

**EVALUATION OF THE REPRESENTATIVENESS
OF ANC BASED SENTINEL SURVEILLANCE
IN ADDIS ABABA**

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LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Clinic
BSS	Behavioral Surveillance Survey
ENARP	Ethio-Netherlands AIDS Research Project
ENHRI	Ethiopian Nutrition and Health Research Institute
FHI	Family Health international
GP	General Population
HIV	Human Immune-deficiency Virus
MCH	Maternal Child Health
MOH	Ministry of Health
PPS	Probability Proportion to Size
SS	Sentinel Surveillance
SRS	Simple Random Sampling
SSS	Sentinel Surveillance system
SSA	Sub-Sahara Africa
STI	Sexually transmitted Infection
STD	Sexually Transmitted diseases
UNAIDS	United Nations Joint program on HIV/AIDS
WHO	World health organizations
OR	Odds Ratio
CI	Confidence Interval

ABSTRACT

National estimates of HIV prevalence of the whole adult population are based on ANC based sentinel surveillance system. Therefore with the objective of determining the representativeness of the ANC attendees in relation to pregnant women not attending ANC and general adult population, a cross sectional comparative study was conducted. It employed a pre-tested standardized questionnaire to collect information on risk factors related to HIV/AIDS from a sample of 1426 individuals. Data was collected in Addis Ababa on April 2000 at the four health centers where the sentinel surveillance is ongoing and at the respective catchment's areas of the health centers. Forty seven percent of the attendees belonged to the age group 15 - 24, 72% were unemployed, 33% had a monthly income of 500 Birr or more, 36% were new comers to the community and 89% were married. Although 61% were multipara, 50% had no children. Over 52% married at age below 19 years, 83.6% never used condom.

There were no significant difference in risk profile between ANC attendees and the non-attendees pregnant women while there were significant differences among ANC attendees and the general adult population of females. ANC attendees were younger with low education; unemployed (72%), new comers to the area, and married compared to the general population of females. Majority of ANC attendees never used condom with regular and non-regular partners (92.7% and 77.6% respectively) and reported STI was 16.4%.

Males were found to have significant association with risk factors i.e. majority of them were single (71.4%), had sexual intercourse with high risk partner (55%) with only

33% of every time use of condom with such partners. The related risk factors were observed to distribute significantly between ANC attendees and the GP of males showing both to have a high-risk profile. It was then concluded that ANC attendees can confidently be taken as representative of the general pregnant population and the GP of males, differ significantly with the general population of female who were observed to exhibit a low risk profile. In addition, close to 30% sexually inactive respondents in the GP, 52% never pregnant and 55% childless women were observed, an addition of another sentinel population as an adjunct to the existing one in order to capture these population is recommended.

1. INTRODUCTION

The Human Immunodeficiency Virus (HIV), which causes Acquired Immune Deficiency Syndrome (AIDS), has brought about global epidemic far more extensive than what was predicted even a decade ago (1). As it continues to spread around the world, it has become increasingly apparent that the epidemic doesn't follow the same course in all societies, rather it affects different geographical areas and population sub-groups in different ways at different times (2).

UNAIDS and WHO now estimate that the number of people living with HIV/AIDS at the end of year 2000 stands at 36.1 million. For Sub Sahara Africa, adult prevalence is reported to be 8.8% at the end of year 2000 with 25.3 million adults and children living with HIV/AIDS. New infections in 2000 totaled an estimated 3.8 million as opposed to a total of 4 million in 1999 (1).

HIV serologic survey using a national representative sample has not been undertaken in Ethiopia. However, using data from limited studies among different population groups, it's estimated that about 3 million adults were living with HIV/AIDS by year 2000 which translated to an adult prevalence rate of 7.4%. (3).

The varying dynamics, together with the serious outcome of the infection and the rapid spread, stress the importance of health officials establishing high quality, reliable HIV surveillance system that can direct the intervention initiatives (4). Since the time when WHO recommended the use of unlinked anonymous screening for routine public health surveillance of HIV-1 infection, various sentinel populations have been set-up to monitor the prevalence of HIV infection in sub populations as well as in the general population (5).

