	United States of America
VCT	Voluntary Counseling and Testing
WHO	World Health Organization

ABSTRACT

Each year, around 370,000 children aged 15 years and below become infected with HIV. Almost all of these infections occur in developing countries, and more than 90% are the result of mother-to-child HIV transmission. The infections can be averted through PMTCT activities. Without interventions, there is a 20-45% chance that an infant born to an HIV-infected mother will become infected. The study evaluated the management of PMTCT in Nakuru District with an aimed of making a positive contribution in improving health services delivery in the district and especially child survival efforts for wider scale application. The program (PMTCT) provides the best chance to prevent HIV transmission to children. It was launched in Nakuru District in the year 2002. The study was conducted in Nakuru District in six health facilities namely: Nakuru Provincial General Hospital, Rongai Health Center, Bondeni Maternity, Langalanga Health center, PCEA Nakuru West Health Center and Marie Stopes Dispensary. The study methodology was comparative descriptive and analytical cross-sectional survey. It was conducted in three phases: phase one: secondary data collection from the six sampled health facilities: phase two: administration of questionnaires to 256 randomly selected ANC expectant mothers and phase three: conducted six interview schedules to key informants and six focus group discussions from health care workers from the six sampled sites aimed at injecting qualitative information not captured through observation or the questionnaires. Descriptive statistics was used to summarize the data while Statistical Package for Social Sciences (SPSS) was used to analyze it. Cross tabulation was done to establish the relationship between variables and Chi-square used to test the hypothesis which was accepted at p values <0.05 . The age of the respondents ranged from 15 years to 44 years, 81.9% of the respondents were married, 16.1% were not married, 1.6% separated and 0.4% divorce. About 40% had secondary, 36.5% primary, 19.6% tertiary, 2.7% university and 1.2% other levels of education. Respondents' monthly incomes showed that 19.5% earned $<ksh\ 2000$, 18% $>ksh\ 2001 >5000$, 9.8% $>ksh\ 5001 >10000$, 5.9% $>ksh\ 10001 >20000$ and 2% $<ksh\ 20,000$. The respondents' occupation showed that 45.2% were housewives, 23% had businesses, 22.6% were employed and 9.3% not employed. The percentage of mothers attending ANC clinic generally increased significantly ($p < 0.001$), while PMTCT awareness was 88.5%. However the awareness had no significant facility association ($p = 0.206$) but the source of PMTCT awareness a part from health care workers showed that media and friends gave significant input ($p = 0.003$). Enrolment to PMTCT increased significantly ($p = 0.018$) while the percentage of mothers tested increased from 55.3% in 2003 to 84.9% in 2007. The percentage of mothers and children put on ARV prophylaxis increased significantly ($P < 0.001$) and so was the mothers practicing exclusive breastfeeding ($p < 0.000$). Among the factors that influenced PMTCT services was human resource ($p = 0.000$), accessibility of PMTCT services ($p = 0.00$) and infrastructure. The study determined that there was an increase in health seeking behavior in the district demonstrated by consistent growth in the number of expectant mothers' visiting ANC clinic and their enrolment to PMTCT services. Services are influenced by level of education, income, human resource and infrastructure. A gap exists between enrolments and testing of the mothers in PMTCT. Lack of well coordinated linkage and referral protocols influence the program negatively. There is need for further research in the area. Frequent deliberate, robust and aggressive campaigns through rapid response community mobilization initiatives and media are recommended as they will assist in increasing PMTCT uptakes.

CHAPTER 1: INTRODUCTION

1.1 Background Information

Each year, around 370,000 children under 15 years of age become infected with HIV (De Cock *et al.*, 2000). Almost all of these infections occur in developing countries, and more than 90% are the result of mother-to-child HIV transmission. Mother to child (MTCT) HIV transmission can occur during pregnancy, labour and delivery, or breastfeeding. Without interventions, there is a 20-45% chance that a baby born to an HIV-infected mother will become HIV infected. Most infant HIV infections can be averted but the problem is that very few of the world's pregnant women are being reached by prevention of mother-to-child HIV transmission (PMTCT) services. Prevention of mother-to-child HIV transmission programs include preventing unplanned pregnancy, use of safer child delivery methods, provision of ARV medicines prophylaxis to high risk mothers, counseling in breastfeeding for those mothers who are HIV infected and provision of clinical care and support services to other eligible members of the family. These measures can reduce the risk of HIV transmission from mother to child to below 2% (De Cock *et al.*, 2000).

Recognizing this potential, the member states of the United Nations General Assembly Special Session on AIDS (UNGASS) set targets for preventing mother-to-child HIV transmission in 2001. In this document the world's leaders made the following pledge: reduce by 20% the proportion of infants who are HIV infected by the year 2005 and by 50 per cent by the year 2010. In order to achieve this target, 80 per cent of pregnant women must access antenatal care services, including counseling and testing on HIV (UNAIDS, 2006).

Prevention of mother-to-child HIV transmission (PMTCT) is a comprehensive program

comprising of family-centered spectrum of clinical care and supportive services. The services are provided in conjunction with public health initiatives. The ideal objective of the programme is to prevent HIV transmission from high risk expectant mother to her infant. The programme does not attach any blame to the mother but suggests shared responsibility to both partners. The goal is to assist expectant mothers know their HIV sero-status through counseling and testing (MOH, 2005). Mother –to-child HIV transmission (MTCT) remains a major public health challenge world wide especially in developing countries where more than 96% of people living with HIV/AIDS (PLWA) live globally (UNAIDS, 2006).

Human Immunodeficiency Virus Transmission in Children was first recognized in 1983. It was believed to be transmitted through vertical transmission from mother to child (WHO, 2002). Two years later possibility of transmission through breastfeeding was acknowledged (WHO, 2002). In 1994 it was demonstrated by Pediatric AIDS Clinical Trials Group (PACTG) that zidovudine (AZT) can reduced HIV vertical transmission by 68% (Connor *et al.*, 1994). This became the turning point in the management of mother to child HIV transmission prevention activities. The result of short course zidovudine conducted in Thailand in 1998 also confirmed that the use of antiretroviral medicines can prevent perinatal transmission of HIV in resource limited settings (Shaffer *et al.*, 1999).

Prevention of Mother-To-Child HIV Transmission Program was launched in 1999. The effort was a joint initiative organized by United Nations Joint Acquired Immunodeficiency syndrome (UNAIDS) Secretariat, United Nations Fund for Population Activities (UNFPA), United Nations International Children Education Fund (UNICEF) and World Health Organization (WHO). The program was established under an Inter Agency Task Team (IATT) (Baek *et al.*,

2003) for ease of coordination and management. In order to enhance coordinated leadership in PMTCT, IATT proposed to undertake the following activities: prevent HIV infection in women of child bearing age 15-49 years; prevent unintended pregnancy among HIV-infected women; reduce HIV transmission –from high risk pregnant and lactating women to their children and clinical care and support of women, children and families infected and affected by HIV and AIDS (Baek *et al.*, 2003).

The program of Mother –To-Child prevention in Kenya was initiated in the year 2000 as a pilot project but the National program was launched in the year 2001 (NASCO, 2005). Out of 1253 facilities capable of implementing PMTCT program, 600 had initiated PMTCT activities by the year 2005 representing 47%. The services of PMTCT rose from 1000 women in 2001 to 265,000 in 2005 representing an increased coverage rate of more than 22% of all eligible pregnant mothers in the country (NASCO, 2005). Through in-depth literature review, the study has found that HIV mitigation efforts are compounded by many challenges. They include socio-cultural issues for example wife inheritance, stigma and discrimination; socioeconomic factors and attitudes of the people including health care workers. Inequity in resource distribution has made PMTCT infrastructure not accessible affecting greatly trend and coverage of the programme (De Cock *et al.*, 2000).

1.2 Problem Statement

Nakuru district has all it takes to be one of the districts in the Rift Valley with the highest rates of HIV prevalence in Kenya yet in the year 2007 the prevalence rates of HIV was 3% as recorded in the district's health information management system compared with 5.1 % National prevalence rate (NASCO, 2008). The economic activities in the district include farming,

hawking, casual labour especially from construction industry, and artisans most of whom earn less than one dollar a day. The district also lies within the great Rift Valley and borders Kericho, to the west, Koibatek and Laikipia, to the north, Nyandarua to the east, Narok to the south west and Kajiado and Kiambu to the south where all economic activities are subsistent farming. Nakuru District is the gate way to Western Kenya, great lake region, the industrial hub of the vast Rift valley Province and the great north road passes through Nakuru town. All these are activities that increase human traffic in the town and HIV infection vulnerability.

Despite the impressive prevalence rate of 3% in 2007, the program has not been assessed since it was started in the year 2002. The (PMTCT) program provides the best chance to prevent HIV positive women from transmitting HIV to their children. Through Prevention of mother to child HIV transmission program the study assessed the trend, coverage, PMTCT utilization and factors that influenced the program's management. These activities reflect HIV pandemic preventive activities in the district and their effectiveness has a direct bearing to effective mitigation of the HIV and AIDS in the district.

1.3 Justification

Mother –to-child HIV transmission is responsible for more than 90% of childhood HIV infections (MOH, 2005) and a threat to global child survival efforts. Comprehensive intervention measures are required to address primary preventions of HIV infections in the general population especially in women of active reproductive age (15-49 years), ensure safer delivery methods of the babies ensure safer breastfeeding methods of the child and establish linkages to Anti retroviral medicines care and support to both mother and child if eligible.

Every time an infant turns HIV positive it reflects prevention failure, questionable behaviour change and stigma. During the period understudy more than six thousands pregnant mothers were not enrolled in the PMTCT program. Inequity in resource distribution is a major cause of poor trend and coverage in many program .By evaluating the program it would be possible to establish the trend, coverage and utilization of the program's package. The current study assessed, evaluated and determined the factors influencing the PMTCT in Nakuru district. The result may also be considered for wide scale application in HIV/AIDS mitigation strategy.

1.4 Research Question

- a) What are the trends, and coverage of Antenatal Care Program in Nakuru District from 2003 to 2007?
- b) What are the trends, coverage and utilization of PMTCT program from 2003 to 2007 in Nakuru District?
- c) What are the factors influencing the PMTCT program management and uptakes in the Nakuru District?

1.5 Hypotheses

PMTCT program has contributed in HIV and AIDS mitigation efforts in Nakuru District.

1.6 General Objective

To evaluate management of Prevention of mother-to-child HIV transmission program in Nakuru District.

1.6.1 Specific Objective

- a) To establish the Antenatal Care (ANC) clinic trend and coverage, in Nakuru District from 2003 to 2007.
- b) To establish the PMTCT activities' trend and coverage in the Nakuru District from 2003 to 2007.
- c) To determine the factors that influence PMTCT activities in Nakuru District.

1.7 Significance and anticipated output

The study has documented ANC trend and coverage, PMTCT trend, coverage and utilization from 2003 to 2007. The factors that influence the trend and coverage of PMTCT program have also been determined by the study and results have shown the challenges that the program must face in order to achieve better and sound management. The study has also highlighted the areas of concern in the program especially men involvement in PMTCT activities and suggested ways of addressing them for better results and program sustainability.

1.8. Assumptions of the study

It was assumed that the respondents would be truthful in their responses to the questionnaires, the Health care workers would cooperate in responding to the focus group discussions and that proper data recording, entry and storage had been maintained since the inaugurations of the program in 2002.

1.9 Conceptual Framework

The conceptual framework (Figure 1.1) was developed from reviewed literature on knowledge,

attitude, coverage, acceptability and utilization of prevention of mother-to-child HIV transmission

Independent variables

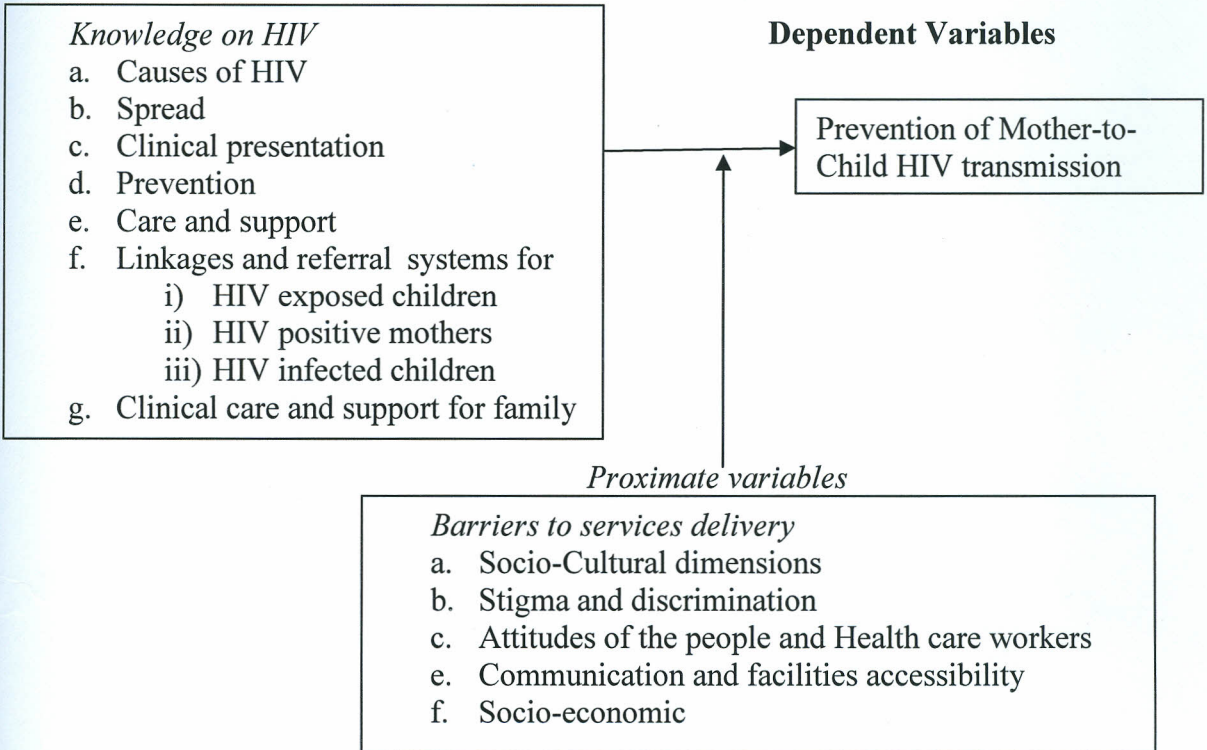


Figure 1.1: Conceptual Framework of PMTCT

1.9 Delimitation and Limitation of the study

The study was faced with several limitations including 2007 general election which polarized almost all social fabrics that hold society and community together making every activity involving ethnic and/or tribal linkage suspicious. This heavily weighed on the study because health services delivery depends on ethnic, historical and political representation (Walley *et al.*, 2001). However the study opted to avoid the ethnic questions but directed its efforts on the management of the PMTCT program. The random selection of the respondent attending the

ANC initially appeared not to provide a random sample. On critically assessing the issue the researcher observed that the expectant mothers attending the ANC clinic were coming on their own accord and interviewed on accepting to participate in the study therefore free from bias.

CHAPTER 2: LITERATURE REVIEW

2.1 Global Status of HIV and AIDS

The effects of Human Immunodeficiency Virus pandemic has impacted heavily on global social- economic and physical infrastructures. The pandemic has not spared individuals, families or communities especially those in developing economies and societies with limited resources. Combined with pervasive social stigma and the collapse of traditional family and support structures, HIV infection has greatly eroded the tenets that held society together. It has left both men and women vulnerable and exposed. By the end of the year 2005, over 40 million people including 17 million women and 2 million children under 15 years were living with HIV and AIDS in the world. Sixty three percent of these people were from sub-Sahara Africa (UNAIDS, 2006; www.unaids.org/EN/resources/epidemiology.asp).

Majority of the people living with HIV and AIDS are aged between 15-49 years. Fifty percent of these are women of child bearing age. The total number of deaths associated with HIV and AIDS in the world by the year 2005 alone was approximately 3 million and two million were from sub-Sahara Africa. In the same period about 5 million people -including 700,000 children less than 15 years of age acquired new HIV infections. Three million were from sub-Sahara Africa (UNAIDS, 2006). All over the world over three million children under 15 years were living with HIV by the end of 2002. Ninety percent of these children were in Africa, twenty five percent were projected to die within the first two years of life and seventy percent were projected to die before their fifth birth day (Gundel *et al.*, 2003).

Seven hundred thousand children acquired HIV from their mothers in 2005 alone (WHO, 2006). Ten percent acquired HIV during pregnancy, 10-20% during labour and delivery and

10-15% during breastfeeding (MOH, 2005). Of these, seven out of eight live in sub-Saharan Africa and most of the rest live in South and Southeast Asia (Baek *et al.*, 2003). The National HIV prevalence rate in Kenya for adults by the year 2004 was 7%. Out of these 9% were women compared to 5% men (MOH, 2005).

2.2 Status of Human Immunodeficiency Virus and Acquired Immunodeficiency Syndrome in Kenya

Nearly 40% of all HIV infections in Kenya live in urban areas and women are most vulnerable between the ages of 20-30 years (CBS, 2004). Over 1 million adults in Kenyans are infected with HIV, two thirds are women and over 100,000 children are living with HIV (ROK, 2005). Gender preference in 15-49 years age group shows that female preference is 8.7% compared with 4.6 % of men and the ratio was 1.9: 1 female/ male ratio (MOH, 2005). Approximately 85,000 adult and 30,000 children new HIV infections occur yearly while, over 140,000 deaths in adults and 30,000 deaths in children occur in Kenya yearly (CBS, 2004).

