THE ROLE OF HORMONAL CONTRACEPTIVES IN HIV INFECTION AMONG ANTENATAL MOTHERS IN MACHAKOS DISTRICT HOSPITAL, KENYA

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DATE: 21/11/07

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INSTITUTION: KENYATTA UNIVERSITY

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November, 2007
DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

Signature: Matheka Emmah Kanini 157/11142/2004

Supervisors: This thesis has been submitted for examination with our approval as University supervisors.

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DEDICATION

To my family and friends, for their encouragement, love, care and support during the entire period of the study.
ACKNOWLEDGEMENT

I would like to express my sincere gratitude to several people for their role in enabling me undertake and accomplish this study. I extend my deep appreciation and special thanks to my University supervisors, Dr. L.P Oteba and Dr. M. Otieno for their unwavering guidance, patience, support, availability and enthusiasm during the planning and execution of the study.

My thanks go to Dr. Oirere. Prof. E. Kabiru, Dr. Kiragu and Dr. Agina for their scientific and technical insights into the relevance of the study. I highly appreciate the help of Mr Francis Oguya for his guidance in data analysis and sample size determination. I am very grateful to my colleagues Monica Mumo, Ng’iela Ronald, Vudambula Valentine, Vincent Wambua, among others for their technical and moral support during the execution of the study.

I sincerely thank the Ministry of Health for my unconditional study leave. I highly appreciate the staff of Maternal, Child Health and Family Planning Department of Machakos District Hospital for their help during execution of this study in their unit. I am also very grateful to my study respondents for their time and cooperation shown during data collection. Without them, this work would have been hard to accomplish.

I highly appreciate the cheerful interest of my son, husband, brothers and sisters for their assistance and moral support during the entire period of the study. Finally, I wish to thank the academic staff of Kenyatta University department of Public Health for their encouragement, moral and academic support during the entire course of my post graduate studies.
ABSTRACT

Fighting Acquired Immune Deficiency Syndrome (AIDS) effectively requires a well-targeted evidence-based approach. Recent studies show that campaigns to prevent the spread of Human Immune-deficiency Virus (HIV) have focused on the promotion of abstinence, condom use, reduction on the number of sexual partners and treatment of Sexually Transmitted Infections (STIs). However, the incidence of HIV infection continues to rise in most of the regions. About 150 million women worldwide use hormonal forms of contraception in an effort to plan their families in order to control the modern population explosion. Many of them are at risk of being infected by HIV since 80% of its transmission is through heterosexual behavior. Unlike barrier methods of contraception, hormonal methods offer no protection against STIs including the incurable and the dreaded HIV. Most prevalence studies on HIV have shown a higher general prevalence among sexually active women compared to their male counterparts. This gender difference can be associated with many biological and socio-cultural factors. Among the biological factors, the association between hormonal contraceptives and HIV infection has recently become a public health concern. This is because some studies have shown that hormonal contraceptives cause thinning of the vaginal and cervical mucosa, possibly increasing the likelihood of trauma and increasing the density of HIV target cells in an event of exposure to HIV infection. On the contrary, some other studies found no association between hormonal contraceptives and HIV acquisition. An association between hormonal contraceptives and HIV infection is of importance particularly given the need to control the rate of population growth in developing countries. The main objective of this study was to determine the relationship between use of hormonal contraceptives and susceptibility to HIV among women since the past few studies on this subject have yielded inconclusive results. Other study variables were analyzed against HIV status. This included socio-demographic information, sexual-reproductive and blood transfusion history among the study participants. The study was done in Machakos General Hospital as a cross-sectional study among the antenatal mothers visiting the antenatal clinic. It was incorporated in an ongoing programme of Prevention of Mother To Child Transmission of HIV (PMTCT). Data was managed using Statistical Package of Social Studies (SPSS) and Epi Info. The results didn’t show any significant evidence of association between hormonal contraceptives and the risk of HIV acquisition $\chi^2=0.01, 1 df$ $p>0.05$ and OR of 1). However, significant relationships between some socio-demographic variables and HIV status among the study participants were found. This included, the residential area, type of occupation done by the respondents at the time of the study, among others. The results will be disseminated to the Kenyan Ministry of Health for appropriate action. This is mainly in enhancing family planning counseling on appropriate contraceptive methods. The results are also expected to help in clarification of previous results on this issue and to allay AIDS related fears among hormonal contraceptive users.
DEFINITIONS OF OPERATIONAL TERMS

Cervical ectopia - Abnormal inflammation of the cervix.

Ovulation - Release of ovum from the ovary during the menstrual cycle.

Reproductive age - Between 15 to 49 years of age.

Fertility rate - The average number of children per woman.

Middle age - Between 30 and 45 years of age.

Pill - Oral hormonal contraceptive both combined and progestins only.

HIV Positive - Presence of HIV antibodies in blood serum.

HIV Negative - Absence of HIV antibodies in blood serum.
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
</tr>
<tr>
<td>APHRC</td>
<td>African Population and Health Research Center.</td>
</tr>
<tr>
<td>C.I</td>
<td>Confidence interval</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers of Communicable Disease Control and prevention</td>
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<tr>
<td>HIV</td>
<td>Human Immune Deficiency Virus</td>
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<tr>
<td>IUCD</td>
<td>Intra Uterine Contraceptive Device</td>
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<tr>
<td>KDHS</td>
<td>Kenya Demographic Health Survey</td>
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<td>KMC</td>
<td>Kenya Meat Commission</td>
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<tr>
<td>MAP</td>
<td>Medical Assistance Programs.</td>
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<tr>
<td>MCH</td>
<td>Maternal and Child Health</td>
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<td>MOH</td>
<td>Ministry of Health</td>
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<tr>
<td>NASCOP</td>
<td>National AIDS and STD Control Programme</td>
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<tr>
<td>OR</td>
<td>Odds Ratio</td>
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<tr>
<td>PID</td>
<td>Pelvic Inflammatory Disease</td>
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<tr>
<td>PMTCT</td>
<td>Prevention of Mother-To-Child Transmission of HIV</td>
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<tr>
<td>ROK</td>
<td>Republic Of Kenya</td>
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<tr>
<td>SIV</td>
<td>Simian Immunodeficiency Virus</td>
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<tr>
<td>SPSS</td>
<td>Statistical Package of Social Studies</td>
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<td>Sexually Transmitted Diseases</td>
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<td>STI</td>
<td>Sexually Transmitted Infections</td>
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<td>United States Agency for International Development</td>
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<td>$\chi^2$</td>
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1. INTRODUCTION

1.1 Background of the study

Acquired Immune Deficiency Syndrome (AIDS) was first reported in the United States of America in 1981 among the homosexuals. It is however believed to have existed a little earlier than its initial reporting (Coyle et al, 1998). HIV/AIDS is transmitted through sexual contact with an infected person, from an infected mother to her foetus or infant before, during or shortly after birth and through breastmilk. Transmission also occurs through HIV infected blood, blood products or transplanted organs and tissues (Baylies et al., 2004).

More than 70% of infections are a result of heterosexual contact. Women in general are at a higher risk of HIV infection than their male counterparts. This has partially been attributed to biological and socio-cultural factors (Harrison et al., 1995). The number of the HIV infected people worldwide by the end of 2004 was approximately 38.7 million with an annual increase of about 5%. More than 20 million people have already died of the disease (UNAIDS \ WHO, 2005). In the nations severely hit by the pandemic, the gains in health made in the last 50 years are being reversed or altered. This is because AIDS claims the lives of millions of young adults who are in their most productive years (Sengendo et al., 1999). Sub-Sahara Africa has by far the largest number of people living with HIV, about 28.7 million people which are two thirds of the world’s total HIV infections (Harrison et al., 1995). In Kenya, over 2 million people had died of AIDS by the end of 2006. Currently 140,000 deaths occur annually world wide. It’s also estimated
that the number of HIV infected people in a population of 32 million may have increased
to 1.75 million. This number rose to 2.6 million by the end of 2005 with overall
prevalence rate of 5.1% (NASCOP/UNAIDS, 2006/ NACC REPORT 2007).

In an effort to control the number of children in their families, many women in
developing countries use hormonal contraceptives in oral, implants or injectable forms.
These are the most common contraceptive methods used in Africa, where the rates of
new HIV infection are high even among low risk contraceptive users (Tabifor, 2000). On
average, 59% of Kenyan women use modern forms of contraceptives. 80% of these use
hormonal contraceptives (KDHS, 2003).

Theoretically, hormonal contraceptives have the potential of increasing or lowering the
risk of Sexually Transmitted Infections acquisition in a number of ways, since the
hormones involved affect the female genital tract (Marx, 2003). The Kenyan HIV
prevalence rate is 5.9% among men and 8.7% among women with an average of 7%
(KDHS, 2003). Several studies to account for the gender differentials between men and
women on HIV prevalence have been done but conclusive results have not been achieved
yet (MAP, 2004).

The choice of contraceptive method affects the likelihood of HIV transmission.
Condoms, used consistently, protect both sexes against HIV. Spermicides containing
nonoxynol 9 protect against bacterial infections of the reproductive tract, but their effect
against HIV is uncertain. Furthermore, these compounds may cause vaginal irritation.
One study found that the use of intrauterine devices carried an increased risk of HIV infection (odds ratio, 3.0), but another did not. Conflicting results have also been reported for hormonal contraceptives. Some investigators report an increased relative risk (range, 2.0 to 4.5), possibly due to increased cervical ectopy or thinning of the vaginal epithelia. Others report a protective effect (relative risk, 0.6) or no effect. In HIV-seropositive women, cervical HIV shedding strongly correlated with the use of oral contraceptives in one study but not in another (Kapiga, et al., 1994).

The aim of this study was to find out if the common use of hormonal contraceptive among women has any contributions to the high HIV prevalence among women.

1.2 Problem statement

Since the onset of HIV, all regions of the world have experienced the pandemic and its effects. According to UNAIDS and WHO research by October 2005, of the 39.5 million people infected by then, women were the majority. Similarly, 21.8m people of which 9m were women and 4.3m were children have died, leaving 8.4million as men who have died of the disease. This means that HIV has had a heavy toll on human life particularly so on women (Coyle et al., 2004). The virus has increased everywhere with the most striking cases of increase in East Asia, Central Asia and Eastern Europe. However, Sub-Saharan Africa still has the most cases of HIV/AIDS (UNAIDS / WHO 2005). There were estimated 4.3 million new HIV infections this year with 2.8 million of these occurring in Sub-Saharan Africa. In Kenya, the cumulative number of AIDS deaths was estimated to
rise from 760,000 in 2003 to 2.4 million by the beginning of year 2006. Likewise, it’s
projected that the number of HIV infected people may increase to 2.6 million in five
years time from 2003 and the number of AIDS orphans will increase to more than 1.5
million by the year 2007 (NASCOP, 2003).

