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PARASITOLOGY**



MSc Research Project

Prevalence of HIV among antenatal care attendants at
Kazanchis Health center in the last five years (2006-2010),
Addis Ababa, Ethiopia

By:

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Prevalence of HIV among antenatal care attendants at
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Addis Ababa, Ethiopia

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LIST OF ABBREVIATIONS

- **ACDIS** Africa Centre Demographic Information System
- **AIDS** Acquired Immunodeficiency Syndrome
- **ANC** Antenatal Care
- **ART** Anti-Retroviral Treatment
- **ARV** Anti-Retroviral
- **CD4** Cluster of Differentiation 4
- **CDC** Center for Disease Control and Prevention
- **CI** Confidence Interval
- **DHS** Demographic and Health Survey
- **DMIP** Department of Microbiology, Immunology and Parasitology
- **EDHS** Ethiopian Demographic and Health Survey
- **ELISA** Enzyme Linked Immunosorbent Assay
- **HIV** Human Immunodeficiency Virus
- **IAIDSS** International AIDS Society
- **IHIV/AIDS** International HIV & AIDS Charity
- **IRB** Institutional Review Board
- **MDG** Millennium Development Goal
- **MOH** Ministry of Health
- **MTCT** Mother to Child Transmission
- **NHAPCO** Nation HIV/AIDS Prevention and Control Office
- **PCR** Polymerase Chain Reaction
- **PMTCT** Prevention of Mother-to-Child Transmission
- **RPR test** Rapid Plasma Reagin test
- **SPSS** Statistical Package for the Social Sciences
- **STD** Sexually Transmitted Disease
- **UNAIDS** United nations program on HIV/AIDS
- **VCT** Voluntary Counseling Test
- **WHO** World Health Organization

ABSTRACT

Background: HIV infection among pregnant women poses particular risks to their family, offspring and health workers at the time of delivery. Potential mother to child transmission of HIV (vertical transmission) is a major concern, because of the attendant consequences of morbidity and mortality of these infections.

The epidemic varies with geographic region based on 2002 data; Sub-Saharan Africa had the highest number of HIV infections. Besides what has been saying and done, this study could provide relevant and update information concerning the epidemic among pregnant women so as to take effective interventions towards the problem by the concerned bodies.

Objective: To assess prevalence of HIV among pregnant women and its associated factors in Addis Ababa and suggest possible intervention measures.

Methods: A retrospective study was conducted from September 2010 to February 2011 at Kazanchis Health center, Addis Ababa, Ethiopia. During the study, the test results of all antenatal care attendants in the period between 2006 and 2010 were taken from ANC PMTCT counseling register. Thereby 3568 pregnant women were collected as source population and consequently analyzed accordingly.

Result: A total of 3568 ANC attendants were enrolled in the period between 2006 and 2010 and their data was collected and analyzed. Data was presented by age group. The annual prevalence rates were found to be 11.15%, 7.88%, 8.66%, 6.70%, and 5.69% in 2006, 2007, 2008, 2009, and 2010 respectively. The highest rates of prevalence were observed in the age categories of 20 to 29.

Conclusion: Prevalence of HIV among ANC attendants in the last five years is in a declining trend. In the health center, the overall prevalence rate decreased from 11.15% to 5.69% within the past five years. The pattern of HIV prevalence among pregnant women who visited the ANC indicates that high prevalence rates were observed in the age categories of 20 to 29 followed by 30 to 39. Whereas percentage of HIV positive pregnant women both taking ARV prophylaxis and who have been counseled on infant feeding more or less has been increasing.

Key words: HIV infection, ANC attendants, Prevalence, age categories, pregnancy, Kazanchis Health Center, ARV, Counseling

CHAPTER I

1.1. INTRODUCTION

HIV/AIDS is one of the most important health problems in the current world. Especially it has been continuing to be health chaos in the sub-Saharan region of Africa. The first HIV infections in Ethiopia were identified in 1984, and the first AIDS cases reported in 1986. In 1987, the government established an HIV/AIDS department within the Ministry of Health, and in 1988, an HIV surveillance system was established. HIV/AIDS increased rapidly during the 1990s. By 1989, HIV prevalence among the general adult population was estimated at 2.7 percent, increasing to 7.1 percent in 1997 and to 7.3 percent in 2000. During the early stages of the HIV/AIDS epidemic, there was a major effort to conduct serosurveys in Addis Ababa and other major urban centers among core transmitter groups. However, post-1990, there are very few data to indicate the level or progression of the epidemic among sex workers and truck drivers, as well as traders/merchants and the military (Garbus, 2003).

Since the late 1980s, country-specific HIV prevalence estimates in countries with generalized epidemics have been derived from data collected at health facilities providing antenatal care (ANC) for pregnant women. Pregnant women are considered to be a good proxy for the general population, and this population is accessible through routine ANC visits, where blood is generally collected for other tests (Montana et al, 2008).

Estimates of the impact of HIV in countries with generalized epidemics are generally based on antenatal clinic surveillance data collected over time. In an attempt to obtain geographically more representative estimates of HIV prevalence, many countries are now also conducting national population-based surveys in which HIV testing is included (Gouws et al, 2008).

UNAIDS/WHO estimates international adult HIV prevalence and the demographic impact of HIV in countries with generalized epidemics have been based on prevalence data collected over time from pregnant women attending antenatal clinics. Because of differences in prevalence between urban and rural areas, country-specific prevalence is often estimated separately for urban and rural areas, and then combined to obtain a national, weighted estimate of adult

prevalence. Historically, the prevalence curve for non-urban areas was adjusted downward by 20% because surveillance systems often did not cover rural areas well, and it was assumed that HIV prevalence was lower in those areas that were excluded from surveillance (UNAIDS, 2004).

In more recent years, in countries where national population-based surveys have been conducted, prevalence curves fitted to antenatal clinic surveillance data have been calibrated so that the fitted prevalence agrees with the reported population-based survey prevalence estimate for the year in which the survey was conducted. In addition to using population-based survey estimates of adult HIV prevalence to calibrate adult prevalence curves fitted to antenatal clinic data in countries where such population-based surveys have been conducted, a comparison of these estimates can also be used to inform the adjustment factor needed to correct for potential surveillance bias in countries where national population-based surveys have not been conducted (Gouws et al, 2008).

In sub-Saharan Africa, surveillance of women attending antenatal care (ANC) is often used to measure prevalence and monitor trends in HIV infection. However, when applying ANC-based HIV prevalence estimates to the general population the following biases should be considered: only pregnant women are eligible for testing (structural bias); women who become pregnant and attend ANC facilities are sexually active and not using contraceptives (self selection bias); attendance varies by factors associated with HIV; and HIV-infected women may be less likely to become pregnant. Bias due to the purposive selection of ANC facilities should also be considered when applying ANC-based prevalence estimates to a population. Over-representation of ANC clinics in urban areas, where HIV prevalence is usually relatively high, may result in HIV prevalence levels being exaggerated. However, evidence of urban and peri-urban based clinics attracting large numbers of women from rural areas, where HIV prevalence tends to be lower, would mitigate this (Rice et al, 2007).

In many countries across the world, women are tested for HIV during pregnancy. There are a number of important reasons for this: HIV infection can be passed on to a baby during pregnancy, labor and delivery, and breastfeeding. With appropriate treatment and intervention, the chances of a child becoming infected can be reduced from around 25% to less than 2%. It is therefore vital that an HIV infection in a mother is identified during the early stages of pregnancy

to allow for an opportunity to reduce the risk of transmission to the baby. In areas where antiretroviral therapy is available, a pregnant woman can receive these drugs if she tests HIV positive during pregnancy. The antiretroviral drugs can suppress HIV, which will keep her healthy for longer. For many women, especially in resource-poor areas, pregnancy will be the only time in their young adult lives when they access healthcare services on a regular basis. It therefore presents an excellent opportunity not only to screen for HIV, but also to educate and advice about the dangers of the virus (IHIV/AIDS, 2007).

Heterosexual contacts and Perinatal (mother-to-infant) transmission of HIV account for the vast majority of HIV infections in Sub-Saharan Africa, and ongoing prevention programs must expand their reach to curb the spread of HIV through these routes. The information required to monitor these trends and the impact of prevention programs remain incomplete. For example, while data exist on the proportion of 15 to 19 year old women who visit antenatal clinics in Sub-Saharan Africa who are infected with HIV, little is known about the levels of infection in girls younger than 15 (Shafer, 2000).

In Ethiopia the rate of HIV infection in pregnant women has been shown to be a reasonable proxy for the level in the combined male and female adult population in a number of settings. However, there are several limitations in estimating the HIV rate in the general adult population from data derived exclusively from pregnant women attending antenatal clinics. First, it is recognized that ANC data may overstate the risk of HIV infection in the general population for several reasons. Most obviously is the fact that the rates among pregnant women are not a good proxy for male HIV rates, which are typically lower than the rates for women. In addition, ANC data do not reflect HIV prevalence levels in non-pregnant women, many of whom are at lower risk of HIV infection either because they are not sexually active or because they use condoms to prevent pregnancy or to avoid sexually transmitted infections including HIV. The ANC results also do not represent women who either do not attend a clinic for pregnancy care or receive antenatal care at facilities not represented in the surveillance system. These women tend to be concentrated in more rural localities and, thus, are likely to be at lower risk of HIV infection. Although most of the potential biases in ANC surveillance are related to lower risks of infection, ANC data also potentially exclude some women who have contracted HIV because HIV

infection reduces fertility and because knowledge of HIV status may influence fertility choices among infected women (EDHS, 2006).