The high rate of infection in women aged 15-49 years (the reproductive age group) coupled with high birth rate translates into an estimated 50,000 - 60,000 children under five years of age infected with HIV per year (MOH, 2002). It is estimated that 65,000 adults and 25,000 children in Kenya became infected with HIV in 2003 (ROK, 2005). By the end of 2003, deaths among adults 15-49 years had tripled since 1990, 1.7 million children were orphaned (ROK, 2005) and life expectancy for Kenyans had dropped from 60 years in 1993 to 47 in the years 2004 (ROK, 2005). Acquired Immunodeficiency syndrome related diseases have reversed years of steady gains in child survival efforts and doubled infant mortality and morbidity rates in the worst-affected countries, Kenya included. Without interventions, there is a 20-45% chance that a baby born to an HIV-infected mother will become infected (NASCOP, 2002). Transmission of HIV

from a high risk mother to her child can be prevented almost entirely and has become rare in industrialized countries (WHO, 2002). The challenge requires a robust policy framework and infrastructure which can enhance and guide an effective response. It is necessary to realize AIDS-related morbidity and mortality especially among adult Kenyan women of child bearing age will continue to increase. There is need therefore to strengthen and increase access to PMTCT services.

2.3.1 Transmission of Human Immunodeficiency Virus

Human immunodeficiency viruses belong to a family of slow growing viruses called Lentiviruses in the genus of retroviruses. Two types of HIV exist namely HIV-1 and HIV-2. They are also subdivided into subtypes A, B, C, D, E among many others (CDC, 1993).

2.3.1.1 Horizontal Transmission of HIV

Ninety percent of all HIV transmission are acquired horizontally through sexual intercourse. The medium of transmission are semen, vaginal secretions or blood and blood product. The virus is transmitted as free viral particles in blood or within infected lymphocytes, monocytes and macrophages (CDC, 1993: <http://www.aidsmap.com>).

2.3.1.2 Vertical Transmission of HIV

Vertical transmission of HIV occurs perinatally from a HIV positive mother to her child (CDC, 1993: <http://www.aidsmap.com>). By comparison HIV-2 has low mother to child HIV infection rate compared to HIV-1 which can be transmitted perinatally in up to 42% cases (Grant and De Cok., 2001). However HIV-1 is more common in Kenya and East Africa while HIV-2 is predominately found in West Africa, Angola and Mozambique.

2.3.1.3 Vulnerability to HIV

Vulnerable persons to HIV infection include: babies born from HIV positive mothers, individuals with multiple sexual partners and practicing unprotected sex, recipients of unsafe blood, intravenous drug users, and people with Sexually transmitted diseases and men/women who practice unprotected anal sex (Lydie *et al.*, 2004). Post natal transmission of HIV-1 by breast milk is however more important because it approximately doubles the risk of mother to child transmission during breast feeding (Grant and De Cok., 2001).

Breastfeeding counseling is therefore necessary as a deliberate effort from the nurse/midwife to the high risk mother (Humphrey *et al.*, 2005). Its objective is to equip the mother with relevant skills and information to assist her in making informed choices on how to feed her child.

2.3.1.4 Pathophysiology

Human immunodeficiency virus enters white blood cell by attaching itself to the CD4 receptors. These receptors are found in white blood cells like lymphocytes, macrophages and monocytes. The cells are very important to the immune system. They protect the body from germs, remove cancer cells, and help the body fight infections. Monocytes and macrophages clean the immune system (CDC, 1993: <http://www.aidsmap.com>).

The process of attachment is facilitated by a molecule on the surface coat of HIV called glycoprotein of 120 KDa (gP 120; (CDC, 1992:<http://www.aidsmap.com>). It then reactivates other proteins in the white blood cell to complete its fusion in the human cell. After fusion, the virus converts its genetic code from RNA into DNA and merges with the human cell DNA.

Successful completion of the process allows the human cell to start produce new HIV building blocks- a process facilitated by an enzyme called reverse transcriptase.

Human immunodeficiency virus on entering the human immune cell starts to multiply inside the white blood cell. It destroys the cell by mechanically bursting them and releasing in the blood system millions of HIV particles capable of infecting equivalent white blood cell. When the process becomes repeated many times, the body is left exposed and unable to defend itself against other infections.

The short course therapy and prophylaxis used in prevention of mother-to-child HIV transmission inhibits the actions of the reverse transcriptase enzyme hence preventing translation of HIV RNA into DNA. Anti-HIV medicines disconnect the cycle by preventing production of HIV particles inside the human cell but they do not kill the virus, this action reduces viral load and the chances of the infected cell reproducing new HIV particles which would continue to infect many more immune cells (CDC, 1993:<http://www.aidsmap.com>). The medicines taken by the mother do not treat the mother nor can they prevent the child who is breast feeding from becoming infected by HIV. The mother is required to seek comprehensive clinical care services for assessment and initiation to ARV medicines if eligible. The child is required to take an ARV preventive course and be followed-up in the Child welfare clinic up to 2 years and linked to other supportive services if eligible.

2.3.2 Clinical Manifestation of Human Immunodeficiency Virus and Acquired Immunodeficiency syndrome

Sero conversion which is the development of antibodies to HIV happens within three month of the initial infection. It presents as flu-like illness with fever, rash and enlarged lymph nodes and during this period the antibody test is usually negative even though one is infected- the period

is also referred to as the window period. Rapid HIV testing confirms HIV infection from between six weeks and three months period (Kassler *et al.*, 1998). Once infected almost all people ultimately develop HIV- related diseases and acquired immunodeficiency syndrome (AIDS). The diagnosis of HIV infection can be made on the basis of clinical symptoms. A person who is HIV infected may develop symptoms of HIV as quickly as few months or remain asymptomatic for 15years or more depending on the immune status, character and the strain of the infecting virus (Justice *et al.*, 1989). During the symptomatic period the body's immune system weakens and CD4 cell counts decrease. The progression of HIV depends on the type of HIV infection and host's characteristics for example general health, and nutritional status. The CD4 count (adult normal range 600 and 1200 cell/mm³) is the number of CD4 cell in the blood and it reflects the state of the immune system and viral load reflects the amount of HIV viral particles in the blood. It is measured by HIV ribonucleic acid polymerase chain reaction assay (HIV-RNA PCR). Both CD4 count and viral load are two measures of progression of HIV (MOH, 2005). When viral load increases CD4 count decreases. When the CD4 cell count of an adult falls below 200 cells/mm³ (Panataleo *et al.*, 1993) the body becomes vulnerable to diseases that were otherwise dormant like Tuberculosis.

Acquired immunodeficiency syndrome is a complex that develops when the immune system of the body becomes completely compromised, becomes weak, susceptible and vulnerable to many opportunistic infections. Minor signs may include persistent cough for more than one month, generalized skin rashes, history of Herpes zoster, and oral pharyngeal candidiasis, among others. Major signs may include weight loss of more than ten percent, chronic diarrhea prolonged fever among many other signs (Grant and De Cok., 2001).

2.3.3 Staging of HIV infection and disease according to World Health Organization

Clinical manifestation of HIV and AIDS can be categorized in four Stages (MOH, 2005). It is based on World Health Organization (WHO) Clinical Staging and Disease Classification System (revised in 2005). Clinical manifestations can be recognized and treated by clinicians in diverse settings, including resource-constrained settings, and by clinicians with varying levels of HIV expertise and training. The staging can also be used readily in resource-constrained settings without access to CD4 cell count measurements or other diagnostic and laboratory testing methods. The staging is relevant especially in resource poor facilities which cannot afford CD4 count machine and therefore diagnosis is made on clinical presentation.

- a) Stage I: This is the asymptomatic stage with initial generalized enlargement of lymph nodes: The patient is capable of passing on an infective dose of HIV to an unsuspecting person (CDC, 1992: <http://www.avert.org/hivstages.htm>).
- b) Stage II: The stage comprises of unexplained weight loss of less than 10% of body weight, recurrent respiratory tract infection like sinusitis, tonsillitis, otitis media or pharyngitis, skin reactions like herpes zoster, popular pruritic eruptions seborrhea dermatitis and oral ulcerations like angular cheilitis recurrent oral ulcerations (CDC, 1992: <http://www.avert.org/hivstages.htm>).
- c) Stage III: The stage involves weight loss of more than 10% body weight, chronic diarrhea more than one month, unexplained persistent intermittent prolonged fever (longer than a month), Chest infections including Tuberculosis, oral ulcerations like persistent oral candidiasis, oral hairy leukoplakia, acute necrotizing ulcerative stomatitis, gingivitis or periodontitis, severe bacterial

infections like emphysema, pyomyositis, bone or joint infection, meningitis ; unexplained anaemia (below 8g/dl), neutropenia (below 0.5 billion/l) and/or chronic thrombocytopenia (below 50 billion/l) and bed ridden less than 50% of the day in the last one month (CDC, 1993: <http://www.avert.org/hivstages.htm>).

- d) Stage IV: The stage comprises of HIV wasting syndrome, Viral pneumocystic pneumonia, recurrent severe bacteria pneumonia, chronic herpes simplex infection (orolabial, genital or anorectic of more than one month's duration or visceral at any sites), Oesophageal candidiasis (or candidiasis of the trachea, bronchi or lungs), Extra pulmonary tuberculosis, Kaposi's sarcoma, Cytomegalovirus infection (retinitis or infection of other organs), Central nervous system toxoplasmosis, HIV encephalopathy, Intrapulmonary Cryptococcus including meningitis, Disseminated non-tuberculous mycobacterium infection, progressive multifocal leukoencephalopathy, chronic cryptosporiasis, Chronic isosporiasis, Disseminated myosis(extrapulmonary histoplasmosis, coccidiomycosis), Recurrent septicaemia (including non-typhoid Salmonella), Lymphoma(cerebral or B cell non-Hodgkin), Invasive cervical carcinoma, Atypical disseminated leishmaniasis, Symptomatic HIV-associated nephropathy or HIV-associated cardiomyopathy and bed ridden for more than 50% of the day during the last one month (CDC, 1992: <http://www.avert.org/hivstages.htm>).

2.3.4 Prevention of mother-to-child HIV transmission Essential Components

Essential components of PMTCT include, Community mobilization, routine ANC Health talk,

pre-test counseling, HIV testing, Post test counseling, Labour or Postpartum VCT and Short course ARV prophylaxis, Breast feeding counseling and follow-up support (Baek *et al.*, 2003). The two regimens in PMTCT include a single dose of 200 mg of oral Nevirapine to the mother at the onset of labour and 2mg/kg of oral Nevirapine to the infant within 72 hours of birth and a dose of 600mg Zidovudine taken orally by the mother at the onset of labour followed by 300mg every 3 hours until delivery and 4mg/kg of oral Zidovudine twice a day to the infant for seven days (MOH, 2002). These short-course treatments, combined with safer infant feeding, have the potential to save many tens of thousands of children from HIV infection each year

2.4 Control of Human Immunodeficiency Virus

Reducing the incidence of HIV infections requires comprehensive intervention measures. The measures include preventing new HIV infections in the general population. This targets women of child bearing age through supportive family planning especially to HIV infected women; preventing HIV transmission from women infected with HIV to their infants by providing them with ARV prophylaxis; provide care and support to HIV infected women together their children and other family members. The entry point to HIV prevention activities, clinical care and support is HIV counseling and testing. In order to achieve the optimum goal of preventing high risk mothers from transmitting HIV infection to their children, PMTCT activities must be able to overcome barriers to these interventions

2.5 Social Cultural Dimensions in PMTCT

Gender inequity increases women's vulnerability to HIV infection in three closely linked ways: there is inequity in economic opportunities for women which is entrenched through socio-

cultural practices and reinforced by the legal systems which make women to depend on men whose interests comes first especially when it comes to sexual decision making; women are also deprived of the right to have control over their own bodies hence unable to refuse sex and demand safer sex practices; some cultural practices for example female genital mutilation and wife inheritance are directly and immediately dangerous and can lead to HIV infection (AIDS in Kenya, 1996). In poorly resourced areas women exchange sex for favours, food or gifts and sometimes sex is demanded without protection (Daily Nation, 2009). Prevention of mother to child HIV activities empower women in child bearing age to make informed decision to not only prevent the child but also alleviate the suffering in the family set up.

2.5.1 Socio-economic Factors

Over 56% of Kenyans live below poverty line (CBS, 2004) and earn less than a dollar a day. About 75% of AIDS cases occur among adults between 20 and 45 years which is the most economically productive part of the population (CBS, 2004). Increased poverty level fuel the spread of HIV as it exacerbates poverty in households by forcing families to spend huge amounts of resources searching for cure or better care for their infected family members when the same resources could have been used to improve nutrition or education status of the family. Access to adequate food and palliative nutritional care and support prolong life and it has the potential to significantly postpone HIV/AIDS related illnesses and keep a person healthy and productive

Many studies in very poorly resourced areas have shown that high drop-out rates in PMTCT have been associated with poor women as they are given many other chores which deny them time to honour PMTCT re-visits. Many of them also live far away from health facilities and

have little access to transport (Wilfert., 2006). A third of these pregnant women do not attend ANC and nearly two-thirds give birth unattended by skilled health workers greatly reducing the number reached by PMTCT program (WHO, 2005). The issue is made worse when the health facilities are more than three kilometers away or distances where the roads are impassible and resources are required to access the facilities when need arises

2.5.2 Age and Sex

All pregnant women are sexually active with pregnancy peak age ranging between 20 and 29 years (AIDS in Kenya., 1996). Young women are more vulnerable to HIV infection with prevalence rate of 9% compared with young men with prevalence rate 2% in the same age group. The overall prevalence rate among women aged 15-24 years is 6 % compared with slightly over 1% among men in the same age group (NASCO, 2007). The greater vulnerability of HIV infection in women against men in the same age group can be attributed to biological, socio-cultural and economic factors. Prevention of HIV infection in women of childbearing age in general population therefore addresses risk factors like early sexual debut the median age being 17.8 years in women aged 20 and 29 years as reported KDHS of 2003 which biologically makes them excessively vulnerable to HIV infection.

Transmission of HIV is 90% heterosexual therefore the number of sexual partners in a relationship is important. Approximately 2 % of woman and 12% of men are reported to having more than one sexual partner within a twelve month period (CBS, 2004). In a (Daily Nation , 2009): (www.nation.co.ke) attributed to teenage girls aged 12-19 years, it was reported that youths were having sex with as many as six partners in six months and some even without

protection. In poverty stricken areas young people routinely exchanged sexual favours with food or gifts.

2.5.3 Marital Status

Widowed, divorced or separated women have higher rates of HIV infection compared with married and cohabiting couples (CBS, 2003). Kenya AIDS Indicator Survey released in 2009 (NASCO, 2008) reported that 45% of married couple showed HIV infection discordance. In KDHS report of 2003, 4% couples showed both partners were HIV infected. In 7% of the discordant couples 3% were men and 4% were women. In polygynous marriages the same report indicated that in 8 % cases of those who were HIV positive, all partners were HIV positive; but in 10% discordant couples in the same report only 1% men were HIV positive while 9% women were HIV positive. The report shows how vulnerable women are even in polygynous relationships. Marital status can greatly influence PMTCT program activities. From the high percentages of discordance, partner participation in PMTCT activities can greatly influence the program's outcome.

2.5.4 Human Resource factors

Human resource is the backbone of PMTCT activities and ultimately health services delivery (Raisler and Cohn., 2005). When mothers visit ANC facilities they undergo a series of steps (Figure 2.1) which lead to the ideal outcome of PMTCT –prevention of mother to child HIV transmission. The series indicate that in every step there can be drop outs. Information provided to the mothers depends on how skilled the health care workers are (Chopra. *et al.*, 2005). The drop-outs can be influenced by staff shortage and the number of mothers attending ANC at a particular time and period (UNICEF, 2003). When the number attending ANC overwhelms the

health care worker, the result can be disastrous as they will have little time to respond to questions and other necessary concerns of the client.

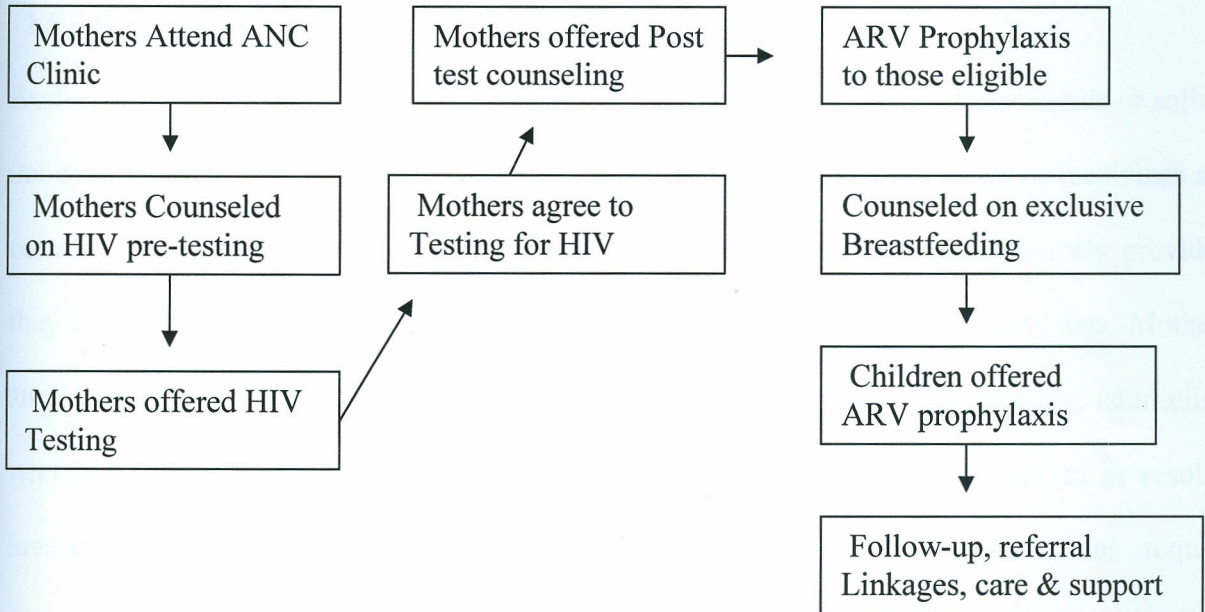


Figure 2.1 PMTCT Activities

From KDHS 2003, 88% of all mothers who sought ANC care were attended to by health care providers 18% by doctors and 70% by nurses and/or midwives. The remainder 12%, 2% received ANC care from traditional birth Attendants (TBA) while 10% never sought for ANC care. Over 50% of mothers who were pregnant delivered their babies at home and only 40% of mothers who were pregnant delivered under the care of a nurse/midwife or a doctor.