From 1650, most parts of the world have been experiencing population explosion due to
reduction in harsh living conditions and improved medical technology. This has led to
general increase in the general population growth rate (WHO, 2003a). Even with the
rising number of deaths from HIV/AIDS throughout the world, the current population
growth rate of 1.3% annually is higher than anything experienced by the world as a whole
prior to World War II (Yerskey et al., 2001). In Kenya Total Fertility Rate (TFR)
dropped from 6.7 in 1989 to 4.6 in 1998. In 2003 however, the TFR was found to have
gone up to 4.8 (KDHS, 2003). Thus, population control is necessary to ease the problem
of overpopulation. More than 150 million women worldwide use hormonal
contraceptives to control their families. This is because of their high efficiency compared
to other forms of contraception excluding sterilization (Yerskey et al., 2001).

Hormonal contraceptives act by inhibiting ovulation and thickening of the cervical plug.
Their disadvantage is that they cause cervical ectopia, a condition in which the delicate
mucus secreting columnar cells that normally line the cervical canal cover part of the
external surface near the opening of the canal. Chlamydia thrives well inside these
columnar cells making the cervix more vulnerable to Chlamydia trachomatis infection.
This makes the woman more vulnerable to Pelvic Inflammatory Disease (PID) and other STDs including HIV (CDC, 1999; Baeten et al., 2001).

In women, the explanation for their shocking rates of HIV infection remains poorly understood. Thus, research on this agenda was considered an urgent need for the realignment of the cause (Mann et al., 1992). The study therefore determined whether there was any relationship between hormonal contraceptives and HIV infection since the few studies done in this area had yielded inconclusive results.

1.3 Research question

What is the association between use of hormonal contraceptives and susceptibility to HIV infection?

1.4 Research hypothesis

1.4.1 Null hypothesis

Use of hormonal contraceptives is not associated with increased susceptibility to HIV infection in women.

1.4.2 Alternative hypothesis

Use of hormonal contraceptives is associated with increased susceptibility to HIV infection among women.
1.5 Research objectives

1.5.1 General objective

To determine the association between use of hormonal contraceptives and susceptibility to HIV infection among antenatal mothers in Machakos District Hospital, Kenya.

1.5.2 Specific objectives

1. To establish the nature and extent of the association between hormonal contraceptives use and susceptibility to HIV infection among antenatal mothers.
2. To determine whether there is any association between certain demographic characteristics of women using hormonal contraceptives and their HIV susceptibility.
3. To determine the association between other STIs and blood transfusion with HIV acquisition.

1.6 Significance of the study

Increase in population growth rate makes social and economic development difficult if not impossible (Foreit et al., 1998). Family planning ensures the spacing and timing of children in accordance to one's ability to bring them up in a state of physical, mental and spiritual well being. Spacing births ensures the mother's health and that of her children. Healthier women, children and men can result in a more productive labour force.
Government resources will be better planned, channeled and utilized in a nation where the population growth rate is well controlled (Tabifor et al., 2000). The fact that women in reproductive age use hormonal contraceptives as a way of family planning is inevitable to majority of them (WHO, 2003).

Many HIV infected women have raised questions about the safety of use of different contraceptive technologies. Majority expressed fear that some technologies of contraception may increase their susceptibility to HIV infection while others thought they could have a protective effect (Mann et al., 1992).

Hormonal contraceptives are known to cause thinning of the vaginal and cervical mucus, possibly increasing the likelihood of trauma and increasing the density of HIV target cells. They are also associated with cervical ectopy which is a risk factor for HIV and other STDs. Thus, since most of HIV new infections are particularly high among young women, a programme aimed at protecting the women from early infection is a key to defeating this epidemic. In addition, relationship between hormonal contraceptives and susceptibility to HIV transmission is of Public health concern particularly given the high fertility rate among women in the developing countries and so, the need to control their family sizes (WHO, 2003).

The results of this study helped to add more value on female-targeted prevention programmes against HIV/AIDS because majority of women use hormonal contraceptives for their family planning. The results will also help in enhancing family planning
counseling. Appropriate policy recommendations are to be made on contraceptive use from the results obtained.

1.7 Limitations and delimitations of the study

a) Possibility of confounding factors- because contraceptive use may determine ones sexual behaviour, the study instruments were designed to capture most of those factors during data collection and analysis with an aim of reducing their effect on the outcome.

b) Only antenatal mothers represented the sexually active women with a history of using hormonal contraceptives. This was due to their willingness to be tested for HIV under the PMTCT programme unlike all the women in the general population.

1.8 Assumptions of the study

1. All the study subjects gave accurate and reliable information.

2. Susceptibility of antenatal mothers to HIV was similar to that of non-gravid women of reproductive age on hormonal contraceptives.

1.9 Conceptual framework

Globally, HIV/AIDS has had devastating effects on the human population. Since its initial reporting in the early 1980s, many people have been infected and affected. Majority of those infected were women. For example by December 2003, 17.4m women,
1.4m children and 15.6m men were infected, while 9m women, 4.3m children and 8.4m men had died of AIDS related illnesses (Coyle et al., 2004).

However, the global population still continue to rise at a growth rate of 1.3% annually despite the deaths from the AIDS pandemic. The socio-economic impact of this growth call for population control measures. The most commonly used method is hormonal contraceptives among women due to their high efficiency (Yerskey et al., 2001).

However, many women have been found to associate use of hormonal contraceptives with acquisition of HIV infection. Several studies done on this area earlier had yielded inconclusive results (Mann, 2003). The study basically determined if there was a relationship between HIV susceptibility and hormonal contraceptive use. Contraceptive use was taken as the independent variable whereas HIV status was the dependent variable. The possibility of confounding factors such as number of sexual partners, level of education and some professions being more risky than others were captured in the study instruments. Each of them was analysed as an independent variable against the dependent variable of HIV status to rule out their effects.

This interrelationship is expressed by the figure below.
Figure 1.9 Conceptual framework of study variables

**Independent Variables**
- **Socio demographic**
  - Age
  - Residential area
  - Marital status
  - Education level
  - Type of occupation
  - Ethnicity
- **Obstetric variables**
  - Age at first marriage
  - Age at first intercourse
  - Form of contraceptive
  - Duration of contraceptive use
- **Alternative exposure to HIV**
  - Blood transfusion
  - History of other STDs

**Dependent Variables**
- Number of sexual partners
- History of condom use
- Frequency of HIV test
- Form of contraceptive

**Outcome**
- HIV Positive
- HIV negative
- Inconclusive
- HIV result
2. LITERATURE REVIEW

2.1 HIV/ AIDS prevalence

The increase in infection among women can be shown by the changing ratio of men to women with HIV/AIDS in particular countries or regions over time. For instance, in Zimbabwe from 1987 to mid 1990, numbers of people infected in the 15-19 age group were low, but there were ten times more young women than men. In the 20-29 age group, 1.4 times as many women were infected as men. Biologically, HIV infection of a woman by a man its more likely than infection of a man by a woman, per exposure (Berer, 1993). In Kenya, almost twice as many women are HIV infected compared to the number of males infected. Results from the 2003 KDHS indicate that 6.7% of Kenyan adults are infected with HIV. Prevalence of HIV in women aged 15-49 is 8.7%, while for men in the same age group is 4.6%. This female to male ratio of 1.9 to 1 is higher than that found in other population-based studies in Africa. Young women were particularly found to be more vulnerable to HIV infection compared with young men in the same age group. For example, 3% of women aged 15-19 are HIV infected, compared with less than 0.5% of men in the 15-19 age bracket. Similarly, HIV prevalence among women in 20-24 age group is over 4 times that of men in the same age group (9% vs.2%). The peak prevalence among women is at 25-29 (13%) while prevalence rises gradually with age among men peaking at the age 40-44 (9%) (MOH, 2005; KDHS, 2003).
Table 2.1.1 HIV prevalence among adults; age 15-49 in % (MOH, 2005)

<table>
<thead>
<tr>
<th>HIV Prevalence</th>
<th>Women</th>
<th>Men</th>
<th>Overall prevalence(%)</th>
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<tbody>
<tr>
<td>Total</td>
<td>8.7</td>
<td>4.6</td>
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<tr>
<td><strong>Age</strong></td>
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<tr>
<td>40-44</td>
<td>9.5</td>
<td>8.8</td>
<td>9.1</td>
</tr>
<tr>
<td>45-49</td>
<td>3.9</td>
<td>5.2</td>
<td>4.4</td>
</tr>
<tr>
<td>50-54</td>
<td>-</td>
<td>5.7</td>
<td>-</td>
</tr>
</tbody>
</table>

2.2 Importance of family planning services

Today, more than half of the worlds one billion couples of reproductive age use some form of contraception, and so they are able to choose how many children they will have and when. Family planning allows women to delay motherhood, space births, prevent unsafe abortions and stop bearing children when they have reached their desired family size (PRB, 2002). Family Planning Association of Kenya (FPAK) was able to realize a total of 83,063 family planning visits in the year 2002 thus a total of 36,188 births in the country were averted during that period. This reduced maternal morbidity and mortality by a third (FPAK, 2002).
Studies indicate that complications of pregnancy and child birth are a leading cause of death and disability among women of reproductive ages (Barton, 2000; UNFPA, 2001). Worldwide, there are nearly 515,000 maternal deaths per year, 99% of which occur in developing countries. Every year, more than 500,000 women in developing countries die of causes related to pregnancy and child birth. It is estimated that for every woman who dies, at least 30 others develop chronic, debilitating problems that can have devastating social and physical consequences (PRB, 2002; UNFPA, 2001). Up to a third of maternal deaths, injury and infection could be avoided if all women had access to a range of modern, safe and effective family planning services that would enable them avoid unwanted and many pregnancies during their child bearing age (UNFPA, 2001).

Family planning saves the lives of children by helping women space births. Between 13 and 15 million children under the age of five years die each year. If all children were born at least two years apart, 3 to 4 million of these deaths would be avoided (UNFPA, 2001). Since 1960s, family planning programmes have helped women around the world to avoid 400 million unwanted pregnancies. As a result, many women's lives have been saved from high risk pregnancies and or unsafe abortions (Abdel, 1985; UNFPA, 2001).