In 2005 data suggests that only 28% of Ethiopian women attend ANC during pregnancy, and only 6% deliver with a skilled attendant. Rates of antenatal care coverage and use of skilled attendants at delivery tend to be higher among urban residents (69% and 45% respectively) than rural residents (24% and 3% respectively), and the vast majority of Ethiopians live in rural areas. Rates of HIV-testing of pregnant women within the context of PMTCT reached 16% in 2009. Though 86% of ANC sites offer PMTCT services, ANC sites themselves are too few and far between. In 2010, Prevalence among pregnant women between the ages of 15 and 24 were higher, at 3.5%. Levels of infection are higher among urban residents (7.7%) than rural residents (0.9%) (PMTCT, 2010).

According to a retrospective study in Addis Ababa, the proportion of women who received HIV counseling and testing among new antenatal care attendees increased from 50.7% (95% CI 50.2-51.2) in 2007 to 84.5% (95% CI 84.1-84.9) in 2009 following the shift to routine opt-out testing. Nevertheless, in 2009 only 53.7% of the positive women and 40.7% of their infants received antiretroviral prophylaxis (Mirkuzie et al, 2010).

1.2. Statement of the problem

Mother to child transmission of HIV has been a serious problem in the replacement of HIV free generation. Moreover, it is a major cause of morbidity and mortality of infants. Different researches conducted in different countries indicate that prevalence of HIV among ANC attendants is considerable. Globally about 370,000 children were newly infected with HIV in 2007. Mainly through mother to child transmission more than 90% of children were infected. Nearly 90% of this MTCT of HIV occurred in the sub Saharan Africa. Without appropriate treatment, out of these infected children, approximately half of them will die before their second birth day (WHO, 2007). The number of orphans is increasing and this by itself is among one of health and socio-economic problems that faces the current world. Thereby providing ANC services to pregnant women and conducting researches in the case so as to solve the problem is a crucial issue in the current health system.

1.3. Literature Review

A study conducted at the Amassoma General Hospital Wilberforce Island in the Niger Delta region of Nigeria between January 2005 and December 2006 showed that out of 277 pregnant women attending antenatal services, 11 subjects (3.96%) were found positive for HIV. Of these 0.72% was between 15-19 age group followed by the following figures: 1.08% (20-24), 1.08% (30-34), 0.72% (35-39), & 0.36% (40-44). However, HIV infection among pregnant women in this study is lower than 11.1%, 13.3%, & 21% recorded in 1999 for pregnant women in Ebonyi, Akwa Ibom & Benue state, respectively (Egesie et.al, 2008).

A surveillance conducted on HIV and syphilis infections among antenatal clinic attendees in Tanzania-2003/2004 indicated that, Of the 17,813 women screened for HIV, 1,545 (8.7% (95% CI = 8.3–9.1)) tested positive with the highest prevalence in women aged 25–34 years (11%), being higher among single women (9.7%) than married women (8.6%) ($p < 0.07$), and increased with level of education from 5.2% among women with no education to 9.3% among those at least primary education ($p < 0.001$). Prevalence ranged from 4.8% (95% CI = 3.8% – 9.8%) in Kagera to 15.3% (95% CI = 13.9% –16.8%) in Mbeya and was; 3.7%, 4.7%, 9.1%, 11.2% and 15.3% for rural, semi-urban, road side, urban and 15.3% border clinics, respectively ($p < 0.001$). The number of enrolled women regionally ranged from 1135 in Lindi to 3018 in Dar es Salaam. A total of 1,545 women tested HIV positive resulting in an overall HIV prevalence in this population of 8.7% (95% CI = 8.3, 9.1). HIV infection prevalence ranged from a low of 4.7% (95% CI = 3.8, 9.8%) in Kagera region to a high of 15.7% (95% CI = 13.9–16.8) in Mbeya region. Of the 57 ANC sites surveyed in this study, 13 (22.8%) were found to have a prevalence of HIV infection of 10% or more. These high prevalence sites consisted of one clinic in Dodoma (urban), three urban clinics in Dar es Salaam, two clinics in Lindi (urban), one in Morogoro (urban), one in Tanga (urban) and five in Mbeya (2 urban, 1 rural, 1 border and 1 road side). The HIV prevalence differed according to residence ranging between 3.7% for rural clinics, 4.7% for semi-urban, 9.1% for road side, 11.2% for urban and 15.3% for border clinics ($p < 0.001$). In all regions, HIV prevalence was highest among women aged 25 – 34 years. Rates were similar among the youngest and oldest age groups. HIV prevalence among single women (9.7%) was slightly higher but not statistically different from that of married women (8.6%) ($p < 0.07$).

HIV prevalence increased with level of education from 5.2% among women with no education to 9.3% among those with some primary education or more ($p < 0.001$) (Swai et al, 2006).

Similar research was conducted at Gondar health center involving pregnant women attending antenatal clinic that revealed over all prevalence of HIV to be 11.9% in which higher seroprevalence of HIV was observed in the age groups of 20-29(13%) and 30-39(12.1%). Besides, ANC attendees from Gondar town had higher seropositivity rate (12.6%) than those who came from outside Gondar (9.4%) (Tiruneh, 2008).

A cross-sectional survey was also conducted among antenatal care attendants of Jimma university hospital from Jan. 25, 2004 to Feb 25, 2004 using a structured questionnaire. At the same time unlinked anonymous blood sample was taken during routine ANC investigations. The sera were tested for HIV antibody using rapid test algorithm. In addition, full VCT service was given for volunteers. Chi-square and binary logistic regression were used to see associations and p-value less than 0.05 was taken as cut of point for significance.

On the whole, 258 women were included in the study of which four were excluded due to incompleteness of the data. The overall HIV sero prevalence was 9.8%; being 10.4 % in urban & 7.7% in rural women. Logistic regression demonstrated low income groups, illiterates, low-level workers and those who have misconception about HIV/AIDS had higher chance of HIV infection accompanied by low likelihood of accepting HIV testing. Women who have history of STD & surgery were also found to be more likely to be HIV sero positive as compared to those without history. Though, 92.1% of mothers were indebted about the importance of HIV screening test, only 31.9 % of them received VCT service. Similarly, only 17.3% of mothers who believed breastfeeding as a potential HIV mode of transmission to the baby if they were found to be infected could afford to buy formula milk for at least six months (Demem et al, 2005).

371 pregnant women attending Dubti Hospital and Assayta Health Center were tested for HIV-1 (using a single ELISA test) and active syphilis (RPR test). Socio-demographic characteristics were collected for each woman. Of the women tested, 278 (75%) were 28years of age or younger. Two hundred eighty (76%) were urban residents and 237 (64%) described themselves as being of Amhara ethnicity. Overall, 73 (19.7%) were HIV-1 positive, but prevalence was three

times higher among the 237 women of Amhara ethnicity compared to 112 of Afar ethnicity (24.9% vs 8.0%, $p < 0.001$), and almost three times higher for urban compared to rural residents (23.2% vs 8.8%, $p < 0.001$). positive RPR results were strongly associated with HIV-1 infection (OR 3.37, 95% CI 1.47-7.71) (Assefa et al, 2003).

Another research conducted in Zambia indicated that the ANC HIV prevalence estimates for age group 15-49 years (rural: 11.5%; 95% CI, 11.2-11.8; urban: 25.4%; 95% CI, 24.8-26.0; adjusted national: 16.9%; 95% CI, 16.6-17.2) were similar to the population survey estimates (rural: 10.8%; 95% CI, 9.6-12.1; urban: 23.2; 95% CI 20.7-25.6; national: 15.6%; 95 CI, 14.4-16.9). The overall prevalence urban to rural ratio was 2.2 in ANC and 2.1 in population survey estimates (WHO, 1994).

Population-based HIV prevalence in rural South Africa estimates for all women (25.2%) and pregnant women (23.7%) were significantly lower than that for ANC attendees (37.7%). A large proportion of women attending urban or peri-urban clinics would be predicted to be resident within rural areas. Although overall estimates remained significantly different, presenting and standardizing estimates by age and location (clinic for ANC-based estimates and individual-residence for population-based estimates) made some group-specific estimates from the two surveillance systems more predictive of one another (Wilkinson et al, 1999).

In a research in DRC Kinshasa of 210 348 pregnant women who were tested for HIV, 3999(1.90%) were found to be HIV positive with 95% CI: 1.84–1.96% (Behets et al, 2010).

In report of national ANC based sentinel surveillance, in Addis Ababa HIV prevalence among pregnant women in 2005 was 11.7% (Mekonnen, 2009).