2.5.5 Education

The KDHS report indicates that those women with at least secondary education were more likely to seek ANC services, make more visits to ANC, more likely to listen to the radio, watch TV than those who had no education; these factors may influence PMTCT awareness beside health care workers (CBS, 2004). The percentage of those tested for HIV increased with

education level and wealth index. Women with no education are six times less likely to attend ANC or receive care from a doctor when compared with those with secondary education (KDHS 1998).

2.5.6 Breast feeding

Exclusive breast feeding means giving the baby only breast milk and no other liquids or solids, not even water. Drops or syrups consisting of vitamins, mineral supplements or medicines are permitted (Coutinho *et al.*, 2005). Virtually all mothers can breastfeed exclusively provided they have accurate information and support within their families and communities. Mothers attending ANC require skilled practical help from people trained in breastfeeding counseling who can help to build their confidence, improve feeding techniques and prevent or resolve breastfeeding difficulties (Haider *et al.*, 2000). After six months all babies require complementary foods while breastfeeding continues up to two years of age or beyond. Complementary feeds should be timely, properly fed, adequate and safe to the baby (WHO, 2006) to avoid complications like diarrhea disease. The advantages of breastfeeding include perfect nutrients which are easily digestible and efficiently used by the baby. Whey in breast milk protects the baby against infections. Breast milk

costs less when compared with artificial infant feeds (Latham *et al.*, 2000). In addition breastfeeding helps bonding between mother and her infant, helps to delay new pregnancy in the mother and protects the mother from uterine bleeding as well as reducing the mother's chances of acquiring both ovarian and breast cancer (WHO, 2006)

Breast milk from HIV positive mothers has also been proved to contain sufficient doses of HIV enough to course HIV infection in an infant especially when combined feeding is done (Humphrey *et al.*, 2005). As part of PMTCT, effective management of breastfeeding can

reduce HIV infection from high risk mother to her infant by between 15-20% (Grant and De Cok., 2001)

2.5.7 Attitude in PMTCT

The fear, shame, blame, lack of proper information concerning HIV infection's mode of transmission and lack of cure makes HIV and AIDS scourge very difficult to manage. It makes many people shy away from VCT sites (Painter *et al.*, 2004). The scourge is also associated with morality, challenging safer sex practices, discourages disclosure to partners, treatment support, and nutritional support, and inhibits psychological support and care to people living with HIV and AIDS. Stigma and discrimination in HIV either from self, others and especially healthcare workers can seriously influence PMTCT activities

The attitude of health care workers, morale and empathy are tenets that are very essential in management of health services delivery. Shortage of staff, poor capacity building and remuneration and inequity in resource distribution greatly influence health services delivery. One study in Côte d'Ivoire reported that a significant number of pregnant women who had been diagnosed with HIV were unwilling to take part in follow-up visits because they had bad experiences when dealing with health workers (Painter *et al.*, 2004).

2.6 Counseling and Testing (CT)

Counseling sessions focus's on risk assessment, risk reduction, referral and linkage to clinical care, and support services, therefore HIV counseling and testing (CT) is a deliberate effort that provides clients with an opportunity to confidentially explore the risks before them and help them make informed decision on HIV including learning their HIV sero-status.

The national Counseling and Testing Program in Kenya has four models of VCT service delivery: integrated, stand alone, community based (Van de Perre., 2000) and mobile special group, VCT sites. Routine health talks, HIV counseling and testing in Antenatal care clinics, maternal and child welfare clinics, maternity and labour ward help to reduce stigma (McKenna *et al.*, 2007; Anderson *et al.*, 2004) associated with HIV infection and can reach a high percentage of pregnant women (MOH, 2005). It also helped to integrate HIV and AIDS Program with other forms of health care services including reproductive health, sexually transmitted diseases, nutritional support and family planning (Anderson *et al.*, 2006). The guidelines have since been replaced with HIV testing and counseling guidelines. The guidelines are a strategy to bridge the gap between HIV testing and counseling and provider initiated approach (PITC) previously known as diagnostic HIV testing and counseling (DTC) (NASCO, 2008). Diagnostic HIV testing and counseling approach targeted only the sick people but PITC targets all patients and clients in the health facility.

2.6.1 Human Immunodeficiency Virus Testing

The guiding principles in HIV testing include confidentiality, informed consent, post test support and management of the client whether positive or negative (Anderson *et al.*, 2004). Normalizing HIV testing at Antenatal Care Clinic avoids the necessity for written informed consent. Counseling and testing for PMTCT is a flexible intervention integrated into several settings where pregnant women and women of child bearing age receive comprehensive services (Anderson *et al.*, 2006). The services include Antenatal care, labour and delivery, post natal and family planning. Preferred antenatal care testing strategy in Kenya is either routine or opt-out (MOH, 2005). Routine PMTCT settings help to normalize HIV testing, they are also

likely to increase the number of women tested. Opt-out strategy involves passing information about HIV testing to the client either in group or individual basis. It allows client to ask all questions to ensure she understands the content of PMTCT and unless she objects HIV test is performed.

Human immunodeficiency virus testing can be divided into three categories: Antibody detecting assays (Downing *et al*, 1998), Antigen and Viral tests assays and viral cultures (MOH, 2005). Samples are drawn from the whole blood, saliva or urine. Blood testing is the most common mode of testing.

2.7 Treatment of HIV and AIDS

Human immunodeficiency virus has no cure and those infected will almost always develop AIDS. The management of HIV includes prevention of further HIV infections, effective treatment of other opportunistic infection, Nutritional care particularly multivitamins, Clinical care and support activities, provision of ARV medicines to the client and addressing psychosocial issues in the clients life (MOH, 2001).

Evaluation of the patient is vital before initiating ARV medicines. The evaluation include basic tests like blood full haemogram (HB) differential counts, serum alanine aminotransferase (ALT/SGPT), serum creatinine, glucose, pregnancy test, CD4 count , sputum for (Acid fast bacilli) AFB. The parameters that may be affected by the ARVs can be done depending on the availability of laboratory services for example; bilirubin, amylase, serum lipids, screen for cervical cancer, hepatitis B and C serology, syphilitic tests (VDRL) and Viral load (MOH, 2005).

Other evaluations include weight, nutritional and social assessment for factors that may influence adherence, concomitant medications like traditional therapies, alcohol and use of non-prescribed drug use. There are four classes of ARV medicines in the management of HIV infection: Nucleoside Reverse transcriptase Inhibitors (NRTIs), Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs), Protease Inhibitors (PIs) and Entry Inhibitors (MOH, 2001).

The management of HIV in PMTCT includes provision of counseling and testing, provision of ARV prophylaxis to the mother and child, promoting safer delivery practices, support and counseling on safer infant feeding practices, providing treatment, care and support to women who are HIV-infected, their infants and their families (MOH, 2005).

The goal of ARV prophylaxis in PMTCT includes provision of maximal and durable suppression of viral replication, restoration and/or preservation of immunologic function, reduction of HIV related morbidity and mortality and improvement of the patient's quality of life (MOH, 2001). Antiretroviral medicines in the management of mother-to-child HIV transmission reduce viral replication, viral load; improve the mother's health hence decreasing the risk of transmission of HIV to the infant.

CHAPTER 3: MATERIALS AND METHODS

3.1 Study Design

The study was both descriptive and analytical cross-sectional survey of clients attending ANC clinic in Nakuru District. The study was conducted in Nakuru District in three phases: Phase one involved collection of the ANC and PMTCT secondary data from the six sampled health facilities in the district. The data was analyzed on the basis of trend, coverage and utilization of the PMTCT package; Phase two involved administration of questionnaires to ANC expectant mothers selected randomly from the six sampled health facilities. The questionnaires enquired from the expectant mothers among other issues; demographic and socio-cultural information, knowledge on HIV infection- prevention and management of the PMTCT elements; Phase three involved interview schedules to key informants and focus group discussions from health care workers from the six sampled sites in the district. Both key informants and focus group discussion participants were selected purposively to inject in the study qualitative information not captured through observation or in the questionnaires.

3.2 Study Area

Nakuru district (Figure 3.1) has three divisions namely Rongai division, Mbogoini division and Nakuru Municipality division. It occupies an area of 10,916² km and a population of approximately 500,000 people in 3,620 households. One hundred and twenty thousands (120,000) (24%) are women of active reproductive age (15-49 years) and approximately four percent (18, 855) pregnancies occur per year. The district has a fertility rate of 6.6 per 1000, crude birth rate 13.8 per 1000, growth rate of 3.4%. The HIV prevalence rate is 3 % and literacy rates 91.29% as reported by Nakuru DHMIS (2007).

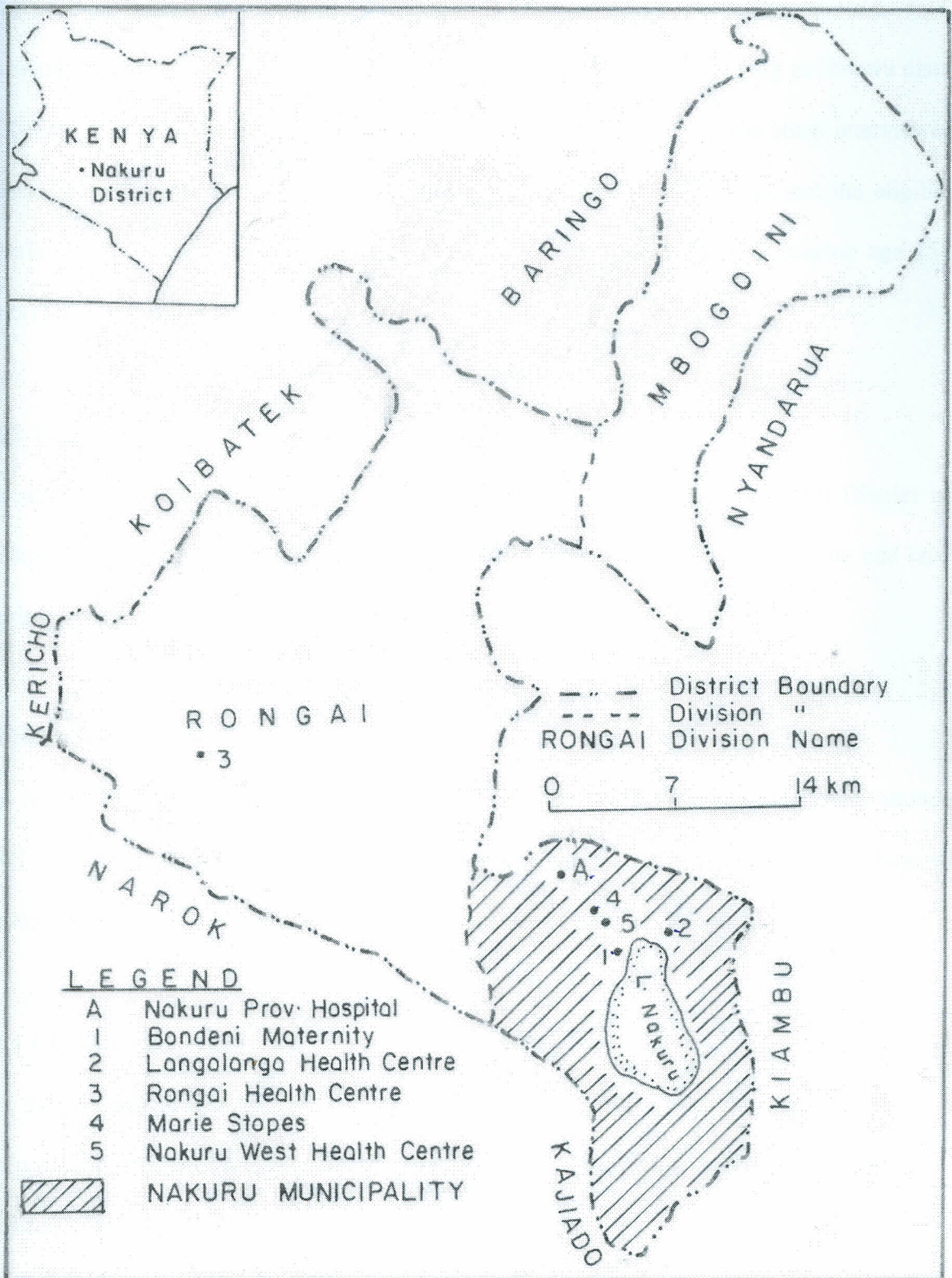


Figure 3.1: The Map of Nakuru District (the study Area) (DHMIS, 2007)

3.2.1 Study Population

The study population was twenty four percent (120,000) of the people living in Nakuru district (120,000) aged 15-49 years which is the active reproductive age group. The study interviewed Clients attending Antenatal care clinics in the six sampled facilities who met the eligibility criteria as highlighted below. The study population was women of child bearing age 15-49 years (120,000) of the total population.

3.2.2 Target Population

The study interviewed approximately 3.9 % of 500,000 people in the Nakuru District who become pregnant per year. Clients attending ANC and those admitted in maternity and labour wards in the sampled facilities in Nakuru District were interviewed.

2.3 Inclusion criteria

The respondents who were included in the study were those who were pregnant, attending ANC clinic or maternity ward during the period under study, not incapacitated and those who showed their willing to take part in the questionnaire by signing the a consent form.

3.2.4 Exclusion criteria

The respondents excluded from the study included mothers not pregnant, pregnant but incapacitated, pregnant but not attending ANC and those attending ANC but not willing to be included in the interview schedule by not signing the consent.

3.3 Sampling Methods

The study employed two sampling techniques simple random sampling method and purposeful sampling method. Simple random sampling method was used to select the health facilities and ANC attendees. Purposive sampling method was used to identify the two divisions in Nakuru district where the sampled Health facilities were selected from and Health care workers who participated in the focus group discussions and key informants.

3.3.1 Administration of Questionnaires

The Questionnaires were administered to the ANC respondents with the help of trained research assistants. The respondents were identified through simple random selection at the ANC clinic.

3.3.2 Focus Group Discussion

Focus group discussions (FGD) and key informant interviews were carried out with the Health care workers at the clinics. They were aimed at providing qualitative information, clarifying perceptions of the PMTCT in the District, management challenges and assisting the researcher in capturing other concerns that were not addressed by the questionnaires or secondary data.

3.4 Sample Size Determination

The minimum sample size was obtained using formula (Fisher *et al.*, 1998) as follows:

$$N = Z^2 pqD / d^2$$

N= is the desired sample size.

Z= normal deviate (1.96)² which corresponds to 95% confidence interval

p= proportion of the target population estimated to have desired characteristics: 3.9 %

$$q = 1 - p$$

$$d = \text{degree of freedom} = (0.025)^2$$

$$D = \text{desired effect} = 1$$

$$\text{Thus } N = (1.96^2 \times 0.04 \times 0.96 \times 1) / (0.025)^2$$

A minimum sample of 236 respondents was required but a sample of 256 respondents was collected to increase the spread and representation. The sample was then stratified according to the six sampled health facilities in Nakuru District.

3.5 Research Instruments

Data from the sampled health facilities from 2003 to 2007 was collected from each sampled health facility and compared with the data recorded and stored by the District's health information management system at the District Headquarters. It was cleaned and analyzed

Primary data was collected using questionnaires which were administered to the respondents by the research assistants through face to face interviews. Some questionnaires were semi structured in order to allow probing when required. Focus group discussions from health care workers and key informants for qualitative information were conducted at each of the sampled health facilities in the district. The variables used were ANC trend and coverage, PMTCT trend, coverage, PMTCT utilization, knowledge, awareness on PMTCT package and social demographic characteristics of the respondents among others. Health care workers' services were also evaluated as well as their attitude in order to further provide qualitative information on the management of PMTCT program in Nakuru District in mitigating HIV and AIDS effects.

3.6 Data collection Techniques

The research assistants were selected from Health care workers in the district strictly because the questionnaires were technical. They were trained on the administration of the questionnaires in both Kiswahili and English in order to minimize the errors. Pre-testing of the questionnaires with 10% of the respondents who did not participate in the study was conducted. The research assistants were closely monitored, supported and supervised on daily basis to ensure that the process and procedures were followed. The questionnaires were checked for omissions and inconsistencies, cleaned by running them through frequency distributions and corrections made where necessary before being analyzed.

3.7 Data Collection

The data collection was done with the assistance of six research assistants all selected and trained on research skill and emphasis made on the key issues in the data collection. The questionnaires (Appendix I) were administered through both Kiswahili and English languages to the respondents in the study. The aim was to increase the data quality and precision of the outcome. The sampled facilities were randomly selected two namely Nakuru Provincial General hospital (town) and Rongai health center (rural) representing government sponsored institutions, two from the municipality setup (Bondeni Maternity and Langalanga health center), one from Faith Based Organization (PCEA Nakuru West health center) and one Marie Stopes dispensary from Non Governmental Organization setup.

Sampling units were Ante Natal attendees in the selected health facilities who were expectant mothers in the active reproductive age between 15 and 49 years. The respondents came to the facilities on their own accord and were interviewed after they had been attended to by the

health care workers in the respective facilities. Six Focus group discussions (FGD) were held with the health care providers immediately questionnaires were completed in every sampled health facility in order to further clarify issues and observations made during the exercise. The discussions were based on the FGD guidelines (Appendix II). In depth interviews with the management of the program were also conducted with health administrator running the health facilities in the six sampled health facilities.