2.3 Use of contraceptives and risk of HIV

Contraception is a population control method. The main forms of contraception involve natural methods, barrier methods, sterilization and hormonal contraceptives. Hormonal contraception is the most effective method of controlling fertility in women apart from
sterilization, both at perfect and typical use. Choosing of contraceptive is an important
decision. This choice depends on several factors namely effectiveness, safety, non –
contraceptive benefits such as STDs prevention and other personal considerations
(Mann, 2003).

The HIV pandemic poses problems for family planning services at different levels. Some
people fear that ready availability and widespread use of contraception may encourage
casual sexual relationships, and perhaps concurrent relationships that would help the
pandemic to spread (Maharaj, 2002).

Contraceptive users may face increased or decreased HIV risk depending on their choice
of contraceptive method. For example Intra Uterine Device has been associated with
increased risk of Pelvic Inflammatory Disease and may increase HIV transmission. On
the other hand, condoms may lower the risk of HIV transmission, but their use require
co-operation of both parties. In Sub-Saharan Africa where HIV prevalence is high, trends
in fertility regulation have favored methods that are controlled by women and can be used
without the partner’s knowledge. This is due to the low status of women that hinder them
from negotiating the use of barrier methods. Thus the use of condoms and other barrier
methods for family planning is low in spite of a heavy burden of STDs and a high
prevalence of HIV seropositivity in Sub-Saharan Africa (Basial, 1998).

An association between hormonal contraceptives and HIV acquisition or transmission is
of Public health concern particularly given the need of women to prevent unwanted
pregnancies and to avoid transmission of HIV to their infants. This has profound implications for individuals’ reproductive health services, programmes and policies (WHO, 2003). In the current era of AIDS pandemic, a significant number of people have expressed fear that hormonal contraceptives because of their interaction with the body’s immune system may make the body more susceptible to HIV infection. In addition some people have been found to confuse whether they are using contraceptives to prevent pregnancy, HIV transmission or both (Njeru et al., 2004).

Studies on contraceptive use and HIV transmission have been found to be complex because both the choice of contraception method and the risk of HIV transmission are related to sexual behaviour. For example, women who use hormonal contraceptives may engage in sexual behaviour that place them at increased risk of HIV such as reduced use of condoms. Condoms if used correctly and consistently are important in the prevention of HIV, STDs and pregnancy. However, data indicate that most married couples prefer other family planning methods mainly the hormonal contraceptives (UNAIDS, 2002). Use of hormonal contraceptives has been associated with an increased risk of HIV infection in some studies but not in others (CDC, 1999).

Safe and effective hormonal contraceptive methods are a key component of family planning programmes. Affordable, high-quality family planning services remain one of the most important interventions that reduce mother and child morbidity and mortality, HIV infection, poverty, and promote sustainable development. Thus there is need for
dedication on improving accessibility and identifying new methods to protect against HIV and other STDs, particularly methods that are controlled by women (WHO, 2005). Data from studies of progestin only injectables and HIV/STDs risks are also conflicting. For example, a 1996 study done at the University of Washington, U.S.A, found an eight fold increase in Simian Immunodeficiency Virus (SIV) infection. SIV-exposed monkeys receiving implants that maintained high progestin levels in their blood were compared to a group of placebo control monkeys exposed at a stage of their menstrual cycle when natural progesterone levels were low. Researchers noted that enhanced SIV infection was strikingly correlated with Progesterone-related thinning of the monkey’s vaginal lining. However, monkeys exposed to SIV throughout the entire menstrual cycle had a much lower risk of infection, an important observation since women at risk for HIV infection are likely to be exposed to the virus throughout most of their menstrual cycle (Marx, 2003). Studies done in Rwanda, USA, Zambia and Zaire found that hormonal contraceptives do not affect the risk of HIV transmission. However, an earlier study found a possible increased risk to HIV infection with use of hormonal contraceptives and a more recent one found a protective effect (Sengendo, 1999).

A 10 year prospective cohort study of female sex workers in Mombasa Kenya (1993 to 2003) showed increase in susceptibility and infectiousness to HIV with use of hormonal contraceptive pills and injectables. This was shown by a hazard ratio of 1.8, 95% C.I of 1.4-2.4. Women who used the implantable contraceptive, Norplant were at increased risk of acquiring HIV although this was not significant statistically (Marx, 2003).
However, it is not known whether such risks also apply to clients of family planning services, whose overall risks of acquiring HIV is typically lower than that of sex workers. In a prospective study done in Rakai, Uganda to examine the association between hormonal contraceptives and HIV acquisition in a general population, there was no significant association (WHO, 2003). Two new studies in Thailand, Zimbabwe and South-Africa found no overall increase in risk of acquiring HIV infection in women who used hormonal contraception compared to those using non hormonal methods or no contraceptive methods (WHO, 2005).

Most studies on this topic have been limited by imprecision in the measurement of contraceptive exposure, insufficient data to make recommendations to women regarding the effect of contraceptive choices and its relationship to the timing of HIV acquisition, as well as by potential confounding factors such as concurrent STDs and sexual behavior.

Thus there remain insufficient data on the risk of HIV acquisition since the past studies on the subject have reached inconclusive results (Sengendo, 1999). Clear evidence of any harmful effect should be established before any changes in recommendations are made regarding this highly effective method of fertility control (WHO, 1998). In an effort to fill in the existing gaps on this area, a cross-sectional study was done to get mainly the history of contraceptive use and the current HIV status of the study subjects.
3. METHODOLOGY

3.1 Research design

Analytical cross-sectional study design was used. Primary data was collected from the study subjects. Where applicable, secondary data was also collected mainly involving the form of contraception used prior to getting pregnant and the HIV status at the time of study.

3.2 Study variables

HIV status was regarded as the dependent variable. Use of hormonal contraceptives and socio-demographic variables were regarded as independent variables.

3.3 Study area

The study was done at Machakos District hospital in Eastern province of Kenya. (Appendix 6.5). Machakos district is one of the twelve Districts that comprise the Eastern Province. Machakos covers an area of 6,281 square kilometers. It has a population of 1102934 projected to 2006. It is within Eastern province in Kenya. The most occupants are Kambas with a minority of other tribes from all over the country. It has a population growth rate of 2.8% per annum. Machakos district borders Kitui to the east, Makueni to the south, Nairobi and Kajiado to the west, Embu and Thika to the north. The district has 12 administrative divisions, 62 locations, 226 Sub locations and 5 local authorities (ROK, 1997).
It acts as the referral hospital in the district from its three Sub – district hospitals. The hospital is in central division of Machakos District. It lies approximately 64 km east of Nairobi (Capital city of Kenya) and 16 km off the Nairobi–Mombasa road. Poverty level in the District is 58%. HIV prevalence in the Eastern province is 2% for males and 6% among women. It has a population density of 157 persons per km² and fertility rate of 5.8 per woman. This is higher than the National average fertility rate of 4.8 (KDHS, 2003).

Machakos central division forms the main catchment area for the District Hospital. It consists of six locations (Muvuti, Kimutwa, Katheka Kai, Mutituni, Mua Hills and Ngelani). The health facilities in the locations refer their antenatal mothers to the PMTCT of HIV programme at the district hospital. The division contains approximately 32,131 households and covers an area of 491.5 km². By the end of 2004, HIV prevalence in the district was 8.7%, which is higher than the national prevalence of 7%. It’s for this reason that the study area was chosen. Duration of the study and financial factors were also considered.

3.1.1 Demography

The district has a population of 1102934 persons projected to 2006 and a population density of 157 persons per Km² (ROK, 1999) Poverty level in the district is 66% with a life expectancy of 55.1 years for males and 62.8 years for the females. The district has a population growth rate of 2.8% (KDHS, 2003)
3.1.2 The health care system

In Machakos, the health facilities are not evenly distributed throughout the district. For instance, out of the seven hospitals within the District, five of them are within the Machakos town, including the district hospital. The average in-patient and out-patients attendance at the Machakos General hospital is 473 and 517 patients per day respectively (ROK, 1999).

3.1.3 Road network and infrastructure

The classified road network of Machakos District covers a distance of 1,562,9 kilometers. Despite the extensive road network, its distribution in the district is not even and the condition of the road is also not very good throughout the year. Some of the roads include Nairobi-Mombasa, Nairobi-Garissa, Nairobi-Kitui and Nairobi-Kangundo which all have a heavy traffic flow (ROK, 1997)

The district has all weather (murram) roads that are fairly well maintained leading to the rural areas thus making rural areas accessible.

3.1.4 Social economic activities

In Machakos District, most people practice small-scale farming and livestock keeping and this explain why many young people move from rural areas to urban areas to search for employment. Most houses are permanently built with stones and iron sheet roofs. The poorer ones build mud and grass thatched houses.
3.4 Target population

All women using a method of contraception and are at risk of HIV infection within Machakos district. The hospital has a catchment population of 143,274 persons and serves an average of 8700 antenatal mothers annually under the PMTCT programme. On average, 51% of the women in 15-49 year age group in the district use a form of contraception. 90% of them use hormonal form of contraception in pill, implants and injectable forms (KDHS, 2003).

3.5 Sample size and sampling techniques

3.5.1 Sample size determination

Since it was not possible to get all the women on contraceptives and test their HIV status, the study subjects were drawn from antenatal mothers who were visiting the hospital for PMTCT services. This was because the programme allowed for counseling and HIV testing. On average, 8700 mothers visit the unit for PMTCT services. This formed the sampling frame of the study from where the sample size was drawn using sampling for an attribute with 90% (0.9) as the proportion of mothers using hormonal contraceptives in the District (KDHS, 2003).

The number being less than 10,000 the formula for sample size calculation was as follows.

\[ n_f = \frac{n}{1 + \left( \frac{n}{N} \right)} \]
Where \( nf \) = The desired sample size (when the population is less than 10,000)

\[ n = \text{The desired sample size when the population is more than 10,000} \]

\[ N = \text{The estimate of the study population.} \]

\[ n = \frac{Z^2 p q}{d^2} \]  
(\text{WHO, 1999})

Where \( n \) = the desired sample size (if the target population is greater than 10,000)

\[ Z = \text{The standard normal deviate at the required confidence Interval / Level} \]

\( P = \) The proportion of the target population estimated to have characteristics being measured, in this its the women in the division using hormonal contraceptives (0.9) (KDHS, 2003).