According to MOH (2005) estimations 30,338 were HIV positive births (mother to child infections) and in the same year 134,500 AIDS deaths occurred, out of which 20,900 in children under 15 years (MOH/NHAPCO, 2006).

The 2004 sentinel surveillance report of Malawi revealed that national HIV prevalence level was 19.8% among antenatal care (ANC) attendants (Moens, 2005).

1.3.1. Risk Factors for Mother-to-Child Transmission of HIV infection

Pregnant women who are infected with HIV, the virus that causes AIDS, face an increased risk of poor pregnancy outcomes and the possibility of transmitting the virus to their newborns. As many as 25–35% of HIV-positive pregnant women pass the virus to their newborns during pregnancy, childbirth, or through breastfeeding. The majority of mother-to-child transmission occurs during pregnancy and childbirth (20% and 40%, respectively); the other 40% occurs through breastfeeding, if breastfeeding continues from birth until 24 months (USAID, 2009).

In the industrialized world almost all mother-to-child transmission is prevented by providing a combined package of anti-retroviral treatment (ART), safe delivery practices, counsel and support on infant feeding. In Africa, however, ART is not available on the scale required; health systems often lack capacity to ensure safe deliveries; and most countries have severe shortages of trained PMTCT counselors. In most of sub-Saharan Africa, HIV transmission during childbirth or breastfeeding is the second most common way that the virus is spread, according to evidence available today. In Sub-Saharan Africa, the risk of MTCT is 30% among mothers with HIV. Only about 10% of pregnant women used PMTCT services in 14 African countries with high HIV prevalence studied in 2004 (WHO, 2011).

If a woman is infected with HIV, her risk of transmitting the virus is reduced when she stays as healthy as possible. Smoking, substance abuse, vitamin A deficiency, malnutrition and other infections, such as sexually transmitted infections, are all associated with higher rates of mother-to-child transmission of HIV. Certain characteristics of the virus, such as the viral load (the quantity of the HIV virus that is in the blood) and the clinical stage of the HIV infection, also contribute to the chances of transmitting the virus to the newborn. In addition, factors related to labor and childbirth (preterm birth, placental disruption, duration of membrane rupture, whether the birth is a vaginal or cesarean birth) affect the risk that a woman will transmit the virus to her child. Finally, breastfeeding is also considered a risk factor for mother-to-child transmission (USAID, 2009).

The main risk factor, which is also a barrier to the prevention of perinatal HIV transmission, is lack of awareness of HIV status among pregnant women. According to CDC's study in the United States, without antiretroviral therapy, approximately 25% of pregnant women infected with HIV will transmit the virus to their child (CDC, 2007). In Burkina Faso, Ghana, Nigeria, Tanzania and Zambia between 18% and 49% of women who were tested for HIV and offered PMTCT services did not receive information about mother-to-child transmission, leaving them with no idea of the consequences for their baby of a positive test (WHO, 2011).

Moreover recent CDC studies also found that HIV testing rates for pregnant women varied widely and that a relatively high proportion of women of childbearing age were unaware that treatment is available to reduce the risk for perinatal transmission. In a 2002 study of HIV testing in the United States, 31% of the 748 women who had recently been pregnant reported that they had not been tested during prenatal care (CDC, 2007).

1.3.2. Laboratory diagnosis of HIV infections

HIV diagnostic testing has come a long way since its inception in the early 1980s. Current enzyme immunoassays are sensitive enough to detect antibody as early as one to two weeks after infection. A variety of other assays are essential to confirm positive antibody screens (Western blot, polymerase chain reaction [PCR]), provide an adjunct to antibody testing (p24 antigen, PCR), or provide additional information for the clinician treating HIV-positive patients (qualitative and quantitative PCR, and genotyping). Most diagnostic laboratories have complex testing algorithms to ensure accuracy of results and optimal use of laboratory resources. The choice of assays is guided by the initial screening results and the clinical information provided by the physician; both are integral to the laboratory's ability to provide an accurate laboratory diagnosis (Fearon, 2005).

Serology - the diagnosis of HIV infection is usually based on serological tests: **Antibody tests** - ELISAs are the most frequently used method for screening of blood samples for HIV antibody. Other test systems available include passive particle agglutination, immunofluorescence, Western blots and RIPA bioassays. Western blots are regarded as the gold standard and seropositivity is diagnosed when antibodies against both the env and the gag proteins are detected. **Antigen tests** - HIV antigen can be detected early in the course of HIV infection before the appearance of antibody. It is undetectable during the latent period (antigen-antibody complexes are present) but become detectable during the final stages of the infection. **Virus isolation** - virus isolation is accomplished by the cocultivation of the patient's lymphocytes with fresh peripheral blood cells of healthy donors or with suitable culture lines such as T-lymphomas. The presence of the virus can be confirmed by reverse transcriptase assays, serological tests, or by changes in growth pattern of the indicator cells. **Demonstration of viral NA** - this can be accomplished by probes or by PCR techniques. The latter may be useful because of its extremely high sensitivity. **Prognostic Tests** - the following may be useful as prognostic tests; (i) HIV antigen (ii) Serial CD4 counts (iii) Neopterin (iv) B2-microglobulin and (v) Viral load. Of these tests, only serial CD4 counts and HIV viral load are still routinely used. **Antiviral susceptibility assays** Because of the increasing range of anti-HIV agents available, there is increasing pressure on the provision of antiviral susceptibility assays. There are two types of antiviral susceptibility assays: phenotypic and genotypic assays (Wong's, 2011).

1.3.3. Prevention and control of mother to child transmission of HIV

Prevention of mother-to-child transmission of HIV is a critical component in the implementation of three key strategic orientations in the WHO African Region, all endorsed by member states of the region: The road map for accelerating the attainment of MDGs related to maternal and new born health; the child survival strategy; and the HIV prevention strategy (WHO, 2009).

The basic approaches in the prevention of mother to child transmission of HIV include making HIV testing a routine part of medical care, limiting the risk of HIV infection among potential mothers, giving HIV infected women the means to avoid becoming pregnant and Provision of ART to HIV positive women to prevent mother to child transmission of HIV (WHO, 2011).

Studies are under way to determine if exclusive breastfeeding with rapid early weaning can reduce transmission rates in the absence of exclusive formula feeding for all infants. Perinatal transmission rates have been dramatically reduced with the use of single-dose nevirapine, but this strategy protects only approximately 50% of infants, and more than 75% of women receiving nevirapine develop a major nevirapine resistance mutation. In developed areas of the world, antiretroviral therapy has reduced perinatal transmission by more than 90%. Improved HIV-related care for HIV-infected women in Africa is needed to reduce rates of HIV infection in children and to prevent maternal mortality (IAIDSS, 2004).

1.3.4. Significance of the study

Much has been said and done about HIV/AIDS both in Ethiopia as well as in the world at large. Despite, different prevalences about HIV have been reported. Every time updated information is important for the control of the disease. The pattern of HIV infection in pregnant women may provide valuable information for future prevention, treatment and control of the epidemic. Thereby concerned bodies will have a compiled data about the current status of HIV and be able to evaluate the outcomes of prevention and control measures which have been practiced in the past.

1.4. **Objective of the study**

General objective

The aim of the study is to assess the prevalence of HIV infection among pregnant women attending ANC and its associated factors in Addis Ababa and suggest possible intervention measures.

Specific objective

- ✓ To determine which age group of pregnant women are more affected
- ✓ To assess the possible factors associated with the prevalence
- ✓ To provide information to planners and policy makers on the prevention measures, prioritization issues and possible intervention methods.
- ✓ To assess trend of ARV prophylaxis uptake

CHAPTER II

MATERIALS AND METHODS

2.1. Study design and study period

A retrospective study was conducted on the records of consecutive antenatal care attendants in the period between 2006 and 2010 at Kazanchis Health center in Addis Ababa. The results were analyzed from September 2010 to February 2011.

2.2. Study area

The study was conducted at Kazanchis Health Center in Addis Ababa from records of antenatal care attendants in the period between 2006 and 2010. The health center is one of the oldest health care providers in the city. It is believed that it was established in 1943 to fulfill the health demand of the society. The health center currently provides various types of health services in the sub-city including reproductive health (ANC service to pregnant women). It is found in Kirkos Sub- city, one of the ten sub cities of Addis Ababa city.

2.3. Study variables

The characteristics (variables) such as, age, year, HIV serostatus, ARV uptake and infant feeding counseling were assessed.

2.3.1. Dependent variables

HIV infection, ARV drug uptake and infant feeding counseling were included in the study.

2.3.2. Independent variables

Age

2.4. Source Population

The source population for the study was all pregnant women who have attended antenatal care services in the city within the specified period (2006 to 2010).

2.5. Sample

During the study, all pregnant women who have attended antenatal care services at the health center within the specified period (2006 to 2010) were included as sample of the study.

2.6. Eligibility and Exclusion Criteria

2.6.1. Inclusion criteria

All pregnant women who have attended antenatal care service for the first time and taken HIV test at the health center during the specified period (between 2006 and 2010).

2.6.2. Exclusion criteria

Pregnant women who have attended antenatal care service for the second or third time and all non pregnant females who have attended at the health center during the specified period were excluded from the study.