3.8 Ethical considerations

Kenyatta University School of Graduate School approved the research proposal (Appendix III), Informed consent was sought from the respondents (Appendix I) while confidentiality was ensured by use of codes instead of names. Nakuru Provincial General Hospital Ethical committee issued Ethical approval of the study (Appendix, VI) and clearance and research permit were obtained from Ministry of Health and Ministry of Education Science and Technology (Appendix VI, VII and VIII) as shown in the references.

3.9 Data Analysis

The completed questionnaires were checked for correctness of entries errors and the missing data. They were coded and numbered and pooled before entry into the computer software scientific package for Social Sciences (SPSS). The results were presented in descriptive form using frequency tables, cross tabulations and charts. Descriptive statistics such as frequency and mean were used. The Chi-square was used to assess associations in bivariate analysis while the logistic regression was used for multivariate analysis. Data from the in-depth interviews were used to qualify and increase accuracy on the inference.

CHAPTER 4: RESULTS

4.1 General Overview of the Study

A total of two hundred and fifty six expectant mothers were interviewed from six health facilities namely Nakuru Provincial General Hospital 31.3% (80), Rongai Health Center 19.1% (49), Bondeni Maternity 18.8% (48), Langalanga Health Center 16.8% (43), PCEA Nakuru West Health Center 9.4% (24) and Marie Stopes Clinic 4.7%(12) (Table 4.1). The facilities were randomly selected from two purposively selected divisions of Nakuru District namely Nakuru Municipality and Rongai Divisions. The two divisions were purposively selected because their population is more multi-culturally and socially represented in the district. The study aimed at assessing the Prevention of Mother to child HIV transmission (PMTCT) in Nakuru District and determining whether the program has been able to mitigate Human immunodeficiency virus and Acquired immunodeficiency syndrome (HIV and AIDS) effects in the district. The study assessed ANC and PMTCT trend, coverage and utilization and how they contributed in the management of HIV and AIDS in the study area.

Table 4.1: Respondents' distribution in each health facility

Health facility	Frequency (n)	(%)
Nakuru Provincial General Hospital	80	31.3
Rongai Health Center	49	19.1
Bondeni Maternity	48	18.8
Langalanga healthCenter	43	16.8
PCEA Nakuru west Health Center	24	9.4
Marie Stopes Dispensary	12	4.7
Total	256	100.0

4.2 Demographic information

The assessment of the demographic and social cultural characteristic of the study will cover the following areas respondents' distribution by facilities, age distribution, age of pregnancy, marital status, and number of sexual partners, income level, occupation, education levels and religious affiliations of the respondents.

4.2.1 Respondents Age distribution

Among those who responded 52.3% (134) were aged 15-24 years, 42.2% (108) were aged 25-34 years while 5.5% (14) were aged 35-44 years. Significantly high proportions (80.3%) of those aged between 25-44 years were counseled and tested compared with low proportions (51.9%) of those aged 15-24 years (Figure 4.1: $\chi^2 = 11.33$, $df=2$, $p=0.003$).

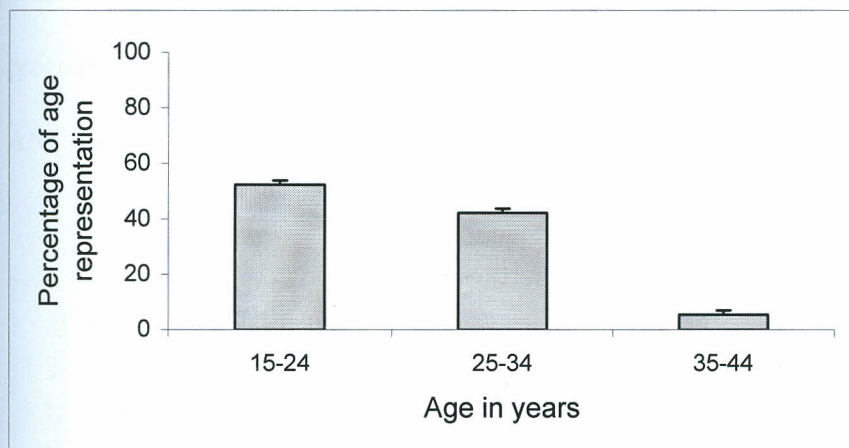


Figure 4.1: Respondents' Distribution by age

4.2.2 Respondents' distribution by Stage of pregnancy

Among the respondents 59.2% (148) were in the third trimester, 34.4% (86) in the second trimester while 6.4 % (16) were in the first trimester this was consistent across the health facilities.

Significantly high numbers of mothers in the 15-24 years age group made ANC visits many times (49%) compared to the fewer number of visits (46%) for those aged 25-34 years. No statistical association was observed between the number of times mothers visited ANC and age of pregnancy (Figure 4.2; $\chi^2 = 13.229$; d f = 12; p = 0.353).

The number of ANC visits made by the mothers was also cross tabulated with facilities and a significant inter facility association was observed ($\chi^2 = 41.117$; d.f = 20; p = 0.035) where Marie Stopes (55.6%), Bondeni Maternity (46.4%), Langalanga health center (45.2%), PCEA Nakuru West health center (44.4%) had recorded high number of visits compared with fewer number of visits at Nakuru Provincial General Hospital (23.7%) and Rongai health center (37.8%) ($\chi^2 = 6.691$, d f = 2, p = 0.035). However when the first ANC visit was tabulated with the Stage of pregnancy there was statistical significance as most of the mothers interviewed had visited ANC for the first time during the third trimester (Figure 4.2: ($\chi^2 = 11.120$; df = 4; p = 0.025).

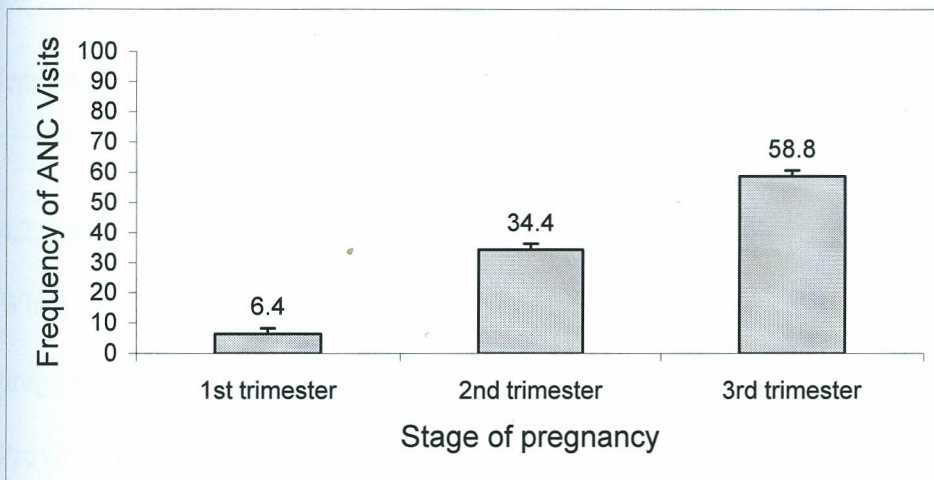


Figure 4.2: Respondents' distribution by Stage of pregnancy

4.2.3 Respondents' distribution by Marital Status

Majority 81.9 % (208) of the respondents were married compared with 16.1% (41) not married, 1.6% (4) separated while 0.4% (1) were divorced. On the number of sexual partners, 95.7% conceded having one partner, 2.7% two partners and 0.8 % had many partners. Significant high number of those not married and separated had more than one partner compared with those married and divorced they were also more counseled and tested compare with the married respondents (Table 4.2: $X^2 = 22.37$; d f- 6; p0.001).

Table 4.2: Respondents' distribution of the on marital status

	Frequency (n)	Percentage	Counseled (%)	HIV Tested (%)
Married	208	81.9	78.2	58.7
Divorced	1	.4	100	100
Not married	41	16.1	87.8	68.3
Separated	4	1.6	100	100

4.2.4 Respondents' distribution by sexual partners

When the respondents were asked about the number of sexual partners in the current pregnancy, significantly more than expected expectant mothers at Marie Stopes and Nakuru Provincial General Hospital agreed to having had more than one partner (Figure 4.3: $X^2 = 28.005$; df 10; p0.002) when compared with other facilities. Those with many partners were aged between 15 and 34 years, not married, did business or not employed, earned < ksh 2000 and they had either primary level or secondary level of education.

Table 4.3: Respondents' distribution by sexual partners

No. Sexual partners	Frequency (n)	Percentage (%)
One	245	95.7
Two	7	2.7
Many	2	.8

4.2.5 Respondents' distribution by level of Income

Majority of those who responded to the questionnaire on income levels, 19.5% (50) were earning a monthly income of Ksh 2000 followed by 18% (46) earning ksh 2100-5000 with least 3.5% who were earning >Ksh. 20,000. Significantly low numbers of those earning < ksh 2000, 44% were tested for HIV compared to 63.6% of those earning > ksh 2000. Statistically significant high numbers of those earning < ksh 2000 56% were residing > 3km away from PMTCT facility compared with those earning > ksh 2000 (Table 4.4: $\chi^2=13.317$, $df =4$, $p=0.010$; $\chi^2=22.623$, $df =12$, $p=0.031$).

Table 4.4: Respondents' distribution by level of income (ksh)

Income	Freq (n)	N (%)	Counseled (%)	HIV Tested (%)
< 2000	50	19.5	74.0	44.0
2001-5000	46	18.0	82.6	63.6
5001-10000	25	9.8	80.0	60
10001-20000	15	5.9	100	86.7
over 20001	5	2.0	100	100

4.2.6 Respondents' distribution by Occupation

Most 45.2% (112) of the respondents were housewives as compared to 23% (57) who were conducting business, 22.6% (56) were employed and 9.3% (23) were not employed. No statistical significance was observed between those not employed and counseling and testing when they were compared with housewives (Table 4.5: $\chi^2=7.610$, $df=3$, $p=0.055$).

Table 4.5: Respondents' distribution by occupation

	Frequency(n)	N (%)	Counseled (%)	HIV Tested (%)
Business	57	22.3	86.0	60.7
Not employed	23	9.0	95.7	77.3
Employed	56	21.9	81.8	73.2
Housewife	112	45.2	73.9	52.3

4.2.7 Respondents' distribution by level of Education

On level of education, 39.8% (102) of the respondents, had attained secondary level of education compared with 36.5% (93) who had attained primary level, 19.6% (50) Tertiary level, 2.7% (7) University level and 1.2% (3) Other levels of education. Significantly low numbers of those in primary level had been counseled and tested compared with higher numbers of those in secondary level tertiary level and university level (Table 4.6: $\chi^2=11.509$, $df=4$, $p=0.021$ and $\chi^2=12.320$, $df=4$, $p=0.015$).

Table 4.6: Respondents' distribution by level of Education

	Frequency (n)	N (%)	Counseled (%) (%)	HIV Tested
Primary	93	36.3	71.0	52.2
Secondary	102	39.8	82.2	59.2
Tertiary college	50	19.5	91.8	76.0
University	7	2.7	100	100
Others	3	1.2	66.7	66.7

4.2.8 Respondents' distribution by Religion

On religion, 35.9% (92) of the respondents were from Pentecostal churches, 26% (65) were from Roman Catholic faith, 12.8% (32) from Evangelical churches, 10% (25) were from Anglican, 4.4% (11) were Muslim and 10% (25) were from other denominations. There was no significant association between religion and the number of the respondents counseled and tested (Table 4.7: $\chi^2=5.708$, d f=5, p=0.336).

Table 4.7: Respondents' distribution by religion

	Frequency (n)	N (%)	counseled (%)	HIV Tested (%)
Muslim	11	4.3	81.8	72.7
Roman Catholic	65	25.4	76.9	64.1
Evangelical	32	12.5	81.3	54.8
Pentecostal	92	35.9	80.4	58.9
Anglican	25	9.8	97.7	78.3
Others	25	9.8	70.8	50.0

4.3 Ante-Natal Care clinic trends and coverage in Nakuru district from 2003-2007

From the secondary data, ANC visit varied from facilities to facility and from year to year. Secondary data from the sampled sites show that there was no PMTCT data recorded at Rongai health center, Langalanga health center, Bondeni maternity, PCEA Nakuru West health center and Marie Stopes dispensary in the years 2003 and 2004 and that PMTCT services were only offered at Nakuru Provincial General Hospital, expansion of PMTCT services started in the year 2005. Marie Stopes clinic and Bondeni maternity show's an increase of ANC attendants from 2005 to 2007, compared with PCEA Nakuru West health center, Langalanga health center, Nakuru Provincial General Hospital and Rongai health center showing minimal fluctuation of ANC attendance.

There was no statistical association observed between facilities and years when 2002-2007 was cross tabulated with the sampled health facilities ($\chi^2= 15.39$, d f=8, p =0.143). Most of the sampled facilities did not run PMTCT services until 2005. The program (PMTCT) was decentralized in 2005. But when facilities were cross tabulated against each other there was significant statistical association between the facilities where some facilities showed consistent increase in number of attendance while others fluctuated over the years (Figure 4.3: $\chi^2= 8035.21$, d f=5, p<.001).

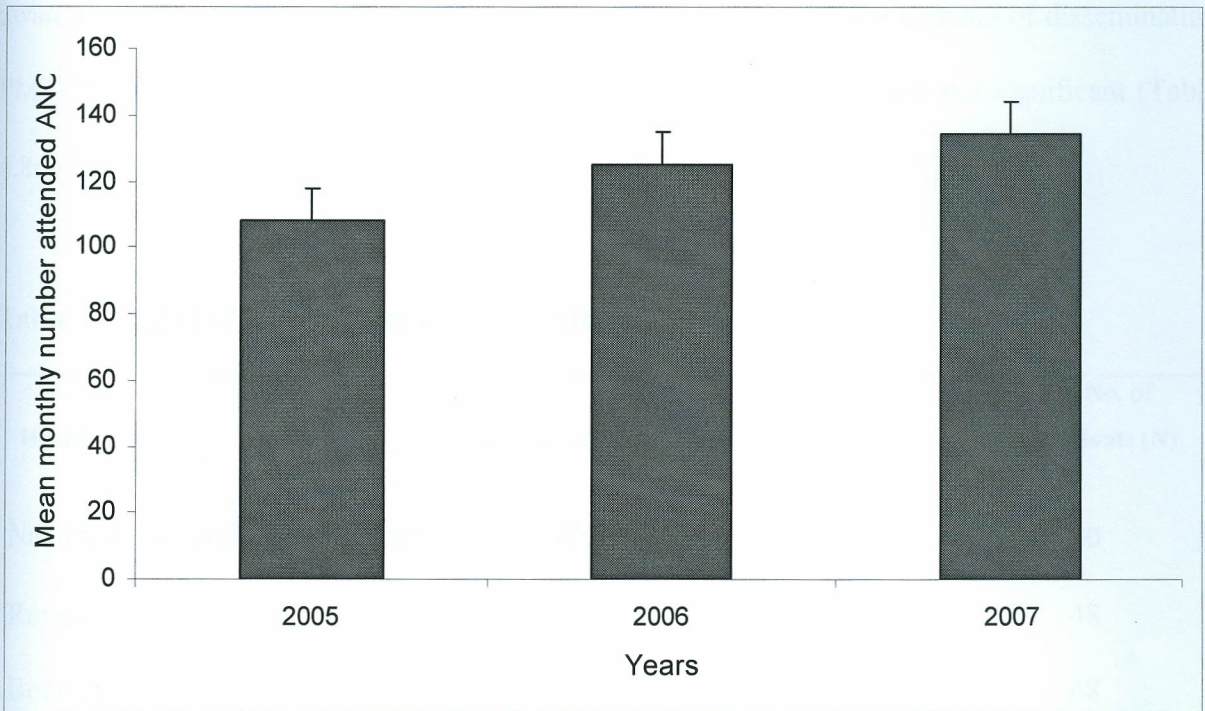


Figure 4.3: Average monthly numbers of pregnant mothers attending ANC in Nakuru district.

4.4 Prevention of mother to child HIV transmission Trends, Coverage and utilization

The PMTCT program in Nakuru district started as a pilot project in 2002 at Nakuru Provincial General Hospital. Expansion of PMTCT activities in the district started in 2005 and currently there are 42 facilities providing PMTCT services in the district with an average of 4,600 ANC visits made to these facilities every month. Nakuru provincial General hospital hosts the largest number of visits.

4.4.1 Awareness of Prevention of mother to child HIV transmission

From the primary data, the awareness level of PMTCT services was 88.5%, as 224 respondents had heard about PMTCT, compared with 11.5% who had not. This was consistent across the six sampled health facilities, but there was no significant statistical association between

awareness of PMTCT and health facility as all health facilities were capable of disseminating PMTCT services equally, hence the margins of differences noted were not significant (Table 4.8: $\chi^2 = 7.204$, d f = 5, p = 0.206).

Table 4.8: PMTCT Awareness in each health facility

Health facility	Yes (%)	No (%)	Total No. of Respondents (N)
Nakuru Provincial General Hospital	81.3	18.8	80
Rongai Health Center	89.6	10.4	48
Bondeni Maternity	95.8	4.2	48
Langalanga health Center	90.5	9.5	42
PCEA Nakuru west Health Center	91.7	8.3	24
Marie Stopes Dispensary	90.9	9.1	11
Total (n)	224	29	253
%	88.5%	11.5%	100.0%

4.4.2 Source of Information on PMTCT services

When respondents were asked on source of information on PMTCT services, majority 65% of the respondents conceded having acquired the awareness from health care workers. However significantly high proportions 27% of the respondents accepted having acquired PMTCT awareness from media and friends compared with health care workers and seminars (Figure 4.4: $\chi^2 = 49.29$, df = 25, p = 0.003).