These sentinel surveys are used as windows through which the epidemic can be observed (6). Results of sero-surveys conducted among pregnant women attending ANC are often used to describe the magnitude of HIV infections in developing countries, as they are feasible to undertake and are within the resource means of these countries (7,8). Ethiopia has initiated surveillance system in 1988. Subsequently ANC based sentinel surveillance was established in several sites and effected in Addis Ababa between 1992 and 1993 (8).

The validity of use of this key sentinel groups in terms of HIV prevalence estimation was evaluated in a population based survey (9). Fifteen studies conducted in various African countries suggest that in many African countries, antenatal estimates tend to underestimate the real levels of HIV infection in the general population (10), as HIV is associated with fertility and not all pregnant women attend ANC (11). UNAIDS /WHO estimate that at the end of 1999, 12 million women and 10.1 million men aged 15-49 were living with HIV in SSA (12). Comparisons done in our country too, noted a high level of discrepancy between the ANC based surveillance prevalence and that of the population based survey (8) i.e. the figures obtained among pregnant women in 1996 contrary to other African findings, were strikingly higher than those obtained among women during the community survey in 1994 even after adjustment for age (13).

In addition, studies done in Uganda and Tanzania (14,15) showed a decline in the overall age adjusted HIV-1 sero-prevalence. There is also a similar trend in our

country, which record a decline in prevalence in the younger age groups between the year 1994 and 1999(8).

As the national estimate, projections and interventions to the whole adult population are based on SS, reliable data on HIV prevalence and incidence are essential. As these groups are selected segments of the population, their representativeness of the general population may be questionable i.e. despite the widespread advocacy and use of these sentinel groups to monitor the prevalence of HIV infection, little is known first, the extent to which the women tested are representative of the sentinel population from which they are drawn (the general pregnant women), and secondly the extent to which the sentinel population is representative of any broader population or indeed of the general population as a whole.

This study was therefore conducted with the aim of contributing information to aid clearer interpretation of the reported discrepancies. It attempts to validate the degree to which the Antenatal women (used to estimate the level of HIV infection in the general population) are in fact representative of the general population.

Furthermore, the survey included detailed measure of a number of different parameters of sexuality; the result may also be helpful in estimating baseline levels of risk factor, particularly related to HIV infection in the general population.

2. REVIEW OF LITERATURE

2.1 The Global Picture of HIV/AIDS

HIV, the virus that causes AIDS, started spreading in various corners of the globe just over two decades ago after it's described in homosexuals and IV drug users in USA in 1981(16). Total number of new HIV infection around the world during 2000 is estimated to be 5.3 million (17), with 16,000 new infections occurring daily (18). After years of struggle, the number of new infections in many developed nation is finally starting to fall (19). But overall HIV prevalence has risen slightly in both regions mainly because anti-retroviral therapy is keeping HIV positive people alive longer (1). The percentage of HIV positive adults who are women has risen from 25% estimated in 1990 to 43% in late 1997 and 55% in year 2000. And 9 out of 10 infected women live in developing countries (20).

Altogether there are now 16 countries in which more than one tenth of the adult population aged 15-49 is infected with HIV. In seven countries, all in the southern cone of the African continent, at least one adult in five is living with the virus. In India HIV is spreading so fast and the largest number of HIV infected people in the world next to S. Africa are found there. With a total of 4.2 million infected people, S. Africa has the largest number of people living with HIV/AIDS in the world while W. Africa is relatively less affected by HIV infection (17). There are signs that AIDS prevention program are beginning to make a difference in some parts of Africa. In areas of Uganda, Tanzania and Zambia for example infection rates have started to decline among young people (in Uganda from a peak close to 19% in early 1990s down to 8%) (17).

2.2 HIV/AIDS Situation in Ethiopia

Since the first identification of the HIV in 1984 (21) and after the first few cases of AIDS diagnosis in 1986 (22) HIV/AIDS involves all parts of Ethiopia, Urban as well as rural sparing no groups of population (8). Adult prevalence of HIV has increased from 0 in 1984 to 1.1% in 1989, 3.2% in 1993 and 7.4% 1997 (23). HIV prevalence estimate carried out between the periods 1994-1998 among female sex workers show rate ranging from 45% - 74% confirming the severity of the epidemic (24).