2.7. Data Collection and processing

2.7.1. Sample collection

All essential clinical data taken from antenatal care attendants in the last 5 years were collected from records of ANC PMTCT counseling register, ANC PMTCT enrollment register and NVP infant log, and PMTCT labor and delivery register kept in the health center using data collection form.

2.7.2. Procedures

In this study certain procedures relevant to the case were implemented. These procedures include:

1. Direct contact with concerned personnel in the health center.
2. Then after all clinical data essential for the study taken from antenatal care attendants in the last 5 years were collected from records of ANC PMTCT counseling register, ANC PMTCT enrollment register and NVP infant log, and PMTCT labor and delivery register kept in the health center using data collection form (manually).
3. After data collection, the data were entered into computer
4. Finally, the data were analyzed using appropriate statistical methods (initially using manual tabulation, graphs and tables later using SPSS 13.0).

2.7.3. Quality controls

Reliability and representativeness of a study is partly measured by its quality control approaches in each step of carrier. Thereby in this study, certain quality control measures were taken to assure quality of the study. These measurement strategies include:

1. Exclusion of incomplete data in a specific year of study
2. Inclusion of complete & specific data only in a respective year of study
3. To keep quality of the data, data were entered into the SPSS twice

2.7.4. Data entry and analysis

Data entry and analysis was done using SPSS version computer 13.0 software. Prevalence rate was calculated for the sum of the numbers of positive cases of examined subjects within each respective year.

2.8. Ethical Considerations

This M.Sc research project was approved by the Department of Microbiology, Immunology and Parasitology (DMIP), the School of Medicine of Addis Ababa University; moreover all essential ethical considerations to insure the confidentiality of the identity of patients (antenatal service attendants) were taken. Ethical commitment was also signed. A letter informing the medical director of the health center about the objective of the study was written from the university prior to actual data collection period and permission was obtained.

CHAPTER III

RESULTS

3.1.Description of the study subjects

Three thousand five hundred sixty eight pregnant women attended antenatal care services in the period between 2006 and 2010 at Kazanchis health center were studied for the prevalence of HIV infections. On attendance, they were carefully examined clinically for the presence of HIV and other health problems. A total of 3568 ANC attendants were enrolled. Data was presented by age group. In 2006 out of 547 ANC attendants 72(13.16%) of them were < 20, 385(70.38%) of them were of 20- 29, 88(16.08%) of them were of 30-39 and 2(0.37%) of them were of 40-49 with mean age of 24.86 and Std. deviation of 4.81. In 2007 out of 723 ANC attendants 98(13.55%) of them were < 20, 495(68.46%) were of 20-29, 127(17.57%) were 30-39, and 3(0.41%) of them were of 40-49 with mean age of 24.55 and Std. deviation of 4.86. In 2008 a total of 635 pregnant women attended ANC. Among them 69(10.87%) were < 20, 437(68.82%) were of 20-29, 126(19.84%) were of 30-39 and 3(0.47%) of them were of 40-49 with mean age of 25.29 and Std. deviation of 4.86. In 2009 out of 627 pregnant women who attended ANC services 61(9.73%) of them < 20, 443(70.65%) were of 20-29, 116(18.50%) were of 30-39, and 7(1.12%) of them were of 40-49 with mean age of 25.19 and Std. deviation of 4.97. In 2010 a total of 1036 pregnant women got ANC service in the clinic. Of these 93(8.98%) were < 20, 731(70.56%) were of 20-29, 205(19.79 %) were of 30-39 and 7(0.68%) of them were of 40-49 with mean age of 25.66 and Std. deviation of 4.80. The overall mean age was 25.16.

In the year 2006, of 547 ANC attendants 3(0.55%), 45(8.23%), 12(2.1%), and 1(0.18%) were found to be HIV positive in the age categories of < 20, 20-29, 30-39, and 40-49 respectively with mean age of 26.67. In 2007, of 723 ANC attendants 2(0.28%), 48(6.64%), 6(0.83%), and 1(0.14%) were found to be HIV positive in the age categories of < 20, 20-29, 30-39, and 40-49 respectively with mean age of 24.74 . In 2008, of 635 ANC attendants 4(0.63%), 31(4.88%), 20(3.15%), and 0(0%) were found to be HIV positive in the age categories of < 20, 20-29, 30-39, and 40-49 respectively with mean age of 26.55. In 2009, of 627 ANC attendants 2(0.32%), 29(4.63%), 11(1.75%), and 0 (0%) were found to be HIV positive in the age categories of < 20,

20-29, 30-39, and 40-49 respectively with mean age of 26.67. In 2010, of 1036 ANC attendants 4(0.39%), 33 (3.19%), 20(1.93%), and 2 (0.19%) were found to be HIV positive in the age categories of < 20, 20-29, 30-39, and 40-49 respectively with mean age of 27.44. The overall prevalence rates in each year were 11.15%, 7.88%, 8.66%, 6.70%, and 5.69% respectively with mean age of 26.41.

Table 1 Prevalence of HIV with age categories among 547 ANC attendants at Kazanchis Health Center, Addis Ababa, Ethiopia (2006)

Age categories	Test results, No (%)		Total
	Negative	Positive	
<20	69 (12.61)	3(0.55)	72 (13.16)
20-29	340 (62.16)	45(8.23)	385 (70.38)
30-39	76 (13.89)	12(2.19)	88 (16.08)
40-49	1 (0.18)	1(0.18)	2(0.37)
Annual HIV prevalence			11.15

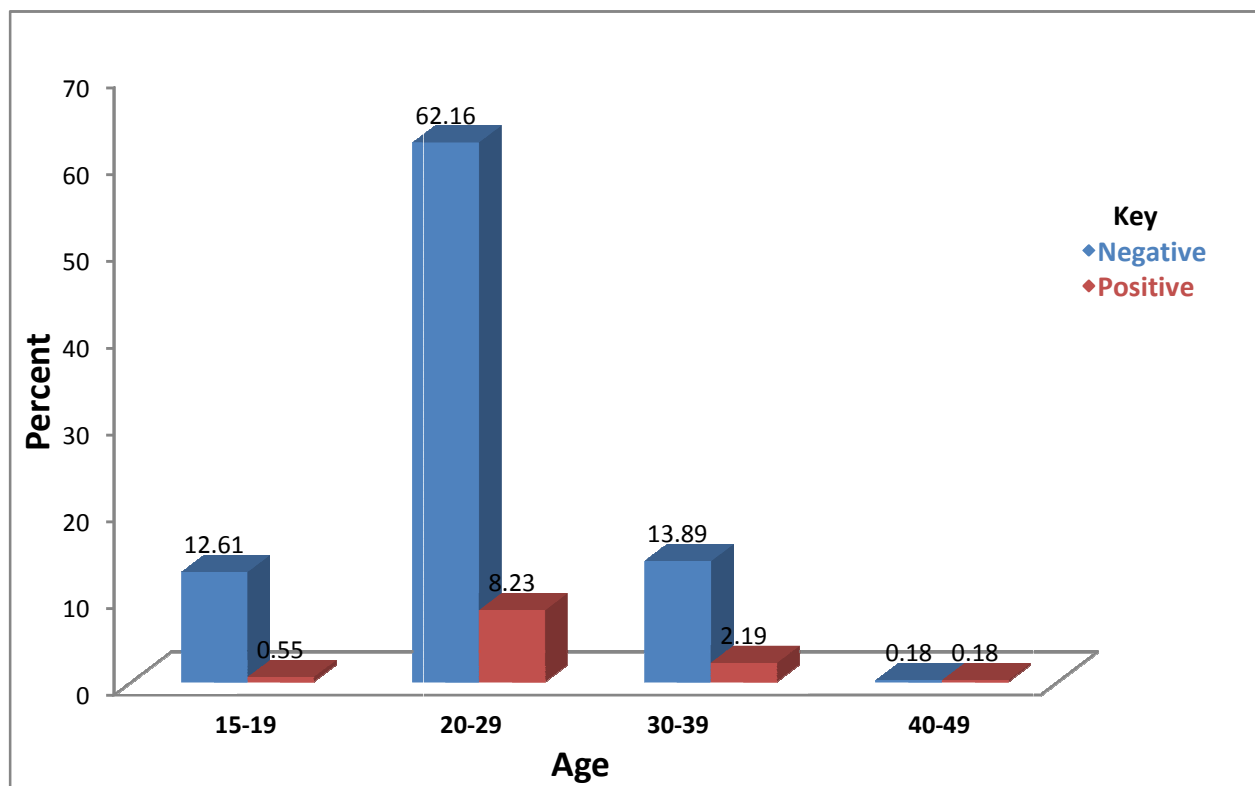


Figure1Prevalence of HIV among ANC attendants in 2006, at Kazanchis Health Center, Addis Ababa

Table 2 Prevalence of HIV with age categories among 723 ANC attendants at Kazanchis Health Center, Addis Ababa, Ethiopia (2007)