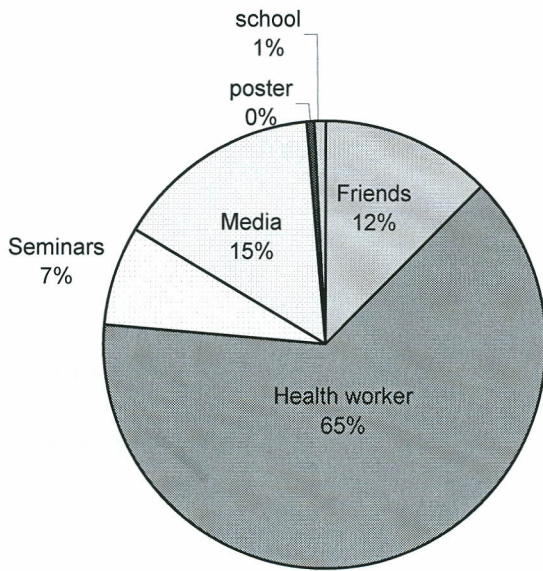


Figure 4.4: Sources of Information on PMTCT services

4.4.3 Enrolment to PMTCT program

Majority 67.6% (173) of those who were aware about PMTCT had enrolled compared to 27.3% (70) who had not enrolled. Significantly high proportions of mothers from Rongai health center(81.6%), Langalanga health center(75%), Provincial General Hospital(73.7%) and PCEA Nakuru West health center (81.8%) had enrolled compared the low enrolment in Bondeni Maternity (54.2%) and Marie Stopes (50.0%).(Table 4.9: $\chi^2= 13.713$, $df=5$, $p=0.018$).

Table 4.9: PMTCT enrolment in each sampled health facilities

Health facility	Yes (%)	No (%)	Total participants(N)
Nakuru Provincial General Hospital	73.7	26.3	76
Rongai Health Center	81.6	18.4	49
Bondeni Maternity	54.2	45.8	48
Langalanga health Center	75.0	25.0	36
PCEA Nakuru west Health Center	81.8	18.2	22
Marie Stopes Dispensary	50.0	50.0	12
Total (n)	173	70	243
%	71.2%	28.8%	100.0%

4.4.4 Counseled and tested in PMTCT based on the sampled facilities

From the primary data high number of respondents were counseled (p; 0.017) and tested (p; 0.002) in Langalanga Health Center, Marie Stopes and PCEA Nakuru West Health center compared with low number of respondents that were counseled and tested in Nakuru Provincial General Hospital, Rongai Health center and Bondeni Maternity (Table 4.10). These facilities are attended by large number of ANC clients and have few health care workers.

Table 4.10 Percentage of the respondents counseled and tested in each facility

	Counseled (%)	Tested (%)
Nakuru Provincial General Hospital	69.6	53.2
Rongai Health Center	79.6	63.8
Bondeni Maternity	79.2	48.9
Langalanga Health Center	95.3	61.9
PCEA Nakuru West Health Center	91.3	91.7
Marie Stopes Clinic	91.7	83.3
P value	0.017	0.002
N	204	153

4.4.5 Mothers Tested for HIV

Amongst those enrolled, 61.4% were tested for HIV as compared to 38.6% who had not. High proportions 91.9% of those who had not taken VCT were willing to take a test for the sake of their child as compared to 6.4% who would not. The number of those tested for HIV over the years shows a gradual increase from 2003 to 2007, period covered in the current study. Mean annual number tested was as follows 55.3, 55.7, 79.9, 82.0 and 84.9 from the year 2003-2007 (Figure 4.5). The number of mothers who tested HIV positive reduced from 10% in 2002 to 8.5% in 2007 as shown in the figure below (Figure 4.6) the graphical trend of HIV positive mothers in the years understudy.

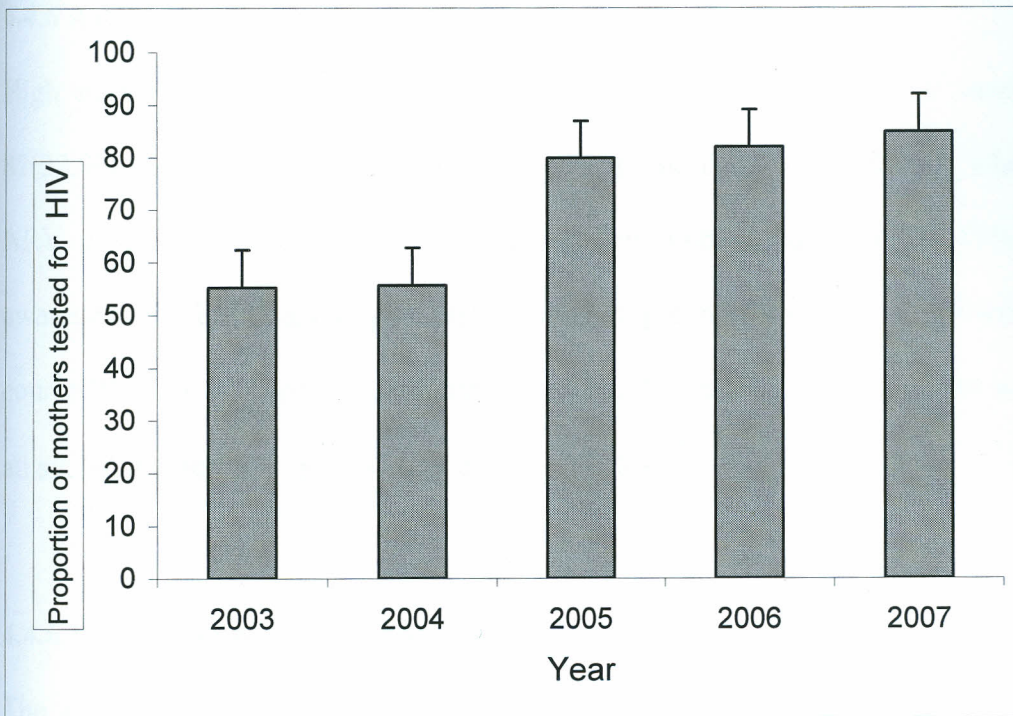


Figure 4.5 Percentage of expectant mothers tested for HIV-AIDS in the period 2003-07

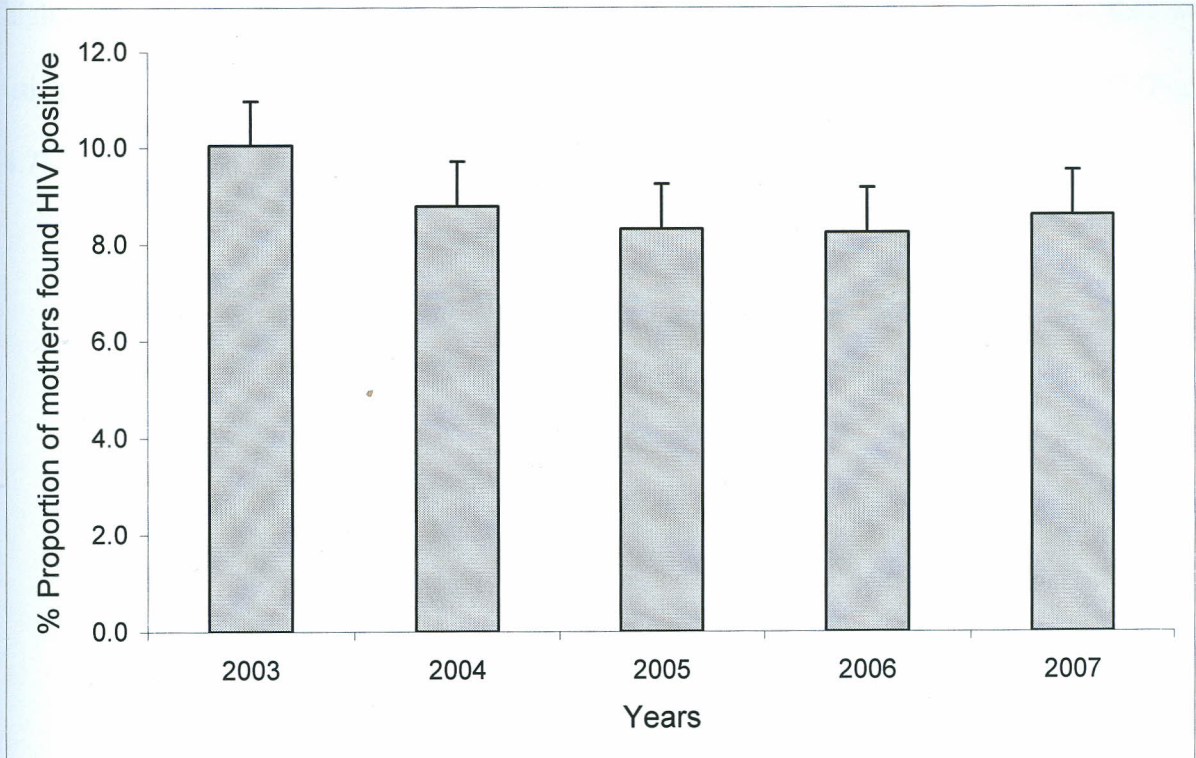


Figure 4.6: Trend of HIV positive expectant mothers in Nakuru district

4.4.6 ARV Prophylaxis awareness

High number of the respondents 167 (67.1%) were aware of ARV medicines and only 82(32.9%) who were not. Significantly high proportions 81% of those who were aware of ARV drugs were likely to try and prevent their unborn babies while 19% would not .On awareness of ARV drugs prophylaxis to high risk pregnant mothers, 53.3% were aware of short course PMTCT prophylaxis as compared to 46.7% were not. These results were consistent in all six health facilities ($\chi^2= 24.286$, d f=5, p=0.000).

4.4.6.1 Mothers on ARV Prophylaxis

The proportion of mothers who were on short course ARV drugs in the sampled health facilities fluctuated from 100 % to 77.45 from inter facility comparison while when compared in years it fluctuated from 54.6% to 95.6%. The secondary data demonstrates a significantly high correlation ($p<0.001$, $0.888=88.8\%$) between HIV positive mothers and those that were using short course ARV drugs to prevent HIV transmission in children from 2003-2007 (Figure 4.7).

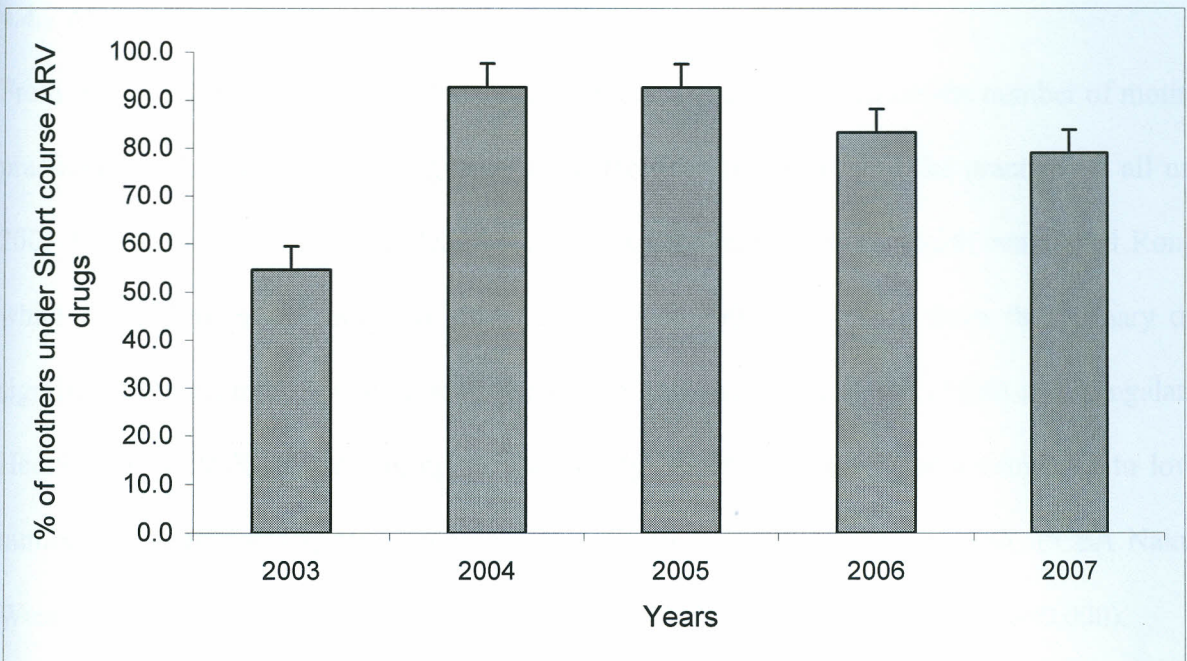


Figure 4.7: Percentages of mothers who were on ARV prophylaxis

4.4.6.2 Children from high risk mothers on ARV Prophylaxis

From the secondary data there was a highly significant correlation ($p < 0.001$; 78.9%) between HIV positive mothers and children who were put on ARV drugs prophylaxis this was consistent in all the six sample health facilities from 2003-2007 (Figure 4.8).

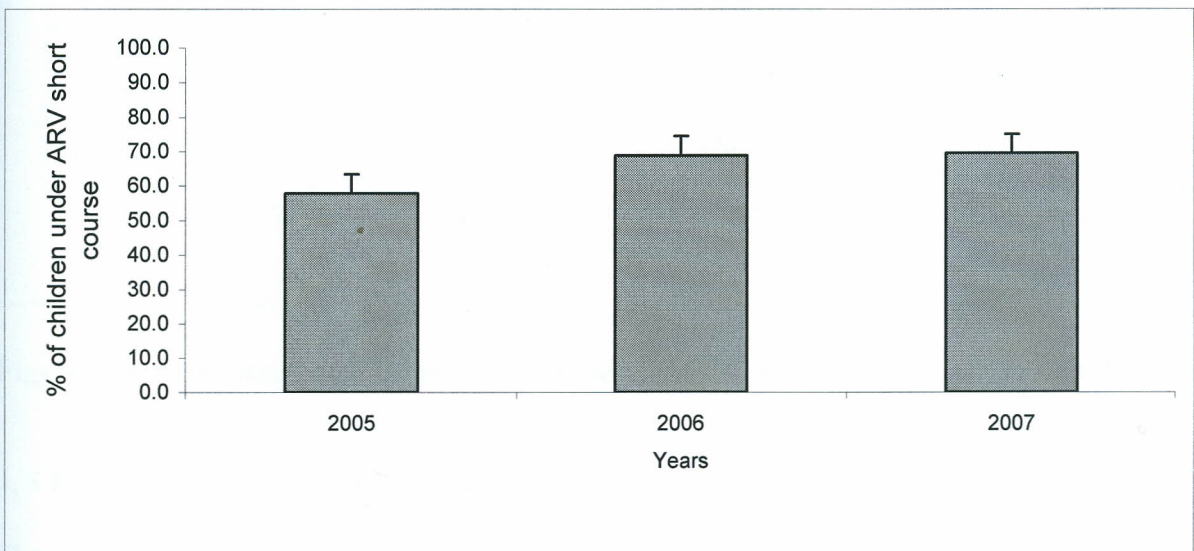


Figure 4.8: Percentage of children who were on ARV Prophylaxis

4.4.7 Mother practicing exclusively breastfeeding

From the secondary data collected since 2003 there was a slow onset on the number of mothers practicing exclusive breastfeeding with some facilities never starting the practice at all until 2007 for example Langalanga Health Center, PCEA Nakuru West Health center and Rongai while Marie Stopes did not have any data even in 2007. However from the primary data significantly high numbers of expectant mothers at Bondeni Maternity (90%) and Langalanga Health Center (93%) were willing to exclusively breastfeed their infants compared to lower numbers of high risk expectant mothers from Rongai Health Center (75.5%) PCEA Nakuru West H/C (78.3%) and Marie Stopes (66.7%) (Figure 4.9: $\chi^2 = 49.280$, $df = 15$, $p = 0.000$).

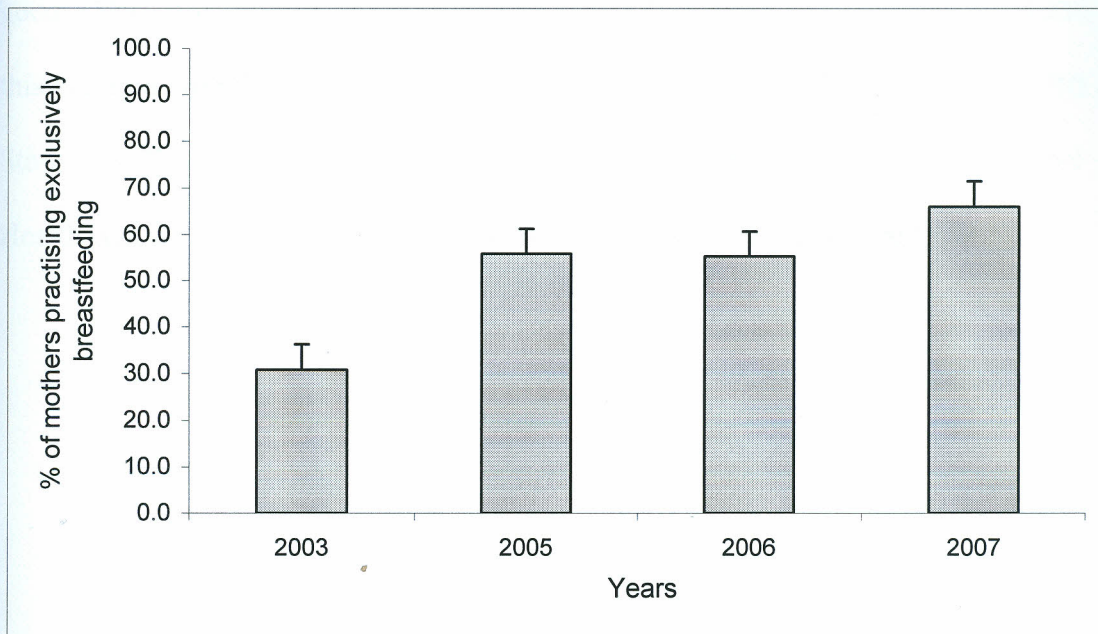


Figure 4.9: Percentage of HIV positive mothers exclusively breastfeeding across the years

4.5 Factors Influencing PMTCT Activities in Nakuru District

The study assessed various factors to determine their influence on PMTCT uptakes in the health district including human resource, accessibility to PMTCT facilities for example

distance from the respondents' homes to the PMTCT facilities, infrastructure, time and days of the week when services were offered, linkage and referral of clients and availability of ARV drugs among others.