\( q = 1-p = 1-0.9 = 0.1 \)

\[ d = \text{level of statistical significance set usually } \alpha = 0.05 \text{ or } 0.02 \]

Thus

\[ n = \frac{(1.96)^2 (0.9) (0.1)}{(0.05)^2} = 138 \]

\[ nf = \frac{138}{1 + 138 / 1004} \]

- Where 1004 was the average number of mothers visiting PMTCT clinic within 8 weeks

\[ = 122 \text{ Study subjects} \]

3.5.2 Sampling technique

Systematic sampling was done to get the required study subjects. Systematic probability sampling technique was applied to know at which interval a study subject was to be
selected who met the inclusion criteria. The following formula was used to get the study subjects.

\[
K = \frac{\text{Estimated total population}}{\text{Desired sample size}} = \frac{1004}{122} = 8.2
\]

(Mugenda and Mugenda, 1999)

Thus every 8\textsuperscript{th} antenatal mother visiting the PMTCT clinic who had no history of consisted condom use was handled as a study subject.

3.6 Construction of research instruments

In order to allow for clarification of issues by both the researcher and study subjects, the research instruments for this research were designed as a researcher administered questionnaire which was self designed. The questionnaire was designed to capture primary data. Secondary data was to be gotten from the participants’ hospital attendance documents such as antenatal visit cards, out patient cards or discharge summaries of those who had been admitted in hospital before execution of the study.

The questionnaire was framed in such a way that essential information was to be collected in line with the research questions. This information included socio-demographic characteristics, sexual, reproductive and contraceptive history as well as past HIV risk exposures. Lastly but not the least, questions to capture past HIV test and the present HIV status of the study subjects were included in the questionnaire.
3.7 Pilot study

Several questionnaires were pre tested at Kangundo District Hospital. This was at their PMTCT unit. 15% of the participants had a positive HIV status whereas the remaining 85% had a negative status. Pre-testing of the research instruments helped to improve them more so in clarification of the found ambiguities since this study gave baseline measures of the main study.

3.7.1 Validity

According to Coolican (1994), Validity refers to whether a measure is really measuring what it was intended to measure. In order to ensure data quality, cross-checking and inspection of the information gotten from the pilot study was done. The study instrument was adjusted to ensure content, productive, concurrent and face validity.

Appropriate collective measures ensured that the instruments gathered valid information during the study. All the pre tested subjects were comfortable with the content information that the researcher wanted to know about then. This was in areas of socio-demographic information, contraceptive issues, reproductive issues, past and present HIV status upon diagnosis. This response helped to ascertain content validity of the research instrument. In addition, research questions framed in view of the objectives helped to increase validity of the study.
3.7.2 Reliability

The collected pre tested data was analyzed to ensure that it helped to answer the study questions. Any required corrections were made. In addition the questionnaire were administered in Kamba, Kiswahili and English depending on the language that a study subject preferred or understood better.

Where applicable, double checking of the information given was done while getting response from a study subject in order to raise the level of reliability further on the information given. Throughout the study a standard 0.05 level of significance was adopted as a measure of reliability. Because this is a standard mean error, the results can be trusted and depended upon.

Simple analysis of the information from the pilot study ensured that areas in the study instrument with contradictory information were replaced with corrected statements and questions. This ensured that the instruments were appropriate for collecting the essential data required in the main study.

3.8 Data collection techniques

The principle investigator did the data collection. All the elements of the research instruments were collected for the antenatal mothers who met the inclusion criteria. Majority of the study respondents came from Machakos and Makueni Districts.
Data collection procedure was done concurrently with the PMTCT of HIV programme for the antenatal mothers in the clinic for about 8 weeks when the sample size was obtained. The study participants included every 8\textsuperscript{th} non-consisted condom user who was an antenatal mother visiting the clinic for PMTCT among other services.

All the sampled study respondents participated. The procedure mainly involved taking of socio-demographic data, sexual, reproductive and contraceptive history. In addition, a possible HIV exposure in the past and the current HIV status was taken for each study subject. This information comprised the primary data. Pre- counseling for HIV test was done first followed by collection of study information if the client met the inclusion criteria. Post- test counseling was done after the HIV results were out. This was followed by appropriate action. Where applicable, secondary data was derived from the respondents discharge summaries, outpatient and antenatal cards. This was especially so on history of STI which was not easy to get as primary data from the study participants.

To avoid biasness in collecting other information, both the researcher and the study subjects checked the subjects HIV status after all the other information had been gathered.

The research instrument being a researcher administered questionnaire had the advantage of collecting adequate information. Moreover, most of the required information was collected during the time of giving HIV results under PMTCT programme. The mothers (study respondents) were found to be willing to share more information especially on
their sexual, reproduction and contraceptive history at the time of receiving their HIV results.

3.8.1 Inclusion criteria

- All antenatal mothers who had used contraceptives except condoms for at least six months prior to becoming pregnant. This ensured that the contraceptive had physiological effects in the woman's body appropriate to enable analysis of its association with HIV status of the woman.

- All the mothers who had used other forms of contraception in their lifetime other than condoms, which have a protective effect. The non-regular condom users were included in the study.

- Antenatal mothers who had never used any form of contraceptive at all in their lifetime.

3.8.2 Exclusion criteria

- Antenatal mothers who had used condoms on every sexual encounter prior to becoming pregnant. This was due to the protective nature of condoms against HIV infection besides their contraceptive properties.

- Mothers who did not consent for the study.

- All antenatal mothers who declined to participate in the study.
3.9 Logistical and ethical considerations

Research clearance was obtained from the Ministry of Education Science and Technology, Kenyatta University, Ministry Of Health, Eastern Provincial administration and Machakos General Hospital Board. Adequate explanation and written consent was sought from the study subjects. No names were included in the study questionnaires. Confidentiality of information gotten was highly maintained.
4: DATA ANALYSIS, RESULTS AND DISCUSSIONS.

4.1 Data analysis and presentation

Several statistical software packages were used for data management and analysis in order to enhance data quality. This included Epi Info and SPSS. The data was therefore presented in frequency tables, proportions, bar graphs, relative frequencies, 95% confidence intervals, box and whisker plots, pie charts and contingency tables. Sero-positive women who had used hormonal contraceptives were taken as the cases whereas those without history of using hormonal contraceptives were handled as the controls. Data was then analysed using Chi square test of independence and Spearman Rank Correlation coefficient to study the presence or absence of any association between use of hormonal contraceptives and HIV transmission. Several measures of risk of HIV infection due to utilizing hormonal contraceptives were analysed using Odds ratio, Experimental Event Rate and Control Event Rate from the contingency tables.

4.1.1 Data quality control methods

In order to ensure data quality, cross checking and inspection of the information on the questionnaire forms was done. The research instruments were scrutinized to ensure that the data collected was accurate and unambiguous. This exercise was done concurrently with data collection in order to ensure completeness, consistency and uniformity of the collected data.
To ensure accuracy, all study instruments with incorrect contradictory information were discarded and replaced with others. All questionnaire data were dually entered and verified before being analyzed. Dual or duplicate entry decreased the likelihood of errors because it is unusual for the same entry error to occur twice.

Moreover, the statistical tools (Epi Info and SPSS programmes) utilized for data entry and analysis contained interval checks which alerted the analysing technician on any missing variables and so due correction was made there and then.

Furthermore, critical investigation for inconsistencies between information presented in the figures and information discussed in the text was made. Multiple comparisons of various independent and dependent variables helped to ensure validity of the data.

At the proposal development stage, power analysis to determine the appropriate and representative sample size (122) for this study was done. To increase the power of the study further, extra 22 respondents were added giving a total of 144 study subjects.
4.2 Results

4.2.1 Socio-demographic characteristics of study subjects

4.2.1.1 Residential district

About 79.9% (115) of the respondents were Machakos District residents whereas 15.3% (22) were from Makueni district. The remaining 4.9(7) were from other districts. Among the respondents, 8 from Machakos District, 2 from Makueni and 2 from other districts had a positive HIV status irrespective of the form of contraception used. The rest, 132 respondents had a negative serostatus.

Table: 4.2.1.1 Distribution of the respondents by residential districts

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>FREQUENCY</th>
<th>PERCENTAGE</th>
<th>CUMULATIVE PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machakos</td>
<td>115</td>
<td>79.9</td>
<td>79.9</td>
</tr>
<tr>
<td>Makueni</td>
<td>22</td>
<td>15.3</td>
<td>95.1</td>
</tr>
<tr>
<td>Others</td>
<td>7</td>
<td>4.9</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>144</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
4.2.1.2 Type of residence

About 102 (70.8%) of the study respondents lived in the rural settings while the rest 42 (29.2%) lived in urban centers. 6 respondents from urban areas and 6 from the rural areas had a positive serostatus.

Figure 4.2.1.2 Distribution of the respondents by type of residence.
4.2.1.3 Age of the study subjects

The study indicated that 76 (52.8%) of the respondents were in 15-25 years age group, 59 (41%) were in the 26-35 years age group while only 9 (6.3%) were found to be in the 36-45 years age group. Mean age of the respondents was 25 years.

Table 4.2.1.3 Frequency table of the ages of study respondents

<table>
<thead>
<tr>
<th>AGE GROUP (years)</th>
<th>FREQUENCY</th>
<th>PERCENT</th>
<th>CUMULATIVE PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-25</td>
<td>76</td>
<td>52.8</td>
<td>52.8</td>
</tr>
<tr>
<td>26-35</td>
<td>59</td>
<td>41.0</td>
<td>93.8</td>
</tr>
<tr>
<td>36-45</td>
<td>9</td>
<td>6.3</td>
<td>100</td>
</tr>
<tr>
<td>Total Number</td>
<td>144</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
4.2.1.4 Marital status

Majority of the respondents (86.1%) were in a monogamous heterogeneous marriage. 6.3% of the respondents were not married and the same number had a steady partner not living together. Only 0.7% of the respondents were divorced and a similar proportion had steady sexual partners but not living together.