Age categories	Test results, No (%)		Total
	Negative	Positive	
<20	96 (13.27)	2(0.28)	98(13.55)
20-29	447 (61.82)	48(6.64)	495(68.46)
30-39	121(16.74)	6(0.83)	127(17.57)
40-49	2 (0.27)	1(0.14)	3(0.41)
Annual HIV prevalence			7.88

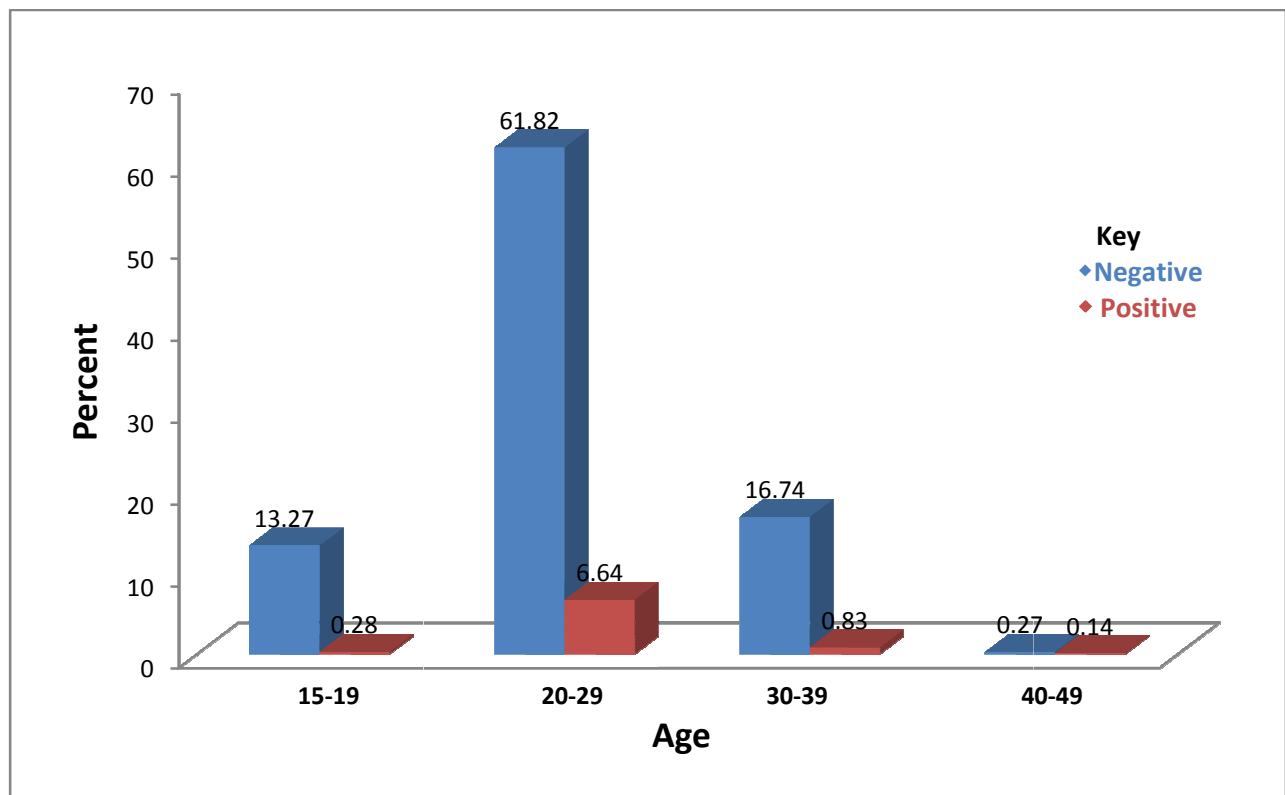


Figure 2 Prevalence of HIV among ANC attendants in 2007, at Kazanchis Health Center, Addis Ababa

Table 3 Prevalence of HIV with age categories among 635 ANC attendants at Kazanchis Health Center, Addis Ababa, Ethiopia (2008)

Age categories	Test results, No (%)		Total
	Negative	Positive	
<20	65 (10.24)	4(0.63)	69(10.87)
20-29	406 (63.94)	31(4.88)	437(68.82)
30-39	106 (16.69)	20(3.15)	126(19.84)
40-49	3(0.47)	0(0)	3(0.47)
Annual HIV prevalence			8.66

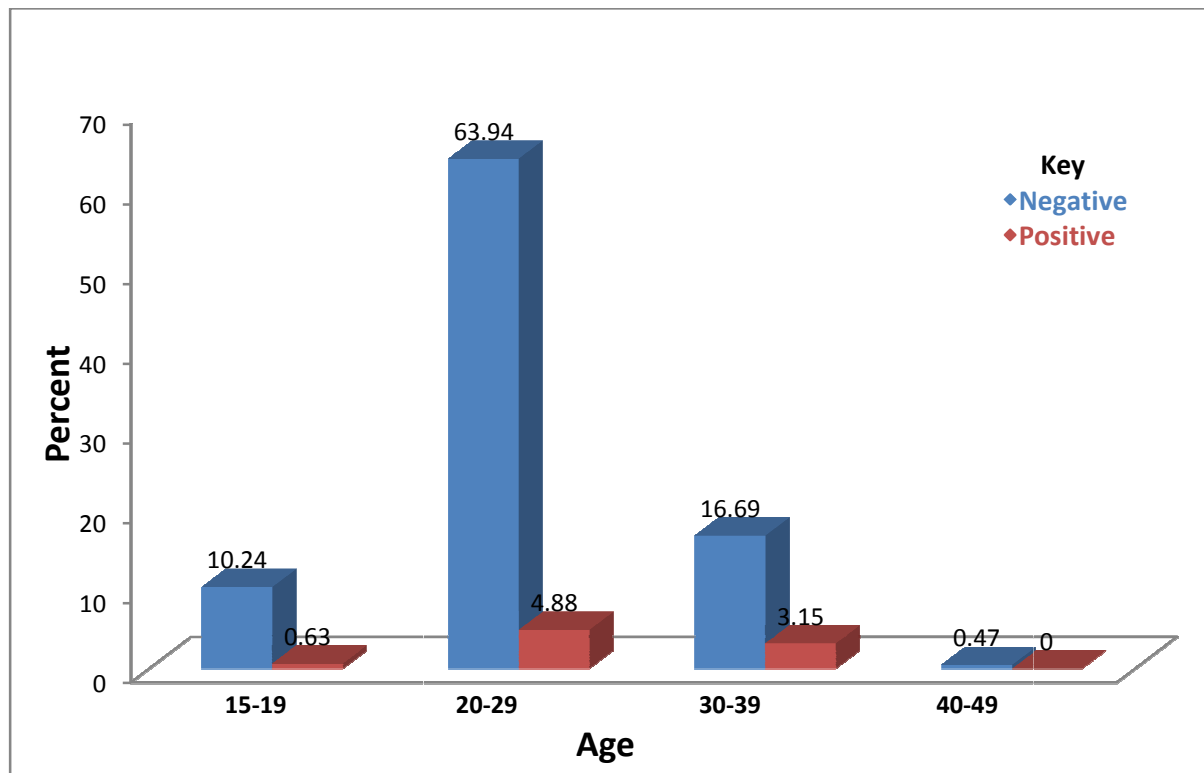


Figure 3 Prevalence of HIV among ANC attendants in 2008, at Kazanchis Health Center, Addis Ababa

Table 4 Prevalence of HIV with age categories among 627 ANC attendants at Kazanchis Health Center, Addis Ababa, Ethiopia (2009)

Age categories	Test results, No (%)		Total
	Negative	Positive	
<20	59 (9.41)	2(0.32)	61(9.73)
20-29	414(66.02)	29(4.63)	443(70.65)
30-39	105 (16.75)	11(1.75)	116(18.50)
40-49	7(1.12)	0 (0)	7(1.12)
Annual HIV prevalence			6.70