In a baseline estimate of age and gender specific HIV prevalence in Addis, obtained from the entire population of 0-49 years old population in 1994, HIV prevalence was reported to be 6.0% and 6.9% in adult male and females respectively, with a male to female ratio of 0.97:1. Such a balanced ratio suggests that the main mode of HIV transmission in Addis to be heterosexual (13).

There were 83,487 cases of AIDS reported to the MOH since the beginning of AIDS through March 2000. But these cases represent only the tip of the pyramid and the true number of AIDS cases since the beginning of the epidemic though not known accurately due to misreporting and misdiagnosis, is estimated to be 400,000 by the end of 1999 (25). About 90% of reported AIDS cases occur to adults between the ages of 20 and 49. The peak age for AIDS cases is 20-29 for females and 20-39 for male. Since AIDS cases result from HIV infection acquired about 8 years earlier, the peak age for HIV infection is 15-24 for females and 15-34 for male (26). With an estimated 3 million people living with HIV/AIDS currently (3), Ethiopia is the country with the third largest population of HIV infected people in the world (27).

2.3 Antenatal – Clinic (ANC) Based Sentinel Surveillance

The extent of HIV transmission among different sub-population can be addressed through carefully designed and conducted serologic survey. HIV seroprevalence focuses in various sub-populations of public health interest rather than the population as a whole (28). In largely heterosexually driven epidemics, where there is evidence that men and women in the general population have become infected with HIV, HIV surveillance is based mostly on tests performed among pregnant women attending ANC that have been selected as sentinel surveillance sites (29). Where sentinel surveillance is defined as Serial collection of HIV prevalence data over time and place among selected populations groups in order to monitor trends in HIV infection (57).

Many countries with heterosexual epidemics in SSA and a few countries in Asia and the Caribbean have conducted HIV prevalence studies in selected ANC more or/less regularly since the end of the 1980s (29). Pregnant women seeking ANC are chosen because they provide easy access to left over blood already drawn for syphilis and other routine examination at the first Antenatal Visit. And HIV screening will be done using the unlinked anonymous method as recommended by WHO. (29).

If estimation of prevalence in sentinel population is uniformly undertaken over a period of time, the data collected can provide information on the trend of HIV infection in these groups as well as that of the general population depending on their representativeness (29). Among the 250 pregnant women screened in Nigeria in 1993, only two (0.8%) were seropositive for HIV 1. Though prevalence was very low, universal screening during pregnancy was then advocated (30). In Kinshasa, seroprevalence of HIV rose in pregnant women from 0.75% in 1970 to 3% in 1980 and 5.7% in 1986 (31). In Tanzania, the 3 years experience of Sentinel surveillance for

HIV-1 in 1993 showed a sero-prevalence of 11.5% (32). Prevalence from ANC sentinel sites range from 5.5-7.2% in Kenya, 10% in Burundi, and 13.1-33-6% in Zambia (33). The AIDS and STDS prevention and control team, diseases prevention and control department of MOH, in collaboration with the regional health bureau, implement the HIV SSS in Ethiopia. Unfortunately this effort was interrupted and discontinued for more than 6 years, with only a few sites reporting data for the interim years. The exception was in Addis, where the HIV SSS was maintained in collaboration between the health bureau of Addis Ababa city Administration and the ENARP based at EHNRI (7).

In a survey on ANC attendees in the towns of Ethiopia in 1989, the HIV prevalence rate was between 2.1% and 3.6% (34). Subsequent data from sentinel sites indicated that the prevalence of HIV infection among ANC attendees in major urban areas in 1992 to be 11.1% (35). HIV trends among pregnant women attending ANC showed prevalence of 17-18% in Addis (1996-1997) and Gambella 13% (1997) (36). In 1999 prevalence among ANC attendees was 21% and 14% for Amhara and Dire-Dawa respectively (8). Sera obtained from ANC attendants in four health centers of Addis (Kazanchis, Tekehaymanot, Gullele, Higher 23) in 1996-97, revealed a prevalence of 26.5%, 21.3%, 15.7% and 9.0% respectively, resulting in an overall estimation of 17.8%. A year later the range of HIV prevalence had narrowed down to 14.0%-19.5% with an overall estimation of 17.5% (37). HIV prevalence for Addis in the year 1999 was calculated as the average of the 4 sentinel sites, giving a prevalence rate of 15.0 in 1999 (7).