Table: 4.2.1.4 Distribution of the respondents by their marital status

<table>
<thead>
<tr>
<th>MARITAL STATUS</th>
<th>FREQUENCY</th>
<th>PERCENT</th>
<th>CUMULATIVE PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never married</td>
<td>9</td>
<td>6.3</td>
<td>6.3</td>
</tr>
<tr>
<td>Steady partner, not living together</td>
<td>9</td>
<td>6.3</td>
<td>12.5</td>
</tr>
<tr>
<td>Steady partner, Living together</td>
<td>1</td>
<td>0.7</td>
<td>13.2</td>
</tr>
<tr>
<td>Married, monogamous</td>
<td>124</td>
<td>86.1</td>
<td>99.3</td>
</tr>
<tr>
<td>Separated/ divorced</td>
<td>1</td>
<td>0.7</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>144</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
4.2.1.5 Highest level of education

A small proportion (0.7%) had no formal education. However 51.4% of the respondents had attained primary education, 42.4% had attained high school education while only 5.6% of the study subjects had gone to colleges.

Table 4.2.1.5 Frequency table for the respondent’s highest level of education achieved

<table>
<thead>
<tr>
<th>HIGHEST LEVEL OF EDUCATION</th>
<th>FREQUENCY</th>
<th>PERCENT</th>
<th>CUMULATIVE PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>1</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Primary</td>
<td>74</td>
<td>51.4</td>
<td>52.1</td>
</tr>
<tr>
<td>Secondary/high school</td>
<td>61</td>
<td>42.4</td>
<td>94.4</td>
</tr>
<tr>
<td>Tertiary, college/university</td>
<td>8</td>
<td>5.6</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>144</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
4.2.1.6 Occupation of the study subjects

The results indicated that majority (47.2%) of the study subjects were housewives. About 27.8% of the respondents held skilled jobs mainly small-scale businesses whereas 9% were in professional jobs such as teaching, accounting, health service providers among others. Very few of the study subjects (7.6%) where peasant farmers while 2.1% did unskilled jobs such as house helping. Only one respondent was a student.

Figure 4.2.1.6: Distribution of the respondents by their occupation
4.2.1.7 Occupation of the sexual partner

Among the study participants, 52.8% had their sexual partners in skilled occupations, which mainly involved small businesses. A proportion of 22.9% had sexual partners in professional jobs while 22.2% of the sexual partners were in unskilled jobs. 1.4% were jobless whereas only 0.7% of the respondents had sexual partners who were students.

Figure 4.2.1.7: Distribution of the respondents by the occupation of their sexual Partners
4.2.1.8 Ethnicity of the study subjects

About 94.4% of the respondents were Kambas, 1.4% were Kikuyus and a similar percentage were Luos. 2.1% were Luhyas while only 0.7% came from other ethnic groups.

Figure 4.2.1.8 Distribution of the study subjects by their ethnicity
4.2.2 Sexual, reproductive and contraceptive aspects of the study

4.2.2.1 Age at first marriage

Majority of the respondents 49.3% got married in the 15-20 years age group. However, 30.6% of them were married in 21-25 years age group. 6.9% of the study subjects got married in 26-30 years age group. 13.2% had never been married by the time the study was conducted. Mean age at first marriage was 21 years.

Table 4.2.2.1 Frequency table for the respondent’s age at first marriage

<table>
<thead>
<tr>
<th>AGES (Years)</th>
<th>FREQUENCY</th>
<th>PERCENT</th>
<th>CUMULATIVE PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-20</td>
<td>71</td>
<td>49.3</td>
<td>49.3</td>
</tr>
<tr>
<td>21-25</td>
<td>44</td>
<td>30.6</td>
<td>79.9</td>
</tr>
<tr>
<td>26-30</td>
<td>10</td>
<td>6.9</td>
<td>86.8</td>
</tr>
<tr>
<td>Never married</td>
<td>19</td>
<td>13.2</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>144</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
4.2.2.2 Age at first pregnancy

Very few, 2.1% of the study subjects became pregnant for the first time at an age below 15 years of age. The results indicated that 53.5% of the respondents got their first babies during the 15-20 years age group. About 7.6% got pregnant for the first time at the age of 26-30 years. Only 0.7% got pregnant at 31-35 years of age. Mean age at first pregnancy for the study respondents was 21 years.

Table: 4.2.2.2 Distribution of the respondents by age at first pregnancy

<table>
<thead>
<tr>
<th>AGES</th>
<th>FREQUENCY</th>
<th>PERCENT</th>
<th>CUMULATIVE PERCENT</th>
</tr>
</thead>
<tbody>
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<td>&lt; 15 years</td>
<td>3</td>
<td>2.1</td>
<td>2.1</td>
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<tr>
<td>15-20 Years</td>
<td>77</td>
<td>53.5</td>
<td>55.6</td>
</tr>
<tr>
<td>21-25 Years</td>
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<td>99.3</td>
</tr>
<tr>
<td>31-35 Years</td>
<td>1</td>
<td>0.7</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>144</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
4.2.2.3 Number of sexual partners

Most of the respondents 98.6% had had only one sexual partner over the past one year. Only 1.4% of the study subjects agreed to have had more than one sexual partner within the last twelve months.

Figure 4.2.2.3 Distribution of the respondents by their sexual partners
4.2.2.4 Separate residence of the sexual partner

It was found that 54.2% of the respondents lived separate from their sexual partners mainly due to distant working stations. The rest (45.8%) of the respondents lived in the same residence with their sexual partners.

Figure: 4.2.2.4 Distribution of the respondents on the residence of the sexual partners
4.2.2.5 Number of children for the respondents

Only 20.8% of the respondents had no children. 61.8% had one to two children, whereas 13.9% had three to four children. Only 2.1% of the respondents had five to six children while 0.7% had more than six children.

Table 4.2.2.5 Respondents distribution by the number of children

<table>
<thead>
<tr>
<th>NUMBER OF CHILDREN</th>
<th>FREQUENCY</th>
<th>PERCENT</th>
<th>CUMULATIVE PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>89</td>
<td>61.8</td>
<td>61.8</td>
</tr>
<tr>
<td>3-4</td>
<td>20</td>
<td>13.9</td>
<td>75.7</td>
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<tr>
<td>5-6</td>
<td>4</td>
<td>2.8</td>
<td>78.5</td>
</tr>
<tr>
<td>None</td>
<td>31</td>
<td>21.5</td>
<td>100</td>
</tr>
<tr>
<td>TOTAL</td>
<td>144</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
4.2.2.6 Use of a family planning method

77.1% had used a family planning method by the time of the study. The remaining 22.9% had not used any form of family planning in their life time.

Figure 4.2.2.6 Distribution of respondents by use of family planning method
4.2.2.7 Type of family planning used

Among the respondents who used family planning methods, 59% used injectables, 31.2% used oral pills, and 6.2% had used Norplant implants while 3.6% used Intra Uterine Contraceptive Devices (IUCD).

Figure 4.2.2.7 Respondents distribution by type of family planning
4.2.2.8 Family planning whether hormonal

The study revealed that 4.5% of the respondents who used a form of family planning had not used hormonal forms of contraception. The methods used here were mainly Intra Uterine Contraceptive Devices (IUCD). The remaining 95.5% of the respondents had used hormonal forms of contraceptives in different forms either in injectables, oral pills, or hormonal implants.

Figure 4.2.2.8 Family planning hormonal or not
4.2.2.9 Age of the pregnancy of the respondents by months

Majority of the study respondents (41%) were 5-6 months pregnant. 37.5% were found to be 7-9 months pregnant while 13.2% were 3-4 months pregnant. About 4.9% had 1-2 months pregnancy whereas 3.5% of the respondents did not know the age of their pregnancy.

Figure 4.2.2.9 Gestational age of respondents' pregnancies
4.2.2.10 Condom use with a steady partner over the last twelve months

The results indicate that 92.4% of the study subjects had never used condoms, whereas 7.6% used condoms irregularly with a steady sexual partner.

Figure 4.2.2.10: Respondents distribution on condom use with a steady partner

Condom use with a steady partner over the last 12 months
4.2.2.11 Condom use with a non-steady partner

99.3% of the respondents had no non-steady sexual partner(s) over the last twelve months. The remaining 0.7% of the respondents used condoms occasionally with a non-steady partner.

Figure 4.2.2.11: Respondents distribution on condom use, with a non-steady partner.
4.2.3 HIV Tests and risk exposures in the past

4.2.3.1 Distribution of the respondents according to history of STI.

The results indicated that 12.5% of the respondents had a history of sexually transmitted infection. 87.5% of the respondents had no history of such infection.

Table 4.2.3.1. A contingency table showing history of STI distribution

<table>
<thead>
<tr>
<th>HISTORY OF STI</th>
<th>CURRENT HIV STATUS</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Negative</td>
<td>Positive</td>
<td>TOTAL</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>17</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>115</td>
<td>11</td>
<td>126</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>132</td>
<td>12</td>
<td>144</td>
</tr>
</tbody>
</table>
4.2.3.2 Time of STI infection

50% of those with history of STI got the infection within the past 1-6 months. 27.8% got the infection more than a year ago while the rest of 22.2% got the infection 7-12 months ago.

Figure 4.2.3.2 respondents distribution according to time of STI
4.2.3.3 Type of STI suffered

Among those who had suffered from STI, about 50% had ailed from Genital Ulcer Disease (GUD). 22.2% had suffered from Gonorrhoea and a similar percentage had suffered from candidiasis. Only 5.5% had gotten an infection of genital warts.

Figure 4.2.3.3 Distribution according to the type of STI suffered
4.2.3.4 HIV test after STI diagnosis

76.5% of mothers with history of STI did not get HIV test after the infection. Only 23.5% went for HIV testing after the STI infection.

Figure 4.2.3.4 A pie chart for HIV test after STI diagnosis
4.2.3.5 HIV results after STI

All those who went for HIV test after the STI had a negative serostatus.

Figure 4.2.3.5 Distribution of the respondents by HIV status after STI diagnosis
4.2.3.6 Duration between STI infection and HIV test

Half (50%) of those who went for HIV test after the STI were tested within 6 months after STI infection. 25% went for the HIV test 7-12 months after the STI diagnosis while the remaining 25% went for HIV test after a period exceeding one year.

Figure 4.2.3.6 Duration between STI infection and HIV test

When HIV test was done
4.2.3.7 Distribution of the respondents based on STI treatment

All the respondents with a history of STI had gone for treatment by the time the study was being conducted.

Figure 4.2.3.7 Respondents distribution on STI treatment
4.2.3.8 Duration of commencing treatment for the STI

Study subjects with a history of STI all went for treatment within six months after the infection.

Figure 4.2.3.8 Commencing STI treatment
4.2.3.9 History of blood transfusion for the respondents

Only 3.5% of the study subjects had been transfused. The remaining 96.5% had not received any blood transfusion.