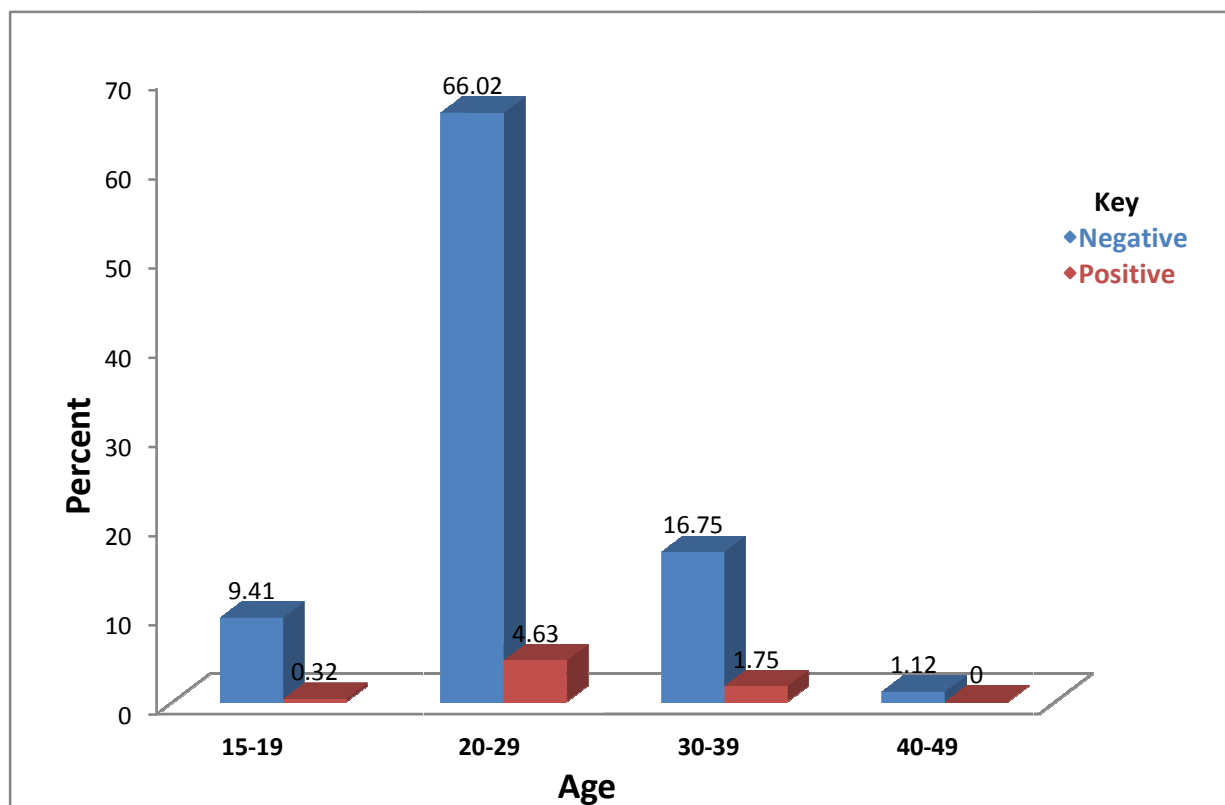


Figure 4 Prevalence of HIV among ANC attendants in 2009, at Kazanchis Health Center, Addis Ababa

Table 5 Prevalence of HIV with age categories among 1036 ANC attendants at Kazanchis Health Center, Addis Ababa, Ethiopia (2010)

Age categories	Test results, No (%)		Total
	Negative	Positive	
<20	89 (8.59)	4(0.39)	93(8.98)
20-29	698 (67.37)	33 (3.19)	731(70.56)
30-39	185 (17.86)	20(1.93)	205(19.79)
40-49	5 (0.49)	2 (0.19)	7(0.68)
Annual HIV prevalence			5.69

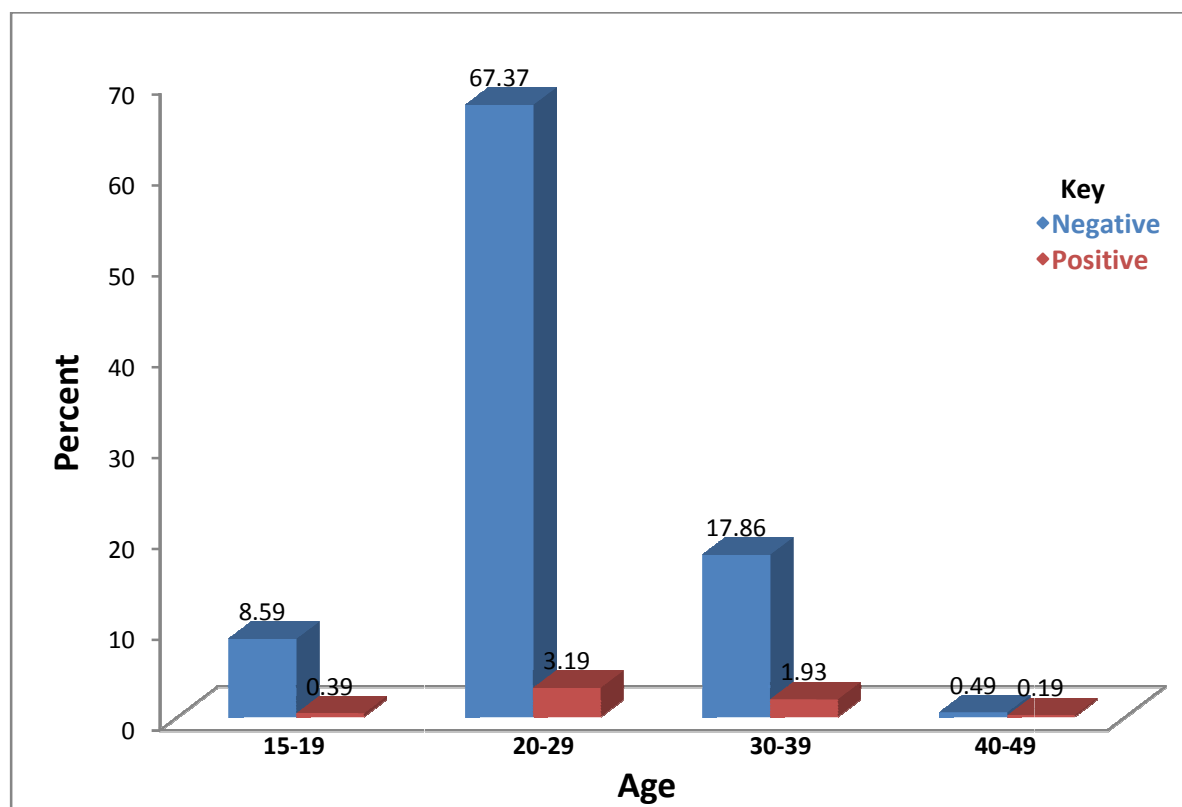


Figure 5 Prevalence of HIV among ANC attendants in 2010, at Kazanchis Health Center, Addis Ababa

Table 6 Overall prevalence of HIV among ANC attendants from 2006 to 2010, at Kazanchis Health Center, Addis Ababa, Ethiopia

Year	Test result		Total
	Negative	Positive	
2006	486 (88.85%)	61 (11.15%)	547(100%)
2007	666 (92.12%)	57 (7.88%)	723(100%)
2008	580 (91.34%)	55 (8.66%)	635(100%)
2009	585 (93.30%)	42 (6.70%)	627(100%)
2010	977 (94.31%)	59 (5.69%)	1036(100%)

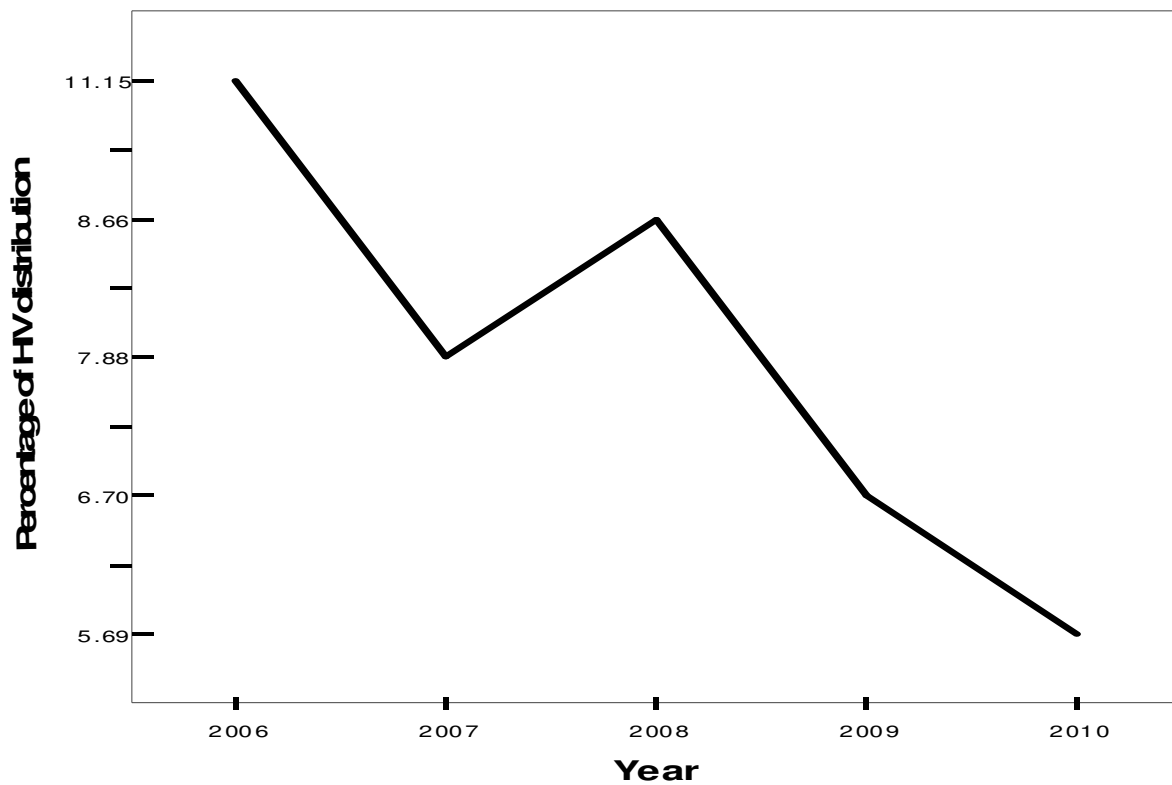


Figure 6 Overall prevalence of HIV among ANC attendants from 2006 to 2010, at Kazanchis Health Center, Addis Ababa

3.2. Patterns of HIV infection among ANC attendants

Among 3568 ANC attendants in the five years, 274(7.68%) were HIV positive. Of the 274 HIV carriers, 15(5.47%) were less than 20 years, 186(67.88%) were of 20 to 29 years of age, 69(25.18%) were of 30 to 39 years of age and 4(1.46%) were of 40 to 49 years of age.