4.5.1 Human resources

The human resource is the backbone of PMTCT services and therefore it was assessed in the following manner to determine the perception of the respondents in the study area.

4.5.1.1 Respondents' Description of the health care workers

Health care workers were described by respondents as mostly excellent 44.2% (110), mostly good 127 (51%), half good half marginal 3.6% (9) and mostly marginal 1.2% (3). However, this varied across the sampled health facilities with Bondeni Maternity 63.8% (20) and Marie Stopes 66.7% (8) rated their health care workers as mostly excellent compared to Rongai Health centre which only 6.3% (3) who rated them most excellent (Table 4.11).

Table 4.11: Respondents' description of health care workers

Health facility	Excellent (%)	Good (%)	Fair (%)	Poor (%)	Total Respondents (N)
Nakuru Provincial General H	46.2	52.6	1.3	0.0	78
Rongai H/Center	6.3	81.3	8.3	4.2	48
Bondeni Maternity	63.8	36.2	.0	0.0	47
Langalanga H/Center	58.5	39.0	2.4	0.0	41
PCEA Nakuru west H/Center	39.1	56.5	4.3	0.0	23
Marie Stopes Dispensary	66.7	8.3	16.7	8.3	12
n	110	127	9	3	249

4.5.1.2 Quality of Care during the last visit

On quality of care during the respondents last visit, 41.8% (97) rated health care offered as excellent, 50% (116) rate it as good and 8.2% (19) rated the quality of care as fair (Table 4.12).

This was consistent in all the sampled health facilities in the study.

Table 4.12: Respondents' description of quality of care during the last ANC visit

Health facility	Excellent (%)	Good (%)	Fair (%)	No respondents
Nakuru Provincial General H	35.5	60.5	3.9	76
Rongai H/ Center	12.5	68.8	18.8	48
Bondeni Maternity	58.1	35.5	6.5	31
Langalanga H/Center	45.2	47.6	7.1	42
PCEA Nakuru West H/ Center	79.2	16.7	4.2	24
Marie Stopes Dispensary	72.7	18.2	9.1	11
N	97	116	19	232

4.5.1.3 Health care worker Attitude

On the attitude of the health care worker, 58.6% (146) disagreed and 32.1% (80) strongly disagreed with the proposals that health care workers did not really care about the feeling of their clients at the ANC. Significantly high numbers of those attending Municipal health facilities, Faith Based Organization facilities and Private clinics were highly rated when compared with government sponsored facilities (Table 4.13: $\chi^2 = 103.453$, $df = 15$, $p = 0.000$).

The scores on figure 4.3 are results based on total responses of respondents based on facilities and they are experiences of the respondents during their last ANC visits

Table 4.13: The Facility based attitudes scores of the health care providers towards the respondents Based on Kruskal Wallis test

Health care providers do not really care about the feeling of their clients at the ANC clinic		
Health facility	N0. of Respondents	Scores Ranking
Nakuru Provincial General Hospital	77	100.9
Rongai Health Center	48	91.3
Bondeni Maternity	48	170.1
Langalanga health Center	41	123.2
PCEA Nakuru west Health Center	23	171.5
Marie Stopes Dispensary	12	150.8
Chi-square	5	64.135
p-value	0.000	

4.5.1.4 Health care workers Shortage

Except for the information on condom use which only 48% of the respondents required much more information, all the other topics which are important and relevant in management of PMTCT were

not addressed adequately as over 50% of the respondents required much more information (Figure 4.14). Health care worker could have been overwhelmed by their client and hence not able to address the various topics adequately.

Table 4.14: Additional information mothers needed in each topic

Topic	Doesn't apply (%)	None (%)	Little more (%)	Some more (%)	Much more (%)
PMTCT	1.6	2.8	10.8	19.7	65.1
VCT	2.8	7.6	12.4	17.4	59.4
Condoms use	8.5	8.9	15.4	19.1	48
Family planning	2.4	3.6	11.6	14.7	67.9
Breastfeeding	2.8	4	8	11.6	73.7
STD & HIV	2	3.6	8	15.3	71.1
Pregnancy & HIV	0.8	4.8	6.8	15.6	72
Nutrition and HIV	0.8	4.6	7.1	7.5	80.1
ARV & Pregnancy	2	6	7.3	14.5	70.2

4.5.1.5 Capacity Building and Networking

All the health care workers interviewed during Focus Group Discussions in the six sampled health facilities were current on how to address PMTCT activities and Key informants interview confirmed that administratively the health care workers they were supported. The health care workers attended frequent seminars and workshops to update themselves on various emerging developments in PMTCT management for example; Early infant diagnosis, nutrition in HIV/AIDS management among many others.

4.5.2 Accessibility of PMTCT services

The study assessed the accessibility of PMTCT services including infrastructure and distance from respondents' homes among others to PMTCT facilities in Nakuru district in order to

determine their influence.

4.5.2.1 Distance from Respondent residence to the PMTCT facility

Majority (35.2%) of the respondents were residing over 3km away from PMTCT services compared with 28.1% (71) who resided 1km away, 23.7% (60), 2km away and 13% (33) who were residing 0-500M away from PMTCT services, which was statistically significant as high number of respondents were residing >3km away from PMTCT services delivery points (Figure 4.10; $\chi^2= 103.453$, d f=15, p=0.000).

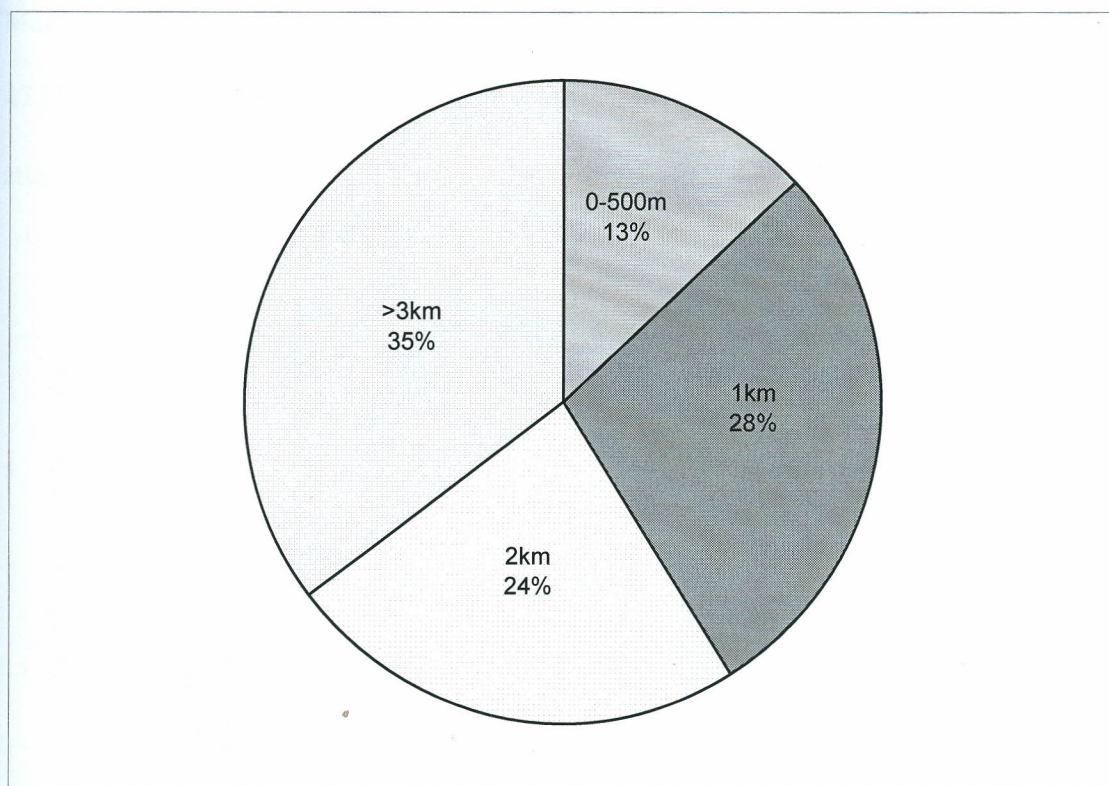


Figure 4.10: Respondents' mean distance from homes to PMTCT services delivery points

4.5.2.2 Days of the week when PMTCT services were available

Significantly high numbers of respondents from Marie Stopes (55%), PCEA Nakuru West H/C

(66.7%) and Langalanga H/C (57.9%) wished that the day and time be changed while significantly high numbers of respondents from Provincial General hospital (72.4%), Rongai H/C (74.5%) and Bondeni Maternity (76.6%) did not agree that the time and days be changed ($\chi^2= 25.836$; $df=5$; $p=0.000$).

4.5.2.3 Respondents' preferred Place of delivery

Significantly high numbers of mothers preferred to deliver at the Nakuru Provincial General hospital 47.8% (120) especially those respondents from Langlanga health center (77.5%) and Marie Stopes Dispensary but significantly high numbers of mothers from Bondeni Maternity 47.9% (23) preferred to deliver in any other hospital other than the ANC clinic they were attending (Figure 4.11: ($\chi^2= 103.976$, $df=20$, $p=0.000$).



Figure 4.11: Respondents' preferred Place of delivery

4.5.2.4 Availability of ARV medicines and their administration to the respondents

Significantly high numbers of expectant mothers preferred to take ARV prophylaxis drugs at home especially respondents from Nakuru Provincial General Hospital (58.3%) and Bondeni Maternity (72.0%) while significantly high numbers of respondents at Rongai H/C (46.5%) Marie Stopes (42.9%) and Langalanga Health Center (41.0%) were not sure ($\chi^2= 67.016$; $df=15$; $p=0.000$).

4.5.2.5 Linkage and Referral Systems

Many of the respondents at Langalanga Health Center and Marie Stopes dispensary were referred to Nakuru Provincial General Hospital for maternity services because they did not have maternity facilities. Most high risk expectant mothers were linked to the Provincial Hospital Comprehensive Care Clinic for registration and management. However there were no clear case management and referral protocols, referral routes, follow-up nor feedback mechanisms put in place to be followed when need arose. Most of the case which required Anti retro viral therapy were advised to go to Nakuru Provincial General Hospital Comprehensive Care clinic at their own time.

CHAPTER 5: DISCUSSION

5.1 Demographic dimensions of the study

Two hundred and fifty six expectant mothers were interviewed in the study and over ninety five percent of them were aged between 15-34 years. When age was compared with counseling and testing, there was a statistical significance ($p = 0.003$) as those mothers aged 24 years and above were counseled and tested more than those aged 24 years and below. On being evaluated further, it was observed that the group aged 15 -24 was more likely to visit ANC more often and enquire more on other relevant topics on PMTCT services. The frequent visits and talks allow them to have more interactions with the health care workers and therefore higher chances of being counseled and tested.

The study was not able to establish any male partner involvement in all the facilities sampled. Focus group discussions however indicated that men believe that ANC clinics specifically address pregnant women needs. The few men who wished to attend felt uncomfortable in the midst of female dominated environment. Participation of men in PMTCT activities is very necessary because recent reports show very high discordance rate $>40\%$ (NASCO, 2008). Involvement of men in PMTCT can be a turning point in acceptance rate and success in mitigation of HIV and AIDS

On marital status, 208 (81%) respondents were married and had only one sexual partner, but 2.7% of 254 respondents conceded having two sexual partners and 0.8% of 254 respondents' conceded having many sexual partners. This is consistent with (CBS, 2004) report that found that 2% women and 12 % men had reported of having more than one partner. It also implies that majority of the respondents were consciously aware of the effects of multiple sexual

partners in transmission of HIV infection. In addition those with multiple sexual partners were aged 15-24 years, mostly primary or secondary level of education and earned a monthly income < ksh 2000 implying that education level and income influenced PMTCT activities. This implies that the awareness level of HIV is quite high in the District which can be attributed to the high literacy rate (91.2%) as reported in the DHMIS, 2007. This allows the respondents to articulate well whatever health care workers taught them and subsequently increased health seeking behaviour among expectant mothers in the district.

When the first ANC visit was tabulated with the age of pregnancy it was observed that majority of the mothers visited ANC clinic during the third trimester. This implies that the source of PMTCT information was restricted to health care workers. Until they visited ANC facility respondents had no information about the benefits of PMTCT. As shown by the questionnaire on source of information, 65% of the mothers were reached by the health care worker and seminars. However a significant ($p=0.003$) as shown in the study acquired PMTCT from media and friends. The potential in media needs to be maximized as it would by extension increase the number of friends who would pass the PMTCT information to others. Men can also be reached through media because men do not accompany their wives to ANC clinics but read news papers, watch TV and listen to radios more (CBS,2004).

Occupation and level of income influence counseling and testing because those not employed and those earning < ksh 2000 per month were less likely to be counseled and tested compared with those earning >ksh 5,000. However PMTCT services at Government hospitals in this case Nakuru Provincial General Hospital and Rongai Health Center are free except for a small fee (Ksh 20) which they pay for registration and this explains why many of those respondents

earning < ksh 2000 attended and preferred to deliver at the government hospitals when compared with private and Municipal facilities.

5.2 Ante Natal Care Visits from 2003-2007

From the secondary data, the average number of pregnant mothers attending ANC varied from facility to facility and from year to year. Fluctuations on the number of expectant mothers making ANC visits were observed at Langalanga Health center, Nakuru Provincial General Hospital, PCEA Nakuru West Health Center and Rongai health Center. However gradual increase in number of expectant mothers making ANC visits was observed at Bondeni Maternity and Marie Stopes from 2005-2007. Coverage of PMTCT in the district has gradually expanded from one in 2002 to 42 sites by the end of 2007. The improvement in trend was across all the facilities with no significant association ($p=0.143$) on the year and facility.

The number of times mothers made visits to the ANC clinic was also compared within facilities and a significant inter facility association ($p<0.001$) was observed where Marie Stopes 55.6% Bondeni Maternity 46.4%, Langalanga Health Center 45.2%, PCEA Nakuru West Health Center 44.4% had recorded high proportions of ANC visits compared with lower proportion of visits at Nakuru Provincial General Hospital 23.7% and Rongai Health Center 37.8%. Decentralization of the program in 2005 and 2006 from Provincial General Hospital may have been the reason as to why mothers tried to relocate to facilities near their homes. The attitude of the health care workers towards the clients, shortage of staff, stigma in government facilities and increase in health seeking behaviour of the mothers in the areas served by these facilities may have contributed to the decrease in ANC attendance in government sponsored facilities.

5.3 Prevention of Mother to Child HIV Transmission

The awareness on PMTCT was 88.5% compared with 11.5% who were not aware and this was consistent across all the sampled health facilities. The source of PMTCT information was Health care workers. There was however a significantly ($p=0.003$) high number of expectant mothers who learnt about PMTCT from media and friends. The information implies that media is a resource that can be utilized to mobilize more mothers to PMTCT activities. It can also be used to increase the coverage by reaching out to men who are partners with mothers in preventing mother to child HIV transmission. The information is supported by KDHS report in 2004 which indicated that ninety nine percent of Kenyans have heard of AIDS and four in five (81% women and 89% men) know that chances of acquiring AIDS virus can be reduced by limiting the number of sexual partners and 61% women and 72 % men know that condoms can reduce the risk of acquiring HIV during sexual intercourse (CBS, 2004).

Secondary data collected from the sampled facilities showed that PMTCT enrolment trends in the health district increased gradually from 2003 to 2007 as follows: 55.3%, 55.7%, 79.9%, 82.0% and 84.9% expectant mothers tested per month. However inter facility comparison did not show any pattern, this implies that the increase was more facility based. Government, municipal, faith based or private sponsorship played no role in the increase in enrolment. This implied that the increase was a general improvement in the district's health seeking behaviour of the mothers and that all facilities were capable of passing PMTCT information equally to the clients. Enrolment did not automatically translate into testing as only 61% of those enrolled were tested for HIV. The report agrees with MOH, 2005 survey which reported that many of the respondents who had access to ANC services were not tested despite having been counseled. Acceptance varied from 25% to 95% with an average of 65% (MOH, 2005).

However, 91.9% of those who had not been tested were willing to be tested for HIV infection for the sake of their children. Through subsequent visits the mothers end up being tested through “Opt in- Opt Out” approach- where group counseling is conducted by the health care worker and unless the mother openly refuses HIV testing, the test is conducted. Numerous studies have found that switching from VCT to routine testing can dramatically improve take-up of testing in PMTCT programmes. When Botswana changed its testing procedure nationwide in 2004, by introducing routine testing it immediately increased testing rates from 75% to 90% (CDC, 2004).

Though excellent in reaching more people tested, the idea of “Opt in Opt Out” may make many mothers shy away from the clinic as they fear stigma associated with HIV and AIDS. The information given by the health care worker during the group counseling may not be providing enough information to allow the mother make an informed decision on HIV. The significant others in relationship may not be there to receive the same information.