Figure 4.2.3.9 Subjects distribution on history of blood transfusion
4.2.3.10 Distribution of the respondents according to the time of blood transfusion

All the study subjects who had been transfused at the time of the study had been transfused more than twelve months ago.

Figure 4.2.3.10 Distribution according to the time of blood transfusion
4.2.3.11 HIV test after blood transfusion.

40% of the transfused respondents had gone for post transfusion HIV testing. However 60% did not get HIV test after their latest blood transfusion.

Figure 4.2.3.11 Post transfusion HIV test
4.2.3.12 Respondent’s distribution according to post transfusion HIV results.

All the respondents who got HIV test after transfusion had a negative status.

Figure 4.2.3.12 Post transfusion HIV results
4.2.3.13 Duration of HIV test after blood transfusion

It was clear that half (50%) of the respondents got post transfusion HIV test within 7-12 months after transfusion. The remaining 50% went for HIV test in a period more than one year after the blood transfusion.

Figure 4.2.3.13 HIV test after blood transfusion
4.2.3.14 HIV test in the past

The results indicated that 59% of all the study subjects had not gone for HIV test before the execution of the study. Therefore only 41% of the respondents had gotten an HIV test before.

Figure 4.2.3.14 A bar graph showing history of HIV test in the past
4.2.3.15 Distribution of the respondents by the time of past HIV tests.

From the results, it was clear that 13.5% of the subjects had gone for the HIV test 1-2 months before the time of the study. Whereas 8.3% had the test 3-4 months prior to the time of the study while 11.7% had the test about 4-7 months ago. The remaining 66.7% had gone for the HIV test more than 6 months prior to the time of this study.

Figure 4.2.3.15 Distribution of the respondents by the time of past HIV tests.
4.2.3.16 Results of HIV test before the current pregnancy

The results indicated that 91.4% of the respondents had a negative HIV results from past HIV tests. However, 5.2% of the respondents had a positive result whereas 3.4% could not remember their past HIV results.

Figure 4.2.3.16 Respondents distribution by Past HIV tests
4.2.3.17 Reason for previous HIV tests

Majority of the respondents (58.3%) had been tested under the PMTCT programme for a previous pregnancy. 23.3% had been tested under VCT programmes because they wanted to know their HIV status. 10% were had been tested because they were ill. About 6.7% of the respondents were tested while getting married whereas only 1.6% had gone for the test due to employers request for occupational purposes.

Figure 4.2.3.17 Reason for previous HIV tests
4.2.3.18 Respondents distribution according to current HIV results

91.7% of the respondents had a negative sero status while 8.3% of them had a positive HIV results at the time when the study was conducted.

Figure 4.2.3.18 Current HIV status of the study subject.
4.3 Discussions

4.3.1 Relationships and associations between the study variables

4.3.1.1 Hormonal contraceptives and HIV status

The results indicated that there was no significant dependency relationship between the use of hormonal contraceptives and the risk of HIV acquisition ($\chi^2 = 0.01$ 1df, ***$p\geq 0.05$). These values do not give enough evidence to reject the null hypothesis at $\alpha = 0.05$ level of significance. The same evidence was given by the Odds Ratio of 1, 95% confidence interval CI 0.23-3.92. This was further supported by a similar Control Event Rate and Experimental Event Rate. All these analysis supported the fact that the risk of HIV infection among hormonal contraceptive users and non-hormonal contraceptive users is equivalent indicating that use of hormonal contraceptives does not increase or decrease the risk of HIV acquisition.

These findings concur with the results of a prospective study done in Uganda to examine the association between hormonal contraceptives and HIV acquisition in a general population (WHO, 2003).

4.3.1.2 Association between other STIs and HIV

The presence of reproductive tract infections is strongly associated with susceptibility to HIV, even after adjustment for sexual behavior. The prevalence of genital ulcer disease
(chancroid, syphilis, or herpes) is associated with an increased relative risk of HIV infection, ranging from 1.5 to 7.0 in both men and women. (Kapiga et al 1994).

Gonorrhea and chlamydia and trichomonas infection are associated with a relative increase of 60 to 340 percent in the prevalence of HIV infection in men and women. Bacterial vaginosis has also been shown to be associated with HIV infection. In women, genital ulcer disease may have a potentiating effect on the incidence of HIV infection. (Wasserheit 1992):

Measurement of HIV in genital secretions indicates that HIV infectiousness may be greater in the presence of concurrent reproductive tract infections. Treatment of urethritis diminishes the detection of HIV in the urethra and the concentration of HIV in semen. A twofold increase in HIV detection associated with sexually transmitted diseases or with purulent cervical secretions has been observed in two studies of women, but no association was noted in another (Laga et al 1993).

Sexually Transmitted Infections (STIs) have spread very fast among sexually active groups. The results of this study confirmed that there is a significant association of STIs and HIV ($\chi^2 = 81, 1df, ***p \leq 0.0001$). OR of 2.31 with a 95% confidence interval of 1.151-11.31 supported these findings further. This concurs with past findings in other studies. For instance, in 2002 HIV prevalence was 23% in women with an STI syndrome and 37% in women with genital ulcer disease (KDHS 2003).
Similarly HIV prevalence among those who sought treatment for the STIs was low compared to those who did not seek early treatment. Treating STIs has been shown to reduce the spread of HIV by reducing the amount of virus shed in the genital tract of those infected and reducing susceptibility to HIV infection among those not infected (MOH, 2005).

This association could further be explained by the fact that Sexually Transmitted Infections (STIs) spread very fast among sexually active groups. STIs and HIV are both spread through the same type of risky behavior such as having multiple partners and frequent partner change. Common STIs, especially those that cause genital ulcers, facilitate rapid entry of HIV into the body (MOH, 2005).

<table>
<thead>
<tr>
<th>History of STI</th>
<th>CURRENT HIV STATUS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negative</td>
<td>Positive</td>
</tr>
<tr>
<td>Yes</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>No</td>
<td>116</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL</td>
<td>132</td>
<td>12</td>
</tr>
</tbody>
</table>
4.3.1.3 Relationship between risk of HIV acquisition and marital status of the respondents

HIV prevalence among married people was 7% compared to 18.8% among the unmarried people. Similarly, the risk of HIV infection differed significantly among the unmarried compared to the married respondents holding the other factors constant (OR=2.71, 95% confidence interval of 1.65-11.33). However when age, socio economic status, type of locality and past diagnosis of a sexually transmitted infection were combined in analysis, the risk of HIV infection did not differ significantly between the married and the unmarried ($\chi^2=1.43, 3\text{df } p \geq 0.05$).

These findings partially support the findings found in South Africa where this relationship was found to be complex depending on various demographic factors, sexual behaviour practices and socio-cultural issues (Simbayi et al, 2004).

4.3.1.4 Relationship between age of the mother and current HIV status

Participants of this study showed the highest prevalence of HIV among the less than 25 years age group with a prevalence of 10.1%. The 26-35 year's age group had a 9% HIV prevalence whereas among the subjects aged over 35 years, none of them had a positive HIV status.
A closer look at the results indicated that HIV incidence and the risk of acquisition was higher in the young age group (OR=1.9, 95% confidence interval of 1.3-6.7. A Chi-square test of independence indicated a very strong association between an individual's age group and the risk of HIV acquisition ($\chi^2 = 419$ 3df **p≤0.001).

4.3.1.5 Relationship between place of residence and HIV acquisition

The results indicated that mothers living in urban areas have almost 3 fold higher risk of acquiring HIV than those living in rural areas (OR =2.7 and 95% confidence interval 1.806-8.81). This association was indicated by Chi-square test of Independence with $\chi^2 = 25.00$ 1df *p ≤0.05.

These observations are similar to a study done in Nakuru district of Rift Valley, Kenya where HIV/AIDS prevalence was found to be a more serious problem in urban than in rural areas (Bauni, 1998)

4.3.1.6 Relationship between duration of contraceptive use and HIV status.

The results indicated that there is no relationship between the duration of hormonal contraceptives use and HIV status. ($\chi^2 = 2.33$ 1df p≥ 0.05). This could be explained by the fact that there was no relationship found between use of contraceptives and susceptibility to HIV infection in this study and in other studies (WHO, 2003).
4.3.1.7 Relationship between HIV and blood transfusion

Results of this study indicated a strong association between blood transfusion and HIV infection risk ($\chi^2 = 136$ 1df and ***$p \leq 0.0001$). This was further demonstrated by risk ratios specifically, Odds Ratio (OR) of 2.9, with 95% Confidence Interval of 2.298-28.16. Thus blood transfusion has almost 3 fold increase of the chance of HIV acquisition in comparison to no blood transfusion whose Control Event Rate was 0.08 and Experimental Event Rate was 0.2, indicating no risk.

These results confirm findings by other researchers who argued that though blood transfusion is not a major route of HIV transmission, it has been estimated to cause 5-10% of HIV cases worldwide (MOH, 2005).

Therefore even though it’s a form if treatment, its still a risky intervention. Voluntarily donated units of blood must be carefully screened for the presence of transfusion-transmissible infections, including HIV.

4.3.1.8 Use of condoms

A few of the study subjects were found to have used condoms with steady or non-steady sexual partners (7.6%). However none of the study subjects reported consisted condom use regardless of the nature of the sexual partner. This results support the findings by some studies done earlier in sub-Saharan Africa indicating that consisted use of
condoms among women of reproductive age exceeds 1% only in Botswana, Ghana, Malawi, Zambia and Zimbabwe.

These findings could be attributed to several factors, namely;

a) Lack of knowledge and confidence in the ability of condoms to protect against disease.

b) In Sub-Saharan Africa, trends in fertility regulation have favored methods that are controlled by women and can be used without the partner’s knowledge but that do not protect from STIs. This is mainly due to the low status of many women and the tolerance of male promiscuity which hinder the women from negotiating about safe use of barrier methods.

c) The inconsistent nature of condom use within the general population.

Results of this study indicate no overall protection against HIV acquisition in women who reported some encounters of condom use. This is largely because of the inconsistent nature of condom use. This finding supports other studies which suggested that only consistent condom use is protective against HIV/STIs.

4.3.1.9 Level of education and HIV prevalence

The prevalence was low (5.7%) among the study subjects with primary level of education. Among the mothers whose highest level of education was high school the prevalence was found to be 11% whereas the prevalence was 14% among mothers who had attained college/University education. These findings contrast earlier findings indicating that educated women are more likely to prevent HIV infection by both
delaying sexual activity and taking protective measures if they have to engage in such an activity (Ahlburg et al, 1994).