The pattern of HIV prevalence among ANC attendants in the period 2006 to 2010 was 11.15%, 7.88%, 8.66%, 6.70% and 5.69% in 2006, 2007, 2008, 2009, and 2010 respectively. The prevalence rates in each consecutive year show more or less a declining trend from 11.15% in 2006 to 5.69% in 2010.

Table 7 Distribution of HIV infections by age group observed in 274 ANC attendants at Kazanchis Health center Addis Ababa, Ethiopia in five years (2006 to 2010)

Age categories	HIV positive, No (%)
<20 years	15(5.47)
20-29	186(67.88)
30-39	69(25.18)
40-49	4(1.46)

In each year, high prevalence rates were observed in the age groups of 20 to 29 followed by 30 to 39 age groups and less than 20 years respectively. The least prevalence rates were observed in the age categories of 40 to 49.

3.3.ARV drug uptake

Among 274 HIV carrier pregnant women 145(52.92%) received ARV drugs either NVP or AZT during their late course of pregnancy in order to prevent mother to child transmission of HIV. The overall percentage of positive pregnant women received ARV drugs were 22(36.07%), 30(52.63%), 30(54.55%), 22(52.38%), and 41(69.49%) in 2006, 2007, 2008, 2009, and 2010 respectively. The percentage of pregnant women who took ARV drugs shows more or less constant trend in the last five years except the out lied figure of 2006.

Table 8 Percentage of ARV drug uptake among HIV positive pregnant women at Kazanchis Health Center, Addis Ababa

Year	ARV drug uptake		Total, No (%)
	Yes, No (%)	No, No (%)	
2006	22 (36.07)	39 (63.93)	61 (100)
2007	30 (52.63)	27 (47.37)	57 (100)
2008	30 (54.55)	25 (45.45)	55 (100)
2009	22 (52.38)	20 (47.62)	42 (100)
2010	41 (69.49)	18 (30.51)	59 (100)

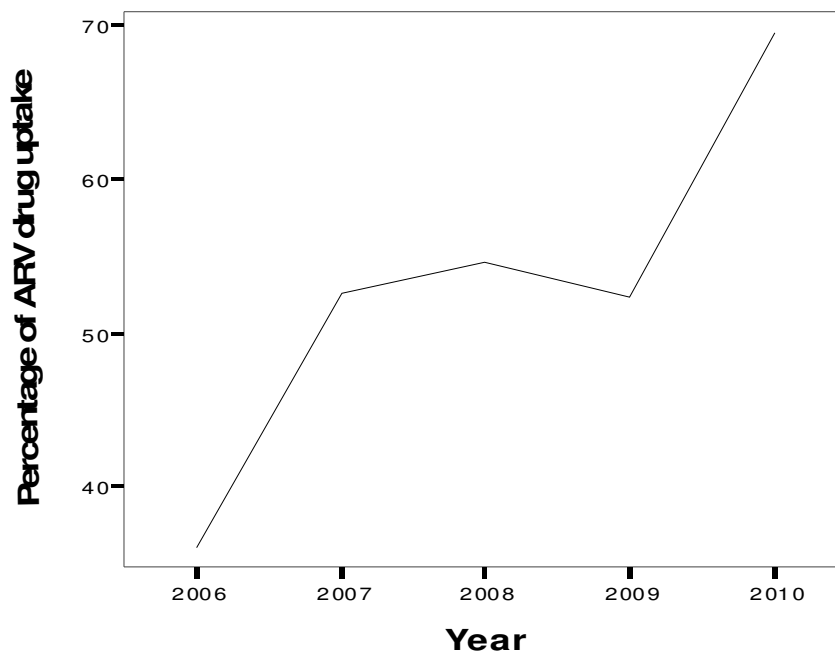


Figure 7 Percentage of ARV drug uptake among HIV positive pregnant women from 2006 to 2010, at Kazanchis Health Center, Addis Ababa

3.4. Percentage of HIV positive pregnant women counseled on infant feeding

Among 274 HIV positive pregnant women 54(88.52%), 55(96.49%), 54(98.18%), 38(90.48%), and 57(96.61%) were counseled on infant feeding in 2006, 2007, 2008, 2009, and 2010 respectively after the test results were known to avoid the possibility of mother to child transmission of HIV during breast feeding after delivery. The figure indicates that majority of them were counseled how to feed their infants after delivery.

Table 9 Percentage of HIV positive pregnant women who have been counseled on infant feeding at Kazanchis Health Center, Addis Ababa

Year	Counseled on infant feeding		Total, No (%)
	Yes, No (%)	No, No (%)	
2006	55 (90.16)	6 (9.84)	61 (100)
2007	55 (96.49)	2 (3.51)	57 (100)
2008	54 (98.18)	1 (1.82)	55 (100)
2009	38 (90.48)	4 (9.52)	42 (100)
2010	57 (96.61)	2 (3.39)	59 (100)

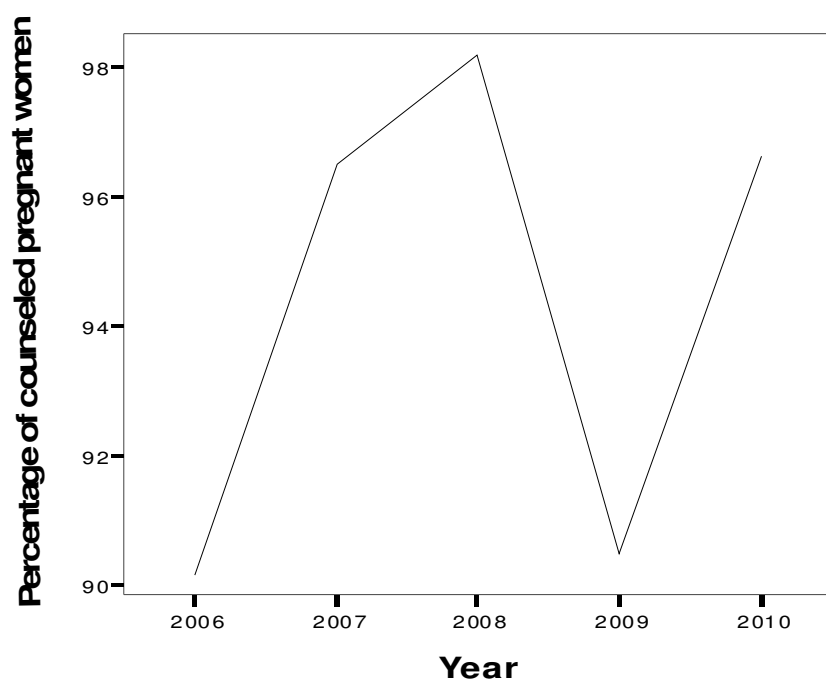


Figure 8 Percentage of HIV positive pregnant women who have been counseled on infant feeding from 2006 to 2010, at Kazanchis Health Center, Addis Ababa

CHAPTER IV

DISCUSSION

HIV infection among pregnant women poses particular risks to their family, offspring and health workers at the time of delivery (Karim et al, 2002). Mother to child transmission of HIV is a major concern in the current world, especially in developing countries like Ethiopia where there are low coverage of ANC. According to estimates reported by statistics of 2010, rates of HIV testing of pregnant women within the context of PMTCT reached 16% in 2009 (PMTCT, 2010).

In this study, the overall prevalence of HIV among ANC attendants in the last five years at Kazanchis Health center was (7.68%) which is lower than previous studies in ANC attendants of health facilities in Addis Ababa, which were with an overall seroprevalence of 18.8% (Mekonnen et al, 2000) and 12.9% in 2005 (HAPCO, 2008). This decrease in the prevalence of HIV among ANC attendants at the health center may related to paying attention to health care education programs, establishment of resource centers for youth, increased level of awareness and positive trend in behavioral change, an increased demand for attending antenatal clinics (ANC), the changing trend of educational and socio economic status of females especially in the reproductive age, and establishment of AIDS resource centers.

Moreover, the current research shows lower prevalence of HIV infection among antenatal clinic (ANC) attendants than reports in Gondar which was 11.9% (Tiruneh, 2008) and 12.9% in Addis Ababa in 2002 (HAPCO, 2008).