The report in this study shows that the process of “Opt in- Opt Out” is repeated every time the expectant mother makes a visit at the ANC site. Testing for HIV is conducted after every three months until the mother gives birth. During delivery the health care worker conducts a test whether the mother was tested before or not. Mothers attending ANC in the third trimester have a very short time with the health care workers. They may not therefore have time to make informed decision on HIV. The testing allows the health care worker to make informed decision on the mode of management the mother and the child should be accorded. From the MOH, (2005) report survey only two out five mothers who deliver under Nurse/midwife, 59% deliver at home under the care of the relatives and traditional midwives.

From the result it is clear that the percentage that delivers at the medical facility receives proper services but the salient majority that delivers at home do not get PMTCT services. The program may need to train traditional birth attendances on PMTCT management in order to improve on PMTCT coverage and utilization

The study found out that the numbers of mothers who tested HIV positive reduced from 10% in 2002 to 8.5% in 2007 but when compared inter facility, some of the facilities sampled like Rongai Health Center and Bondeni Maternity there was an increase of mothers who tested positive. The Population served by both Rongai Health Center and Bondeni Maternity includes artisans, casual laborers from large flower farms especially at Rongai division and from construction industry in Nakuru Municipality. They are HIV vulnerable as they are lowly paid (< ksh 2000 per month). The rising level of HIV awareness and increased health seeking behaviour may be the reason why the number of mothers testing positive are rising. Rongai division is part of Salgaa shopping center where most of the track drivers' night stops as they transport goods to Western Kenya and great lake region. The shopping center has high numbers of guest houses and night spots that entertain the long track drivers and therefore high vulnerability to HIV infection and high probability of unprotected sex.

When the respondents' awareness on ARV drugs was assessed, 53.3% were aware of short course PMTCT prophylaxis to both mother and child. These results were consistent in all six sampled health facilities. Kenya demographic health survey KDHS, (2004) reported that only one third of women (33%) and (38%) of men knew that the risk of MTCT of HIV can be reduced by taking certain drugs during pregnancy. When application of the awareness was compared, high proportions 81% of those who had knowledge on ARV medicines were likely

to prevent their unborn babies. Those that would not (19%) cited various reasons including stigma. The report therefore implies that awareness on ARV medicines and their relationship with prevention of transmission of HIV to children was high in the district. The chances therefore that a HIV positive mother would use ARV medicine to prevent the child from contracting HIV was very high.

The results from the study showed that the proportion of mothers who were being put on short course ARV per health facilities per year fluctuated from 100% to 77.45% when compared interfacility but when compared in years, the proportions fluctuated from 54.6% to 95.6% implying that there was an increase in the trend of ARV short course uptake in the years under review. On the other hand, there were no significant inter facility differences on the proportion of mothers using short course ARV medicines in the six sampled health facilities across the years. This implied that all the sampled health facilities had provided equal chances for the mothers to access short course ARV medicines.

Addressing safer breastfeeding practices in prevention of mother to child HIV transmission is necessary and critical because breast milk has been proven to contain infective doses of HIV. When breast milk is combined with other infant feeding especially in HIV positive mothers it increases HIV infectivity by 60% to 85% (NASCO, 2002). The increase of HIV positive mothers who were exclusively breastfeeding from 2003 to 2007 implies that many mothers were willing to prevent their children from HIV infection. Mothers attending ANC require skilled practical help from people trained in breastfeeding counseling who can help to build their confidence, improve feeding techniques and prevent or resolve breastfeeding difficulties (Haider *et al.*, 2000). The report was not able to capture breast feeding practices in 2004

because there was no data available. This is further supported by the high numbers of mothers who were enquiring for more information on breastfeeding.

However the high number of mother who opted to combine breastfeeding especially at the Marie Stopes clinic, PCEA Nakuru West Health Center, and Rongai Health Center implies that health care workers were not reaching their clients adequately especially where counseling on breastfeeding was concerned. Breast milk has protective value and prevents common infections in babies (WHO, 2000). In Kenya Breast feeding practices are universal (CBS, 2004) as 97% of the children are breastfed because the gold standard of infant feeding is breast milk; it is the ideal nutrition for the infant. It is natural, nutritious and complete, anti-infective, available with no special preparation, promotes bonding and has many benefits to the mother as well as natural family planning (Iloff *et al.*, 2005).

In a study conducted in Zimbabwe in 2005 by Iliff and colleagues, it was observed that early mixed feeding was associated with a four-fold increased risk of postnatal HIV-1 transmission at six months compared to exclusive breastfeeding. It was also established that if Health workers are poorly equipped they will not be able to deliver convincing messages to the mothers (Chopra. *et al.*, 2005). Replacement feeding is only recommended when it is acceptable, feasible, affordable, sustainable and safe without which exclusive breastfeeding is solely recommended during the first months of life (WHO, 2003).

5.4: Factor Influencing PMTCT Activities in Nakuru Central Health District

Human resource is very essential in achieving the objectives of PMTCT. Over ninety five percent of the respondents were satisfied with services provided by the health care workers.

The attitude and the quality of care of the health care workers significantly varied across the sampled facilities. According to KDHS report of 2003, 88% of expectant women in Kenya sought ANC from Medical professional, from doctors (18%) from Nurses/ Mid wives (70%) and only a very small proportion (2%) from traditional birth attendants, while 10% did not receive Ante natal care at all (CBS, 2004). One study in Côte d'Ivoire found that a significant number of pregnant women who had been diagnosed with HIV were unwilling to take part in follow-up visits because they had bad experiences when dealing with health workers (Painter et al, 2004). Human resource is the bed-rock of a well functioning health care system (Raisler and Cohn., 2005) and developing and sustaining staff competences and attitudes remains a challenge in PMTCT services delivery. In order to address the shortage of health care workers, the option of using saliva tests (NASCOPI., 2008) as an alternative to rapid blood tests need to be explored as this could relieve some of the work load from the health care workers. Most facilities had acute shortages of health care workers exposing them to serious burnouts. Accessibility of ARV medicines was a challenge besides storage especially the syrups.

High proportions (35.2%) of the respondents were living over 3km away from PMTCT services, as 60.8 % of the respondents in Nakuru Provincial General Hospital resided more than 3km away from the health facility and 32.9% 2km away from the facility. The distance can seriously affect PMTCT service because it will hinder services accessibility. Mothers may not be able to honour revisits to the clinic come to the hospital when time to deliver approaches and therefore deliver at home assisted by traditional birth attendants.

The respondents were however (64.3%) comfortable with the time and days that PMTCT services were offered during the week. The difficulties and expenses of simply getting to

PMTCT facilities is a major barrier to adequate coverage of the program and continuity of care. The district has significantly high numbers of those earning < ksh 2000 and living > 3km away from PMTCT facilities. The observation means that the respondents are not able to honour the revisits and may end up delivering at home due to lack of resources to take them to the hospital for delivery.

Infrastructure has an influence in PMTCT services because 47.5% of the respondents from primary data preferred to deliver at general hospital maternity with least 2.4% who did not know. Marie Stopes's clinic and Langalanga H/Center did not have maternity services hence most of their expectant mothers were referred to Provincial General Hospital for delivery. With lack of clear referral protocol it is difficult to know where the client ended up giving birth. Follow-up and feedback becomes also very difficult. At the same time a high number of those attending ANC clinic at Nakuru Provincial General Hospital wished to deliver elsewhere. This implied that infrastructure and the attitude of health care workers in provision of PMTCT services strongly influenced the decision of place of delivery among the expecting mothers.

Many of the respondents at Langalanga Health Center and Marie Stopes were referred to Nakuru Provincial General Hospital for delivery but no clear referral protocols and obvious inter facility relationship was observed. The high number of respondents wishing to deliver at Nakuru Provincial General Hospital despite living more than 3Km away can be associated with better equipment, low charges after delivery and availability of consultation services. Most high risk expectant mothers were linked to the Provincial Hospital Comprehensive Care Clinic for registration and management for HIV.

In order to enhance health services delivery and health information management systems in Nakuru district it is necessary to establish clear health service delivery protocols. Training of health care workers on how to use the protocols is necessary for uniform application of the protocol. Other issues that should be included are routes of client referral, follow-up and feedback mechanisms to health care workers (Walley *et al.*, 2001). Protocols assist in maintaining a patient's confidentiality; increase the patient's confidence to the health care workers and supports data collection and storage. Proper data collection and storage assist a health care system in self monitoring and evaluation, planning and budget making (Walley *et al.*, 2001).

The ARV medicines prophylaxis only reduces the chances of the mother passing HIV infection to the baby. The transmission can occur during delivery which is the most common factor accounting for 30%-50% of transmission, during pregnancy or breastfeeding. The ARV medicines prophylaxis protects the baby but does not treat the mother. Linkage and clear referral protocol are an integral part of proper and consistent mitigation efforts of HIV/AIDS. Health information management services allow data collection analyzes and accurate interpolation. The benefits of proper data analyzes including evaluation, planning and budget making

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusions

- a) There was consistent growth in all the facilities offering PMTCT services in Nakuru District which steadily increased health seeking behavior especially in Antenatal care services. This is demonstrated by increased number of expectant mothers seeking ANC services.
- b) The awareness level on PMTCT activities is 88.5%. Sixty five percent of the respondents conceded having learned about PMTCT from health care workers. Another significant 27% of respondents had learned about PMTCT from media and friends.
- c) The PMTCT services have expanded from one site in 2002 to 42 sites by the year 2007.
- d) Proportion of those tested for HIV has grown from 55% in 2002 to over 84% by the year 2007.
- e) Proportions of those found HIV positive dropped from 10% to 8.5% from 2003-2007.
- f) Proportions of those put on ARV medicines prophylaxis was 89.3%
- g) Proportion of children put on ARV medicines prophylaxis was 59.0%.
- h) Proportion of HIV positive mothers practicing exclusive breastfeeding in the district is 10.7%.
- i) Prevention of mother to child HIV transmission program in Nakuru district was positively influenced by the following:
 - i) Age: those aged 25 years and below made frequent PMTCT visits hence they had more interactions with health care workers,
 - ii) Level of income and level of education: Those mothers with higher level of education > secondary level and earning > ksh 10,000 were enrolled more in PMTCT, counseled and tested. Education also allowed respondents to articulate PMTCT better.

- iii) Marital Status: Married respondents were exclusively breast feeding their infants more and they had one sexual partner
 - iv) Occupation. Those in employment had one sexual partner and accepted to be counseled tested
 - v) Attitude of health care workers was better in Municipal and private facilities hence a rise in numbers of mothers visiting the institutions.
 - vi) Media and friends increased source of Information on PMTCT services
- j) Other factors that influenced PMTCT activities negatively:
- i) Level of education: those who had primary and secondary level of education had more than one sexual partner, few were counseled and tested and fewer practiced exclusively breast feeding.
 - ii) Level of Income; those respondents earning ksh 2000 >ksh 5000 were combining breastfeeding with other infant feeding, they had more than one partner and were not honouring their ANC revisits.
 - iii) Marital status; those not married were having more than one sexual partner.
 - iv) Human Resource; health care workers were few and overwhelmed by the work and hence some times unable to holistically respond to the client's concerns, many respondents in the study wished for more information in PMTCT critical areas.
 - v) Accessibility of PMTCT services; Many respondents especially from Langalanga and Marie Stopes were advised to deliver in other facilities due to lack of Infrastructure. Distance also affected many respondents who were staying > 3km from the PMTCT facility and earning < ksh 2000 as they were not able to make regular ANC visits and probably delivered at home;
 - vi) Stigma and discrimination; HIV tests required in many delivery wards before

the mothers can be admitted in maternity wards and be allowed to deliver in labour ward were turning away mothers from PMTCT facilities due to stigma.

vii ARV medicines information, accessibility and storage; no assurance was available to show that the mother and infant took the given medicines especially those mothers who were given the medicines at PMTCT facilities and advised to take the drugs at home. This may end up creating resistance to ARV medicines.

k) Linkages and referral: With no clear referral protocol there was no assurance that those referred to the comprehensive care clinic really went or were attended to.

6:2 RECOOMENDATIONS

- a) Integrate PMTCT activities in all health delivery points including Maternal and Child Health Clinics, Family planning, VCT sites especially youth friendly sites and sexually transmitted Infections clinics (STI). This will assist in scaling-up PMTCT uptakes in the District.
- b) Increase men involvement in PMTCT through media to reduce stigma, increase ARV medicines acceptability, encourage exclusive breastfeeding and reduce combined infant feeding practices.
- c) In order to improve PMTCT, Health information management services need to be improved by establishing accurate data collection strategies, referral protocols and feedback mechanisms that are clearly defined, easy and well understood by all the people concerned.

- d) Provide Traditional Birth Attendance (TBA) with PMTCT skills to enable them provide relevant PMTCT services at their level

6.3 Further Research

1. The study has established that there is a gap between PMTCT awareness, counseling and testing for HIV infection. Further research is recommended to evaluate the underlying causes of the gap and make recommendations on how to bridge the gap.
2. The study also established that there was a significant high number of respondents who got PMTCT information from friends and media. Further research is recommended to determine how best media can be used to scale-up PMTCT uptakes.

REFERENCES

- AIDS in Kenya: (1996). Socioeconomic Impact and Policy Implications Family Health International/ AIDSCAP
- Anderson J E, Ebrahim S and Samsom S (2004). Women's knowledge about treatment to Prevention of mother to-child human immunodeficiency virus transmission. *Obstetrics and Gynecology* 103:165-168
- Anderson J E, Ebrahim S and Samson S (2006). HIV testing among US women prenatal care: findings from the 2002 National Survey of Growth. *Maternal and Child Health journal*: 10 (5): 413-417
- Baek C, Marina Xioleth Rodriguez, and Luis Roberto Escoto (2003). Report on the Qualitative Rapid Assessment of the UN-Supported PMTCT Pilot Program in Honduras"
- Central Bureau Statistic (CBS), Ministry of Health, ORC Macro, (CBS, 2003). Kenya demographic and health survey 2003. Calverton, Maryland, USA: CBS, MOH, ORC Macro.
- Central Bureau Statistic, Ministry of Health, ORC Macro (2004). Kenya demographic and health survey 2004. Calverton, Maryland, USA: CBS, MOH, ORC Macro.
- Central Bureau Statistic (CBS) (Kenya), Ministry of Health (MOH) (Kenya), and ORC Macro, (CBS, 2004). *Kenya Demographic and Health Survey 2003*. Calverton, Maryland: CBS, MOH, and ORC Macro.
- Center for Disease Control Program (CDC, 1992). Guidelines for prophylaxis against *Pneumocystis carinii* pneumonia for persons infected with human immunodeficiency virus. *MMWR*; 41(No. RR-4):1-11.
- Center For Disease Control Program CDC (1993). Revised classification system for HIV infection and expanded surveillance case definition for AIDS among adolescents and adults. *MMWR Recomm Rep*. 1992 Dec 18; 41(RR-17):1- 19 (www.cdc.gov/mmwr/preview/mmwrhtml/00018871.htm)
- Center for Disease Control Program (CDC, 2004). Introduction of routine HIV testing in prenatal care ---- Botswana "MMR 53(46)
- Chopra M, Doherty T, Jackson D, Ashworth A (2005). Preventing HIV transmission to children: quality of counseling of mothers in South Africa. *Acta Paediatr*, 94(3):357-363.)

- Connor EM, Sperling RS and Gelber R (1994). Reduction of maternal-infant transmission Human immunodeficiency virus type 1 with zidovudine treatment. Paediatric AIDS Clinical Trials Group Protocol 076 Study Group. *New England journal of Medicine*, 331:1173-1180
- Coutinho SB, de Lira PI, de Carvalho Lima M, Ashworth A (2005). Comparison of the effects of two systems for the promotion of exclusive breast feeding. *Lancet*, 366(9491): 1094- 1100.)
- Daily Nation (DN), (14th Oct 2009): Teenage Sex study Shock for parents: Center for the Study of Adolescence: No 16311: (www.nation.co.ke)
- De Kock KM, Fowler MG, Mercier E, de Vincenzi I, and Saba J, Hoff E (2000). Prevention of mother to child HIV transmission in resource poor countries: Translating research into policy and practice."JAMA 283(9)"
- District Medical Officer of Health Nakuru (2007). District health information Office records
- Downing RG, Otten RA, Marrum ME, Biryawaho B, Alwano-Edyegu MG, Sempala SDK, Fridlund CA, Dondero TJ, Campbell CH and Rayfield MA (1998). Optimizing the delivery of HIV counseling and testing services: The Uganda experience using rapid HIV antibody Test algorithms. *Journal of AIDS and Human Retrovirology*.18 (4):384-388.
- Fisher, AA Laing JE, Stockel EJ and Townsend JW (1998). Handbook for Family Planning operation research design 43-46. Second Edition. Population Council
- Grant AD and De Cock KM (2001). ABC of AIDS HIV infection and AIDS in the developing world. *British Medical Journal* volume 322:1475-1478).
- Gundel H, Angelika M and Heiko K (2003). Prevention of Mother to Child Transmission of HIV in Kenya, Tanzania and Uganda. GT Z Project Report.
- Haider R, Ashworth A, Kabir I, Huttly SR (2000). Effects of community-based peer counselors on exclusive breastfeeding practices in Dhakar, Bangladesh: randomized controlled trial. *Lancet* 2000, 356(9242):1643 -1647.
- Humphrey J, Piwoz E, Iliff PJ, Tavengwa NV, Marinda ET (2005). *Safer Breastfeeding for Babies Born to HIV- Positive Mothers: Part of the Answer to a Dilemma: Boston, USA.*
- Iliff PJ, Piwoz EG, Tavengwa NV, Zunguza CD, Marinda ET, Nathoo KJ, Moulton LH, Ward BJ, Humphrey JH (2005). *Early exclusive breast-feeding reduces the risk of postnatal HIV-1 transmission and increases HIV-free survival.* AIDS, 19:699-708.