Many factors contribute to findings of this study in this aspect. It's true that majority of girls who go to high schools and colleges become sexually active when they are still in school, a factor that may contribute to their having multiple sexual partners which is a major contributory factor to HIV infection. In contrast, girls who attain primary level of education tend to marry at a young age. This reduces their number of lifetime sexual partners and so the rate of HIV infection among them (United Nations, 2004).
5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Summary

HIV/AIDS is a fatal disease that has no cure and no preventive vaccine. Each year, as the proportion of cases due to heterosexual transmission of HIV increases, proportionately more of those infected are women. To control their families many women use hormonal contraceptives. Some past studies have associated hormonal contraceptive use with increased risk of HIV acquisition; others have indicated reduced risk whereas others didn’t show any association. However, none of them had been done in Kenya.

This study was conducted as a cross-sectional study in Machakos District Hospital among the antenatal mothers visiting the hospital for PMTCT (Prevention of Mother To child Transmission of HIV). The main objective of this study was to determine the relationship between use of hormonal contraceptives and susceptibility to HIV among women since the past few studies on this subject have yielded inconclusive results. The study instruments were pre tested in MCH clinic of Kangundo Sub-District Hospital. Appropriate corrective measures were made on the instruments before the actual data collection.

Other study variables were analyzed against HIV status. This included socio-demographic information, sexual -reproductive and blood transfusion history among the study participants. The study was done in Machakos General Hospital as a cross-sectional study among the antenatal mothers visiting the antenatal clinic. It was incorporated in an ongoing programme of Prevention of Mother to Child Transmission of HIV (PMTCT).
Data was managed using Statistical Package of Social Studies (SPSS) and Epi INfo. The results didn’t show any significant evidence of association between hormonal contraceptives and the risk of HIV acquisition $\chi^2=0.01$, 1df $p\geq0.05$ and OR of 1). However, significant relationships between some socio-demographic variables and HIV status among the study participants were found. These variables included residential area, level of education, type of occupation among others.

5.1 Implications of the findings

The achieved findings implied that

- Women of child bearing age can use hormonal contraceptives without any fear of increased susceptibility to HIV infection.

- HIV prevalence is much higher in urban areas than in the rural areas and so more programmes to curb the spread of HIV should be promoted in urban areas.

5.2 Conclusion

- In general, the collected data indicates that hormonal contraceptive use is not associated with HIV acquisition. Therefore, this method of birth control can be promoted as an effective contraception even in areas with high HIV prevalence.
• Even though World Health Organization Contraceptive eligibility guidelines place no restrictions on the use of any hormonal method by women perceived to be at increased risk of HIV or other STIs, family planning providers should promote proper condom use in addition as a way of dual protection against HIV/STIs and unwanted pregnancies for such women.

• In the absence of conclusive evidence that hormonal contraception increases HIV/STI risks, family planning providers should be encouraged to promote hormonal contraception when it is appropriate for family planning to their clients.

• The relationship between marital status and HIV is complex. The risk mainly depends on various demographic factors and sex behavior practices. Thus, increased prevention strategies that take socio-cultural context into account are needed for married people.

5.3 Recommendations

Several recommendations were drawn from the results of this study. These included the following.

• Family planning clients should be counseled on the fact that hormonal contraceptives do not increase or decrease their HIV susceptibility.

• Family planning providers should be trained to provide HIV/AIDS counseling to
clients. They should also consider promotion of both hormonal methods in conjunction with condoms to clients perceived to be at increased risk of HIV infection.

- Countries need to see reproductive health as a priority. Resources should be provided to facilitate the integration of family planning and HIV service delivery and policies including adequate funds to ensure security of reproductive health commodities. Family planning programmes should develop strategies to access resources available for maternal health, adolescent reproductive health, HIV/AIDS and prevention of mother-to-Child transmission of HIV programmes.

- Since STIs have a strong association with HIV infection, it shows that people with an STI have a higher probability of being HIV infected than the general population. Thus, all people with an STI should be offered HIV testing and counseling as part of Diagnostic Testing and Counseling (DTC).

- Promotion of girls' primary and secondary education, and in general women's literacy. This is because basic education is a key factor in effective HIV/AIDS response since educated women are more likely to take protective measures.

- Blood Transfusion Services should be encouraged to strengthen the zero tolerance in transmitting transfusion related infections to recipients of blood and blood
products. This should be through adherence to quality standards in recruiting blood donors, screening and processing blood.

- Since majority (99.3%) of the HIV infected study participants claimed to have had a single sexual partner over the last 12 months, there is a strong indication that their sexual partners could have contributed to their infection. Therefore, involvement of men both in high risk of HIV / STI and in general population in reproductive health and HIV prevention must be strongly promoted. Because this has been done before with little improvement, new and creative ways to promote such involvement need to be explored.

- Family planning providers and STI sufferers need to be given information on the links between such infections and HIV. This will help to empower women to choose a method of fertility regulation that will prevent recurrence of the STI and probably subsequent HIV infection.

5.4 Further research needs

- Further analysis on the relationship between hormonal contraceptives and the risk of HIV acquisition among women should be encouraged. This will help in further clarification on this issue.
- Research on the interaction between hormonal contraception and HIV in specific sub-groups, particularly adolescents who are already very vulnerable to
HIV because of their low knowledge on HIV/AIDS. Most past studies have concentrated on commercial sex workers and women in the general population.

- Investigations on better understanding of how to effectively promote dual protection especially on optimization of counseling processes and techniques.
- Further investigation on tools for risk benefit assessment of using locally relevant data. Special consideration should be addressed to the broad risks and benefits of using hormonal contraceptives for appropriate policy adjustments on the issue.
- Since many study subjects expressed fear of being HIV infected citing their partners infidelity as the reason, there is need to research on gender differences that inhibit women's roles in sexual decision making and negotiation.
5.6 REFERENCES


Centres of Disease Control (1999), *Essentials of Contraceptives*, USAID Atlanta


Kenya Demographic Health Survey (2003), MOH Nairobi, Kenya.


6. APPENDICES

6.1. Logistics and ethical issues

Ministry of Science & Technology

Telegrams: "SCIENCE TEC", Nairobi
Fax No.
Telephone No: 318581
When replying please quote
MOS&T 13/001/36C 349/2

Matheka Emma Kanini
Kenyatta University
P.O. Box 43844
NAIROBI

Dear Madam

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on 'The role of Hormonal Contraceptives in HIV infection among Antenatal Mothers in Machakos District Hospital'

I am pleased to inform you that you have been authorized to carry out research in Machakos District for a period ending 30th August 2006.

You are advised to report to the District Commissioner, the District Education Officer and the Medical Officer of Health, Machakos District before commencing your research project.

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

Yours faithfully

M. O. Ondieki
FOR: PERMANENT SECRETARY

Copy to:
The District Commissioner – Machakos District
The District Education Officer Machakos District
The Medical Officer of Health – Machakos District
TO WHOM IT MAY CONCERN

RESEARCH AUTHORIZATION

This is to confirm that authority has been granted to Matheka Emma Kanini to carry out research on "The role of hormonal contraceptives in HIV infection among antenatal mothers in Machakos District Hospital" for a period ending 30th August 2006.

Kindly accord him the necessary support.

MAGIRI P. M.
FOR: DISTRICT EDUCATION OFFICER
MACHAKOS
OFFICE OF THE PRESIDENT

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION
MATHEKA BENA KAMINI

The above named student from Kenyatta University college has been authorized to conduct a research on "The role of Hormonal contraceptives in HIV Infection among Antenatal mothers in Machakos General Hospital" for a period ending 30th August 2006.

Any assistance accorded to her will be highly appreciated.

S M CIMBO
FOR DISTRICT COMMISSIONER
MACHAKOS

CC The HCH
MACHAKOS
6.2. STUDY CONSENT FORM

Declaration I hereby consent that the study has been explained to me and I voluntarily agree to participate in it.

Signature or thump print of the participant...................... Date..............
6.3. STUDY QUESTIONNAIRE

INSTRUCTIONS

1. The questionnaire is strictly for study purposes.
2. Information given here in will be held confidentially.
3. Names should not be indicated.
4. Please tick the right choice.

SECTION 1

Demographic Data

1. Mother antenatal clinic number.................

2. Which is your home District?
   □ Machakos
   □ Makueni
   □ Others

5. Place of residence
   □ Rural
   □ Urban

6. What is your present age?
   □ 15 to 25 years
   □ 26 to 35 years
   □ 36 to 45 years

7. Marital status.................
   □ Never married
   □ Steady partner, not living together
   □ Steady partner, living together
   □ Married, monogamous
   □ Married, polygamous
   □ Widowed
   □ Separated / divorced
8. Education
   □ None
   □ Primary
   □ Secondary/high school
   □ Tertiary, college/university

9. Occupation of the mother
   □ None
   □ Unskilled
   □ Skilled
   □ Professional
   □ Student
   □ Any other, specify

10. Occupation of the sexual partner
    □ None
    □ Unskilled
    □ Skilled
    □ Professional
    □ Student
    □ Any other, please specify

11. Ethnicity
    □ Kamba
    □ Luo
    □ Kikuyu
    □ Others specify
SECTION 2
Obstetric data

12. What was your age at first marriage?
   □ 15 to 20 years
   □ 21 to 25 years
   □ 26 to 30 years
   □ Never married

13. What was your age at first pregnancy?
   □ 15 to 20 years
   □ 21 to 25 years
   □ 26 to 30 years
   □ 31 to 35 years
   □ Below 15 years

14. What is the number of your sexual partners in the last 12 months?
   □ One
   □ More than one

15. Does your sexual partner have another place of residence?
   □ Yes
   □ No

16. How many children do you have?
   □ One to two
   □ Three to four
   □ Five to six
   □ None

17. Have you used any form of family planning methods?
   □ Yes  □ No

18. If Yes in 17 above,
(a) Name the form of contraception used in the last 6 months before getting pregnant
- Natural methods
- Injectable
- Oral pills
- Implants
- IUCD
- Any other, please specify 

(b) What was the duration of using the named contraceptive method?
- Less than a month
- 1-6 months
- 6-12 months
- More than one year

19. Approximately, how old is the pregnancy now (Gestation by months)
- 1-2 months
- 3-4 months
- 5-6 months
- 7-9 Months
- Do not know

20. Condom use in the last 12 months
   a) With a steady partner:
      - Never
      - Sometimes
      - Always
      - No steady partner
   b) With a non – steady partner
      - Never
      - Sometimes
      - Always
      - No non-steady partner
21. Do you have a history of sexually transmitted infection?