In each year, higher prevalence rates were observed in the age groups of 20 to 29 followed by 30 to 39. This age specific prevalence of HIV among pregnant women is supported by results of a research conducted in Gondar in which higher seroprevalence of HIV was observed in age groups of 20 to 29(13%) and 30 to 39(12.1%) years (Tiruneh, 2008). More over sentinel surveillance in Addis Ababa suggested that HIV prevalence tends to be higher in pregnant women in young adult age groups (20 to 30) years (Mekonnen et al, 2000). Similar finding has been reported in Nigeria in which women aged 20 to 29 years had more than 4 fold increased risk of HIV and prevalence of HIV was 10.9% among women aged 25 to 29 (Sagay et al, 2005).

There are certain reasons why the prevalence rate is high in this age group. The increased risk of HIV among relatively young women has been associated with increased biological vulnerability, and relatively prevalent asymptomatic and untreated STIs. In addition, young women tend to have sexual relationships with relatively older men who have been exposed to the risk of HIV for many years. (Sagay et al, 2005).

This study indicates that the pattern of HIV prevalence among ANC attendants in the period 2006 to 2010 was 11.15%, 7.88%, 8.66%, 6.70% and 5.69% in 2006, 2007, 2008, 2009, and 2010 respectively. The prevalence rates in each consecutive year show more or less a declining trend from 11.15% in 2006 to 5.69% in 2010. This result is also supported by other studies and reports. According to the 2010 report of federal HIV/AIDS prevention and control office, HIV prevalence among pregnant women attending ANC in Addis Ababa has declined from 23% in 1996 to 10% in 2007 (FHAPCO, 2010). Another research carried out in Addis Ababa revealed that there was a decreasing trend in the number of pregnant women who tested HIV positive in Addis Ababa, 9.1%, 8.9%, and 5.8% in 2004/5, 2005/6, and 2006/7 respectively (Mekonnen, 2009). Another supporting document is the national ANC based HIV sentinel surveillance survey results that show the national urban HIV prevalence among pregnant women is declining slowly and gradually (MOH/NHAPCO, 2006). Likewise the HIV prevalence among antenatal attendees decreased significantly from 10.5% in 2004 to 4.6% in 2009 in parallel to the increased number of women being tested (Mirkuzie et al, 2010).

According to UNAIDS/WHO report Ethiopia's HIV epidemic was most severe in urban areas, including in the capital Addis Ababa. However, there were encouraging signs that the declining HIV trend among pregnant women in the capital (first detected in 1997) was continuing. (UNAIDS/WHO, 2004)

The overall declining rate of HIV among ANC attendees is observed in various researches which took place in different African countries especially in Sub Saharan countries. In a study which took place from January 2005 to December 2006 in Amassoma, Nigeria, nearly 4% of pregnant women were HIV positive which is lower than 11.3%, 13.3%, and 21% recorded in 1999 for pregnant women in Eboyi, Akawa Ibom, and Benue state of Nigeria respectively (Egesie et.al, 2008). Another research conducted in Congo revealed that prevalence of HIV among women

seeking antenatal care in Kinshasa, Democratic Republic of Congo was found to be 1.90% (95% CI) in which modeling suggested that the overall prevalence dropped from 2.04% (95% CI) to 1.77% (95% CI) over 4.5 years (Behets et.al, 2010).

The result of this study points out that prevalence of HIV is more or less declining in young age groups especially in early twenties. In a sentinel surveillance carried out in Addis Ababa, the decline in the prevalence of HIV infection was found in the younger age group in inner city health centers (from 24.2% [95% CI, 19.7%-29.2%] in 1995 to 15.1% [95% CI, 11.3%-19.5%] in 2001 (Mekonnen et al, 2002).

The decline in the prevalence of HIV infection among young age groups particularly in those less than twenty corresponds to a decline in the incidence of HIV infection, it would be important to know whether this took place as a result of changes in sexual behaviors, and, if yes, what caused these changes. Declines in prevalence among young age groups are useful to monitor because they suggest declines in incidence, given that the effects of HIV infection-associated reduction in fertility or increase in mortality are likely to be less pronounced in recently infected individuals (Zaba et al, 2000).

For that reason, the prevalence of HIV infection among young women (age range, 15-24years) attending antenatal clinics (ANCs) was selected as a key indicator for monitoring programs on prevalence of HIV infection by WHO. (WHO, 1994).

The decrease in HIV prevalence among ANC attendants which has been confirming with different researches may be an indicator for that much emphasis is given to these groups in order to overcome the problem by concerned bodies.

In this study the percentage of ARV drug uptake among HIV positive pregnant women is more or less in increasing trend year to year except 2009. This finding is supported by a research which took place in Addis Ababa in which the ARV prophylaxis uptake by the women was low in 2004 as compared to 41.6% and 55.0% in 2005 and 2006 respectively (Mirkuzie et al, 2010). These changes might be the result of increased level of awareness of HIV positive pregnant women and increased level of PMTCT services along skilled health care workers. According to Kasenga, skilled attendance at birth is an important determinant of ARV prophylaxis uptake that

requires thorough consideration (Kasenga et al, 2007). In Addis Ababa, only 30% of the pregnant women had skilled attendance at birth in 2008 (FMOH, 2008).

Furthermore this result is sustained by another report; According to report of Federal HIV/AIDS Prevention and Control Office, nationally, of the total pregnant women diagnosed with HIV, only 6,466 (63%) received antiretroviral prophylaxis (ARV/NVP) and only 5,025 infants received PMTCT prophylaxis in 2009. The proportion of diagnosed HIV positive pregnant mothers receiving antiretroviral prophylaxis was significantly greater than the 52% in 2007/08 (FHAPCO, 2010).

Similarly the percentage of HIV pregnant women who have been counseled on infant feeding more or less increases time to time. However, it was slightly decreased in 2009. This result is also supported by a study in Addis Ababa in 2004, 58.3% (95% CI 53.5-63.0) of the HIV positive women received infant feeding counseling, compared to 87.3% (95% CI 85.3-89.0) in 2009 (Mirkuzie et al, 2010) and in Zambia in which receipt of complete course of antiretroviral (ARV) prophylaxis increased from 29% to 66% in the first year and 97% by year three of study (Torpey et al, 2010). It is believed that this progression is related to the development of PMTCT services and skilled health care workers.

Limitations of the Study

- Incompleteness (missing) of some figures (test results) in the counseling register may have its own disadvantage in the study result and analysis.
- Some relevant variables such as marital status and educational status of the attendants are not included in ANC PMTCT counseling register. These variables would have been essential to see cases from different angles and assess the possible factors for the prevalence of HIV.
- Antenatal care attendants who develop HIV infection after diagnosis were not included in this study.

Conclusion

The pattern of HIV prevalence among pregnant women who visited the ANC indicates that high prevalence rates were observed in the age categories of 20 to 29 followed by 30 to 39. Whereas least rates of prevalence were observed in older age groups (40 to 49). However, the percentage of HIV positive pregnant women both taking ARV prophylaxis and who have been counseled on infant feeding more or less has been increasing.

In general prevalence of HIV among ANC attendants in the last five years is in a declining trend. In Addis Ababa the overall prevalence rate decreased from 11.15% to 5.69% within the past five years.

The decrease in HIV prevalence among ANC attendants which has been confirming with different researches may be an indicator for that much emphasis is given to pregnant women in order to overcome the problem by concerned bodies.

Though this declining trend is encouraging, continuous efforts should be implemented for further prevention and control of the epidemic.

Recommendations

Based on the findings the following recommendations are given:

- Improve access to information for adolescents and reproductive age women particularly educational awareness should be given to youngsters; much effort should be applied in the early stages of females since they become sexually active at this stage and being exposed for HIV.
- Intensified efforts to prevent new infections among childbearing age are needed especially for women in the age groups of 20 to 29.
- Community based health education by targeting the age groups of 20 to 29
- Provide age specific reproductive health educations among childbearing age to reduce the risk of HIV infection as their interest varies in specific age categories.
- Innovative strategies involving men in promotion of safe sexual practice are crucial.
- Promote routine offer of HIV testing to all pregnant women attending ANC
- Early treatment and control of other sexually transmitted diseases (STDs) such as active syphilis and genital ulcers that could aggravate the possibility of being infected with HIV.
- Increase access of antenatal care that will decrease the possibility of pregnant women being exposed for HIV
- Even though the trend of ARV drug uptake is increasing, it is still less than 70%. Therefore further researches are needed to identify and address challenges to ARV prophylaxis uptake
- Much is expected from Antenatal clinics in the advancement of new dimensions in routine HIV counseling and testing.
- Services for couple counseling, combined with education on appropriate prevention measures are needed.
- Mobilization of awareness campaign by targeting vulnerable groups
- Though the declining trend is encouraging, continuous efforts should be implemented for further prevention and control of the epidemic.

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Appendix I

Data collection form

[illegible]

Appendix-II

Declaration

I, the undersigned, declare that this MSc research project is my original work, has not been presented for a degree in Addis Ababa University or any other Universities. I also declare that all sources of materials used for the project have been properly acknowledged.

Name of the candidate

Signature

Place

Date of submission

____/____/____

This research project has been submitted for examination with my approval as university advisor.

Name of advisor

Signature

Place

Date of submission

____/____/____

Name of examiner

Signature

Place

Date of submission

____/____/____