- Ilf PJ, Piwoz EG, Tavengwa NV, Zunguza CD, Marinda ET, Nathoo KJ, Moulton LH, Ward BJ, Humphrey JH (2005). Early exclusive breast-feeding reduces the risk of postnatal HIV-1 'transmission and increases HIV-free survival. *IDS*, 19:699-708.
Journal of the American Medical Association, **283**:1175-1185.
- Justice AC, Feinstein AR, Wells CK (1989). *A new prognostic staging system for the acquired immunodeficiency syndrome. N Engl J Med*; 320:1388-93.
- Kassler WJ, Awano-Edyegu MG, Marrum ME, Biryahwaho B, Katacha P and Dillion B (1998). Rapid HIV Testing with same day results: a field trial in Uganda. *International Journal of STD and AIDS* 9(3): 134-188 *Lancet* 2000, 355:451-455. [PubMed Abstract](#) | [Publisher Full Text](#)
- Latham MC, Preble E (2000). Appropriate feeding methods for infants of HIV infected mothers in sub-Saharan Africa. *British Medical Journal*, 320: 1656-1660
- Lydie N, Robinson N K, Ferry B, De Loenzien M and Abega S (2004). Mobility, sexual behaviour and HIV Infection in urban Population Cameroon. *JAIDS* 35(1) 67-74
- Mckenna MT and Hu X (2007). Recent trends in the incidence and morbidity associated with perinatal human immunodeficiency virus infection in the United States. *American Journal of Obstetrics and Gynaecology*.197: S10-S16.
- Ministry of Health, Republic of Kenya (MOH, 2002). National Guide lines: prevention of mother-to-child HIV/AIDS transmission (PMTCT), 2nd ed. Nairobi.
- Ministry of Health, Republic of Kenya (MOH, 2005). Kenya National Prevention of Mother-to-Child HIV Transmission, Training Curriculum, Trainer's Manual 1st Edition.
- Ministry of Health, Republic of Kenya (MOH, 2001). Guidelines for Antiretroviral drug therapy in Kenya. National AIDS and Sexually Transmitted Diseases Coordination Program (NAS COP (2008). National AIDS and Sexually transmitted diseases Control Programme, Ministry of Public Health and Sanitation, Kenya. Guidelines for HIV Testing and Counseling in Kenya. Nairobi
- National AIDS and Sexually Transmitted Diseases Coordination Program (NAS COP (2009). *Kenya AIDS Indicator Survey (KAIS)*
- National AIDS and Sexually Transmitted Diseases Coordination Program (NAS COP, 2005). HIV Trends interventions and Impacts. National AIDS and STI Control Program, Ministry of Health, Kenya. AIDS in Kenya, 7th ed. Nairobi: Trends interventions and Impact.

- National AIDS and Sexually Transmitted Diseases Coordination Program (NAS COP (2002). National Guidelines: prevention of mother-to-child HIV/AIDS transmission (PMTCT), 2nd ed. Nairobi.
- Republic Of Kenya (ROK, 2005). "A call for Action" National AIDS Control Council. Kenya National HIV/AIDS Strategic Plan 2005/6-2009/10. Nairobi:
- Painter TM, Diaby KL, Matia DM (2004). Women's reasons for not participating in follow up visits before starting short course antiretroviral prophylaxis for prevention of Mother to Child Transmission of HIV: qualitative interview study: *BMJ* 2004;329(7465): 543
- Panataleo G, Graziosi and AS Fauci (1993). The immunopathogenesis of human immunodeficiency virus infection. *New England Journal of Medicine* 328: 327-335
- Preble E A, Piwoz E (2001). *Prevention of mother-to-child transmission of HIV in Africa: Practical Guidance for Programs*. SARA Project and Academy for Educational Development;
- Raisler J, Cohn J (2005). Mothers, Midwives, and HIV/AIDS in Sub-Saharan Africa. *J Midwifery Women's Health*, 50 (4):275-282.
- Shaffer N, Chuachoowong R and Mock P (1999). *Short course zidovudine for Prenatal HIV Transmission in Bangkok, Thailand: a randomized controlled trial*. Bangkok collaborative Prenatal HIV Transmission Study Group. *Lancet* 353:773-780
- Joint United Nations Programme for HIV and AIDS (UNAIDS 2006). 2005 report on global AIDS Epidemic
- Joint United Nations Programme for HIV and AIDS (UNAIDS, (2006). 2006 report on AIDS Epidemic
- Joint United Nations Programme for HIV and AIDS (UNAIDS), United Nations International Children Educational Fund (UNICEF) and World Health Organization (WHO, 1998). Prevention of HIV transmission from mother to child: meeting on planning for programme implementation, Geneva, 23-25 March 1998
- Van de Perre P (2000). HIV voluntary counseling and testing in community health services. *Lancet*; 356: 86-87
- Walley J, Wright J and Hubley J (2001). *Public health, an action guide to improving health in developing countries*. Leeds/Bradford; Oxford University Press Inc. New York.
- Wilfert C (2006). "Site Specific Factors Influencing Access to PMTCT Services, Trends with Time, and Suggestions for Improvement" XVI International AIDS Conference

- World Health Organization (WHO, 2000). Collaborative study team on the role of breastfeeding on the prevention of infant mortality. Effect of breastfeeding on infant and child mortality due to infectious diseases in less developed countries: a pooled analysis.
- World Health Organization (WHO, 2002). Human immunodeficiency virus type 1 with zidovudine treatment .Pediatric AIDS Clinical Trials Group Protocol 076 Study Group. *New England Journal of Medicine*, 331:1173-1180.
- World Health Organization (WHO, 2002). Strategic Approaches to Prevention of HIV Infection in Infants: Report of WHO meeting, Morges, Switzerland
- World Health Organization (WHO, 2003). WHO/UNICEF/UNFPA/UNAIDS, HIV and Infant Feeding: Guidelines for Decision-makers. Reviewed. Geneva, Switzerland, World Health Organization.
- World Health Organization (WHO, 2006). WHO case definitions of HIV for surveillance and revised clinical staging and immunological classification of HIV-related disease in adults and children (<http://www.who.int/hiv/pub/guidelines/hivstaging/en/index.html>.)
- World Health Organization (WHO, 2006). Infant and young child feeding and Counseling.

APPENDIX I

QUESTIONNAIRES

INTRODUCTION

I am a student in Kenyatta University undertaking a master degree in public health.

This study aims at assessing prevention of mother-to-child HIV transmission in Nakuru Central Health District. You are requested to participate, please respond to all questions, be truthful and honest. Your response will be made confidential and used only for the purpose of this study and it will not be discussed with any member of your family or friends neither will it be linked to you in any other way.

You do not need to write your name but bear in mind that whatever you write will have a bearing in this study and may help to make services better for you in the future or other people will benefit from your honesty and truthfulness. Should you feel you do not want to participate, please say so, you do not need to explain why you do not want to participate.

Jonathan N Mwangi

Sign.....Date.....

Would you like to participate in this study?

Yes..... No.....

Signature..... Date.....

Demography

1. Area of residence.....

Please tick where appropriate

2. Age.....

3. Marital status never married

- | | | | |
|----|------------|---------------------|--------------------------|
| | | Married now | <input type="checkbox"/> |
| | | Windowed | <input type="checkbox"/> |
| | | Divorced/Annulled | <input type="checkbox"/> |
| | | Separated | <input type="checkbox"/> |
| 4. | Occupation | Business | |
| | | Employed | <input type="checkbox"/> |
| | | House wife | <input type="checkbox"/> |
| 5. | Education | Primary Completed | <input type="checkbox"/> |
| | | Not completed | <input type="checkbox"/> |
| | | Secondary Completed | <input type="checkbox"/> |
| | | Not completed | <input type="checkbox"/> |
| | | College | <input type="checkbox"/> |
| | | University | <input type="checkbox"/> |
| | | Others | <input type="checkbox"/> |
| 6. | Religion | Muslim | |
| | | Roman Catholic | <input type="checkbox"/> |
| | | Evangelical | <input type="checkbox"/> |
| | | Pentecostal | <input type="checkbox"/> |
| | | Anglican | <input type="checkbox"/> |
| | | Others | <input type="checkbox"/> |

STUDY QUESTIONNAIRES

- 7 Is this your first Pregnancy?
- Yes
- No
- 8 Is this your first time to attend ANC clinic?

Yes

No

9. If No how many times have you attended ANC?

2

3

4

5

Others

10. How old is your pregnancy?

3 month

4Months

5 months

6 months

7 months

8 months

11. Have you ever heard any thing about PMTCT?

Yes

NO

12. How many sexual partners do you have?

One

Two

Many

I do not know

13. Would you mind to tell how many sexual partners you have had during this pregnancy?
Yes/No

- One
- Two
- Many
- I do not know

14. Have you ever been given counseling on HIV?

- Yes
- NO

15. If yes how many times?

- About two
- More than two
- Many times
- Am not sure

16. Have you ever taken a VCT test?

- Yes
- No

Note: By knowing your HIV status you are able to prevent your child from becoming infected while in the uterus, during delivery and/or during breast feeding

17. If no, would your wish to take a test for the sake of your child?

- Yes
- No
- I do not know

18. If no, would you wish to explain why?

Please give details.....

19. Do you know anything about Antiretroviral (ARVs) drugs?

- Yes
- No

20. If yes, would you like to try them to prevent your unborn child from getting HIV infection?

- Yes
- No

21. Have you ever heard anything about short course ARV on Prevention of Mother to child HIV transmission?

- Yes
- No

22. If yes would you like to tell me about them?
Please make your comments

.....

.....

.....

23. How would you describe your Health care Providers?

- Excellent
- Good
- Fair
- Poor
- Extremely Poor

24. Please rate the quality of the care you received in the ANC in your last visit

- Excellent
- Good
-

Fair

Poor

25. Health care providers do not really care about the feeling of their clients at the ANC clinic

I strongly agree

I agree

I disagree

I strongly disagree

26 The time and days that the services are available during the week should be extended/increased because people are waiting too long for appointments

Yes

No

27 Where would you prefer to deliver your child?

At the General hospital
Maternity

At home

Any other clinic/Hospital

I do not know

28. How would you prefer to take your ARV short course?

At home before delivery

In the Hospital during delivery

Am not sure

29 How would you wish to feed your child after birth?

Breast feeding

No breast feeding

Combine feeding
(Breast & bottle feeding)

I do not know

30. Would you wish your child tested for HIV infection?

Yes

NO

I need to consult

31. How much additional Information would you like about these topics?

	Does not apply	none	little more	some more	Much more
a. PMTCT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. VCT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. ARVs in pregnancy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Condom use in Preventing HIV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Family Planning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Breast feeding and Nutrition in HIV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. HIV Transmission in Pregnancy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Sexually transmitted Diseases and HIV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Pregnancy and HIV AIDS infection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Nutrition, ARV drugs and Breast feeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX II**Guide to Focus Group Discussions**

1. What do you think are the challenges of the program of PMTCT in this facility?
2. I have not seen men participate in the programme either staff or clients do you have any opinion as to why?
3. What do you think should be done to bring them on board?
4. Condom distribution is one of the personal primary preventive activities in not only PMTCT but also STI/STDs and Family planning how efficient is the activity in terms of availability, acceptance and returns?
5. Except for those women/mother who attends the ANC on voluntary bases how much community mobilization is undertaken monthly on HIV and AIDS?
6. Stigma is known to be one of the bottlenecks in HIV and AIDS preventive activities, is it an issue in this area and if yes how do you address it?
7. Infant feeding program for those children exposed to HIV is a major preventive activity, how do you address it in terms of acceptability, resources and efficiency?
8. Follow-up of the children exposed to HIV is very important because 25% of them acquire HIV within 6 weeks and 60 to 70% acquire HIV by 6th month How many of these children are followed up? How many have sero converted?
9. Is there an issue you think has been left out and in your opinion can be beneficial to this study?
10. In your opinion what should be the way forward to make the service more efficient and effective in this area?

Appendix III



KENYATTA UNIVERSITY
GRADUATE SCHOOL
INTERNAL MEMO

From: Dean, Graduate School
To: Jonathan Njogu Mwangi
C/o Public Health Department
Ref: 157/6578/03
Date: 18th July, 2008
Subject: RESEARCH PROPOSAL

This is to inform you that the Graduate School Board at its meeting of 26th June, 2008 approved your research proposal for the Masters degree.

Thank you.

A handwritten signature in black ink, appearing to read 'M. C. Makokha'.

M. C. MAKOKHA
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Public Health Dept.

MCM/cww

APPENDIX IV

Ministry of Higher Education Science and Technology

PROVINCIAL GENERAL HOSPITAL
RIFT VALLEY PROVINCE
26 JUN 2008
P. O. Box 71, NAKURU



REPUBLIC OF KENYA

**MINISTRY OF HIGHER EDUCATION SCIENCE
& TECHNOLOGY**

Telegrams: "SCIENCE TEC", Nairobi
Telephone: 02-318581
E-Mail: ps@scienceandtechnology.go.ke

JOGOO HOUSE "B"
HARAMBEE AVENUE.
P.O. Box 9583-00200
NAIROBI

When Replying please quote

Ref. MOHEST 13/001/ 38C 339/2

19th June 2008

Mwangi Jonathan Njogu
Kenyatta University
P.O. Box 43844
NAIROBI

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on,
*'Assessment of Prevention of Mother to child HIV Transmission
Programme in Nakuru Health District.*

I am pleased to inform you that you have been authorized to carry out
research in Nakuru District for a period ending 30th December, 2008.

You are advised to report to the District Commissioner and the District
Education Officer Nakuru District before embarking on your research.

On completion of your research, you are expected to submit two copies of
your research report to this office.


M. O. ONDIEKI
FOR: PERMANENT SECRETARY

Copy to:

The District Commissioner
Nakuru District
NAKURU

The District Education Officer
Nakuru District
NAKURU

APPENDIX V

MINISTRY OF HEALTH



Telephone: 051-2216899/2216908
 Fax: 050-50882
 Website: www.moh-nakuru.or.ke
 Email: mohnkr@wanainch.com
 When replying please quote
 Ref: B.31/Vol.I/108
 and date

Medical Officer of Health
 Nakuru District
 P.O. Box 1214
NAKURU

30th June 2008

Mr. Mwangi Jonathan Njogu
 Kenyatta University
 P O Box 43844
NAIROBI

RE: PERMISSION TO CONDUCT A RESEARCH

We are in receipt of the District Education officer's letter dated 27th June 2008 informing us of your intention to carry out a research study on "*Assessment of prevention of Mother to child HIV Transmission programme*" in Nakuru District

We have no objection to this but we would appreciate it if you stick to the laid down rules and regulations during the course of your research.

You are also advised to liaise with the concerned officers in all health facilities for further guidance and assistance.

Dr. Z. Kariuki
 MEDICAL OFFICER OF HEALTH
NAKURU DISTRICT

cc

The Medical Officer of Health
 Nakuru Municipality
NAKURU

The Medical Superintendent
 Provincial General Hospital
 P O Box 71
NAKURU

The District Education Officer
NAKURU DISTRICT

APPENDIX VI

MINISTRY OF HEALTH

grams: "PROVMED", Nakuru
phone: Nakuru 215580-90
in replying please quote



PROVINCIAL GENERAL HOSPITAL
RIFT VALLEY PROVINCE
P.O. Box 71
NAKURU

No.

RII/VOL.I/08

Date: 3/7/2008

To: Jonathan Mwangi
P.O. Box 43244
Nairobi

Dear Jonathan Mwangi

RE: APPROVAL TO UNDERTAKE RESEARCH AT THE
RIFT VALLEY PROVINCIAL GENERAL HOSPITAL

Reference is made to your letter dated 30/6/2008 seeking
permission to do research at Provincial General Hospital, Nakuru on Assessment
of prevention of mother to child HIV trans-
mission programme

Permission has been granted/Not granted for the research. It is hoped that you will
adhere to the ethics and standards that relate to research at our institution.

Thank you.

Yours sincerely

MEDICAL SUPERINTENDENT

CHAIRPERSON
RESEARCH AND ETHICS COMMITTEE

APPENDIX VII
 MINISTRY OF EDUCATION

Telegrams: "LEARNING"
 Telephone: 2216529/2216563
 When replying please quote



DISTRICT EDUCATION OFFICE
 NAKURU DISTRICT
 P.O. BOX 1028
NAKURU

Ref. NKU/ED/156/189


27TH JUNE, 2008

TO MOH
NAKURU DISTRICT

REF: RESEARCH AUTHORISATION
MR. MWANGI JONATHAN NJOGU

This is to inform you that the above named officer has been authorized to carry out research on "Assessment of prevention of Mother to child HIV Transmission programme in Nakuru District.


Please give him the necessary assistance.

 **DISTRICT EDUCATION OFFICER**
NAKURU
KAMAU CHRISTOPHER
FOR: DISTRICT EDUCATION OFFICER
NAKURU DISTRICT

Copy to:

Permanent Secretary,
 Ministry of Education,
 P.O. Box 30040,
NAIROBI.

Provincial Medical Officer
NAKURU DISTRICT.

 The Superintendent
 Provincial General Hospital
NAKURU

APPENDIX VIII

PAGE 2

PAGE 3

THIS IS TO CERTIFY THAT:

Prof./Dr./Mr./Mrs./Miss MWANGI
JONATHAN NJOGU

of (Address) KENYATTA UNIVERSITY
P.O. BOX 43844 NAIROBI

has been permitted to conduct research in.....

.....Location,
NAKURU District,
RIFT VALLEY Province,

on the topic ASSESSMENT OF PREVENTION
OF MOTHER TO CHILD HIV TRANSMISSION
PROGRAMME IN NAKURU HEALTH DISTRICT

.....
.....
for a period ending 30TH DECEMBER, 2008

Research Permit No. MOHEST 13/001/38C 339

Date of issue 19.6.2008

Fee received SHS. 500



M.O. ONDIEKI

[Signature]
Applicant's
Signature

FOR: Permanent Secretary
Ministry of
Science and Technology