☐ Yes    ☐ No.

22. If yes in 21 above,

(a) When was this?

☐ 1-6 months ago
☐ 6-12 months ago
☐ More than a year ago
☐ Not applicable

(b) Which disease was it?

☐ Genital Ulcer Disease
☐ Gonorrhoea
☐ Candidiasis
☐ Not applicable
☐ Any other, specify ............

(c) Was HIV test done after the STD infection?

☐ Not applicable
☐ Not done
☐ Yes, negative
☐ Yes, positive
☐ Yes, do not know results
(d) If yes in 22 (c) above, how soon was the HIV test done after the STD infection?

- 0-6 months later
- 6-12 months later
- More than a year later
- Not applicable

(e) Was the STD treated?

- Yes
- No
- Not applicable

(f) If yes in 22(e) how soon was the STD treated?

- Not applicable
- Within 6 months
- Within 6-12 months later
- More than a year later

SECTION 3

Information on HIV test.

23. Have you been given blood transfusion before?

- Yes
- No.

24. If yes in 23 above, when was it done?

- Within the last 6 months
- Within 6-12 months ago
25. Did you get HIV test after the transfusion?
☐ Yes
☐ No
☐ Not applicable

26. If yes in 25 above,
(a) What were the results?
☐ Negative
☐ Inconclusive
☐ Positive
☐ Do not know the results
☐ Not applicable
(b) How soon was the test done after the transfusion?
☐ Within 3 months
☐ Within 3-6 months later
☐ Within 6-12 months later
☐ More than one year later
☐ Not applicable

27. Have you had an HIV Test in the past?
☐ No
☐ Yes
28. If yes in 27 above,
   a) When was it done?
      □ 1-2 months ago
      □ 3-4 months ago
      □ 4-6 months ago
      □ More than six months ago

   (b) What were the results?
      □ Negative
      □ Positive
      □ Inconclusive
      □ Do not know the results

   (c) Why was it done?
      □ Getting married
      □ Client risk behavior
      □ Felt unwell
      □ After blood transfusion
      □ Referred by a health worker
      □ Occupational purposes
      □ Partners risk behavior
      □ VCT (Voluntary Counseling and Testing)
      □ PMTCT for a previous pregnancy
      □ DTC (Diagnostic Test and Counseling)
      □ Other reasons, specify..........................

29. HIV result today/ done in the current pregnancy
    □ Negative
    □ Positive
    □ Inconclusive
### 6.4. TABLE 4.1 DATA DICTIONARY

<table>
<thead>
<tr>
<th>DATA ITEM</th>
<th>DATALABEL</th>
<th>DATA TYPE</th>
<th>DATA SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dist</td>
<td>Residential district</td>
<td>Number</td>
<td>1-Machakos, 2-Makueni, 3-Others</td>
</tr>
<tr>
<td>Res.type</td>
<td>Type of residence</td>
<td>Number</td>
<td>1-Urban, 2-Rural</td>
</tr>
<tr>
<td>Mar.sta</td>
<td>Marital status</td>
<td>Number</td>
<td>1-Never married, 2-Steady partner not living together, 3-Steady partner living together, 4-Monogamous marriage, 5-polygamous marriage, 6-Widowed, 7-separated/divorced</td>
</tr>
<tr>
<td>Edu.</td>
<td>Level of education</td>
<td>number</td>
<td>1-none, 2-primary, 3-secondary/High school</td>
</tr>
<tr>
<td>Mt.oc</td>
<td>Client’s occupation</td>
<td>number</td>
<td>1-none, 2-unskilled, 3-skilled, 4-professional, 5-student, 6-others</td>
</tr>
<tr>
<td>Sp.oc</td>
<td>Sexual partner’s occupation</td>
<td>number</td>
<td>1-none, 2-unskilled, 3-skilled, 4-professional, 5-student, 6-others</td>
</tr>
<tr>
<td>Eth.</td>
<td>Ethnicity</td>
<td>number</td>
<td>1-Kamba, 2-Luo, 3-Kikuyu, 4-others</td>
</tr>
<tr>
<td>c.a.o.m</td>
<td>Current age of the mother</td>
<td>number</td>
<td>1-15 to 25 years, 2-26 to 35 years, 3-36 to 45 years</td>
</tr>
<tr>
<td>A.1.mar</td>
<td>Age at first marriage</td>
<td>number</td>
<td>1-15 to 20 years</td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
<td>Value</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>A.1.pg</td>
<td>Age at first pregnancy</td>
<td>1-15 to 20 years, 2-21 to 25 years, 3-26 to 30 years, 4-31 to 35 years, 5-below 15 years</td>
<td></td>
</tr>
<tr>
<td>No.sp</td>
<td>Number of sexual partners in the last 12 months</td>
<td>1-one, 2-more than one</td>
<td></td>
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<tr>
<td>Res.sp</td>
<td>Residence of the sexual partner different</td>
<td>1-yes, 2-no</td>
<td></td>
</tr>
<tr>
<td>N.o.ch</td>
<td>Number of children</td>
<td>1-one to two, 2-three to four, 3-five to six, 4-none</td>
<td></td>
</tr>
<tr>
<td>U.fpm</td>
<td>Use of a family planning method at least six months before getting pregnant</td>
<td>1-yes, 2-no</td>
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<tr>
<td>Fp.hor</td>
<td>Family planning used hormonal or not</td>
<td>1-not applicable, 2-no, 3-yes</td>
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<tr>
<td>D.o.fp.u</td>
<td>Duration of using the named contraceptive method</td>
<td>1-one to six months, 2-seven to twelve months, 3-more than a year, 4-not applicable</td>
<td></td>
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<tr>
<td>Ge.a.o.p</td>
<td>Gestational age of the pregnancy by months</td>
<td>1-one to two months, 2-three to four months, 3-five to six months, 4-seven to nine months, 5-does not know</td>
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<tr>
<td>Cdu-sp</td>
<td>Condom use with a steady sexual partner</td>
<td>1-never, 2-sometimes</td>
<td></td>
</tr>
<tr>
<td>Cdu-nsp</td>
<td>Condom use with a non-steady partner</td>
<td>1-sometimes, 2-no non-steady partner</td>
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<tr>
<td>Hosti</td>
<td>History of STI</td>
<td>1-yes, 2-no</td>
<td></td>
</tr>
<tr>
<td>Tosti</td>
<td>Time of STI diagnosis</td>
<td>1-one to six months ago, 2-seven to twelve months</td>
<td></td>
</tr>
<tr>
<td>Ty.o.STI</td>
<td>Type of STI</td>
<td>Number</td>
<td></td>
</tr>
<tr>
<td>------------</td>
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</tr>
<tr>
<td></td>
<td>1-Gud</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-Gonorrhoea</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-candidiasis</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-not applicable</td>
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<table>
<thead>
<tr>
<th>HIVt.a.s</th>
<th>HIV test after sti</th>
<th>Number</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1-not applicable</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>2-not done</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-Yes</td>
<td>3</td>
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</table>

<table>
<thead>
<tr>
<th>HIVr.a.S</th>
<th>HIV results after STI</th>
<th>Number</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-not applicable</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-negative</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-Positive</td>
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<tr>
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<th>Duration between STI diagnosis and HIV test</th>
<th>Number</th>
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<tbody>
<tr>
<td></td>
<td>1-0-6 months later</td>
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<tr>
<td></td>
<td>2-7-12 months later</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-more than a year later</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-not applicable</td>
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<table>
<thead>
<tr>
<th>W STI tr</th>
<th>Was the STI treated</th>
<th>Number</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1-not applicable</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-one to six months later</td>
<td>2</td>
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</tr>
<tr>
<td></td>
<td>3- seven to twelve months later</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-more than a year later</td>
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<th>Duration of beginning treatment after the STI diagnosis</th>
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<tr>
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<td>1-not applicable</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>2- within six months</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3- within seven to twelve months</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-not applicable</td>
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<table>
<thead>
<tr>
<th>Hobt</th>
<th>History of blood transfusion</th>
<th>Number</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1-yes</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-no</td>
<td>2</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Per o tra</th>
<th>When was the client transfused</th>
<th>Number</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1-within six months ago</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-seven to twelve months ago</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3- more than a year ago</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4- not applicable</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Htabt</th>
<th>HIV test after blood transfusion</th>
<th>Number</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-not applicable</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-yes</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-no</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Hrabort</th>
<th>HIV results after blood transfusion</th>
<th>Number</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1-not applicable</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-negative</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-positive</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Description</td>
<td>Number Options</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>----------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>DoHtabt</td>
<td>Duration of HIV test after blood transfusion</td>
<td>1-not applicable&lt;br&gt;2-within six months&lt;br&gt;3-within seven to twelve months&lt;br&gt;4-more than a year later</td>
<td></td>
</tr>
<tr>
<td>Htttp</td>
<td>HIV test in the past</td>
<td>1-no&lt;br&gt;2-yes</td>
<td></td>
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<tr>
<td>Htbcp</td>
<td>When was the HIV test before the current pregnancy</td>
<td>1- not applicable&lt;br&gt;2-one to two months ago&lt;br&gt;3-Three to four months ago&lt;br&gt;4- more than 6 months ago</td>
<td></td>
</tr>
<tr>
<td>RfpHt</td>
<td>Reasons for the previous HIV tests</td>
<td>1- Getting married&lt;br&gt;2-Client risk behavior&lt;br&gt;3- Felt unwell&lt;br&gt;4- After blood transfusion&lt;br&gt;5-Refereed by a health worker&lt;br&gt;6- Occupational purposes&lt;br&gt;7- Partners risk behavior&lt;br&gt;8-VCT(Voluntary Counseling and Testing)&lt;br&gt;9-PMTCT for a previous pregnancy&lt;br&gt;10- DTC (Diagnostic Test and Counseling)&lt;br&gt;11-Other reasons, specify.................................</td>
<td></td>
</tr>
<tr>
<td>Chs</td>
<td>Current HIV status</td>
<td>1-negative&lt;br&gt;2-positive&lt;br&gt;3-inconclusive</td>
<td></td>
</tr>
</tbody>
</table>
6.5. MAP OF THE STUDY AREA

MAP OF KENYA

KEY

MACHAKOS DISTRICT

MACHAKOS DISTRICT MAP

Study area

KEY

District Hospitals