For monitoring the changes in HIV prevalence over time, ENARP in collaboration with region 14-health bureau revitalized the former SSS for HIV infection. Four

Health centers in areas with different HIV prevalence were selected. In each health center 300 pregnant women were tested for HIV antibodies every year according to WHO guidelines for unlinked anonymous testing. In 1997, HIV prevalence was ranging from 14% - 20% in the four health centers surveyed. These data have since been used in the calculation of the total number of people infected with HIV in Ethiopia (27). Since the SSS data are being used to prepare national HIV prevalence estimate in addition to determining the current situation, forecasting the future case loads, the need to compare the seroprevalence rate obtained from ANC sentinel site to that of the population based survey were taken to be crucial in order to validate the system.

2.4- Comparative Studies of ANC Seroprevalence Vs Population Based Surveys

Assessments of the dynamics of the HIV/AIDS epidemic in Africa are based largely on sentinel surveillance of ANC attendees. The validity of use of this key sentinel groups in terms of HIV prevalence estimation was evaluated in a population based survey (9). Recently 15 studies of HIV prevalence on the general population conducted in various African countries have added enormously to our understanding of the speed and shape of the epidemic an understanding which up to now has been based largely on anonymous screening of blood taken at ANC. The studies suggest that in many African countries Antenatal estimates tend to underestimate the real levels of HIV infection in the general population (12). In Zambia, of the 4195 Zambian adults in Urban Lusaka and a rural district in 1995/96 overall ANC surveillance tended to underestimate HIV prevalence in the general population. Comparison of age specific prevalence indicated ANC over estimated infection in

teenagers and underestimated HIV in those aged 30 years and above. These findings suggest that extrapolation from survey data may indeed produce a distorted picture of the current dynamics of the HIV epidemic in the population at large (9).

Another study done in Cameroon showed that 7.7% of women in the general population as compared to 5.5% of those in ANC sentinel sites were positive for HIV. In this study, too, the prevalence of HIV in ANC attendees in the younger age group overestimated the prevalence of HIV in the general population and under estimate for those above the age of 20 years. The authors concluded that ANC based seroprevalence underestimated the overall HIV-1 prevalence for the general population (38).

In a study done in Mwanza, Tanzania, it was found that the ANC attendees significantly underestimate the prevalence of HIV infection in the general population for women under the age of 35. Another study carried out there in Tanzania on the Kagera region in 1996 found that the overall age, sex and residence standardized prevalence of the general population closely resembles that of the prevalence in blood donors than the ANC attendees. So it was concluded that blood donors appeared to be the most representative sentinel groups in that region (29). On the other hand, one comparative study in Tanzania reported that the trend in prevalence observed at sentinel site closely resembled the trend in the female adult population on the region concluding that GP estimate could be generalized using sentinel data based on pregnant women (39). A study done in Uganda showed that sentinel data closely reflected results for the female GP for the younger age groups (15-24 years). In contrast, pregnant women aged 25-29 years showed significantly lower rates than

the population sample. The study commented that SSS need to be age stratified to give useful information (40).

The HIV prevalence from the home based survey conducted in 1994(5.5%) in Addis, was compared to that from ANC based SS conducted in 1996 (16.4%) by A. fontanel et al. The prevalence showed wide variation between clusters, which was also observed in the sentinel population prevalence. However contrary to the other findings from various African countries, the figures obtained among pregnant women in 1996 were surprisingly higher than those obtained from the home based survey in 1994 giving an over estimation even after adjustment for age. Likely explanations forwarded were that, HIV epidemic is still in its expansion phases in Addis, high HIV incidence during the two years separating the surveys, and participation biases in the community leaving out high risk individuals (13).

The result of the two years SS in Addis (1996-7) were compared with those obtained from other population groups of the city in a study conducted by Tsegaye A. HIV prevalence from visa applicants ranged between 8-10% and from population based surveys between 10-22%. In general when compared to women of the same age group in other studies, pregnant women tended to give an overestimate of HIV prevalence in the younger age group (15-24) and an underestimate in the older age group (35-44) which was explained by the risky sexual behavior experience of the younger pregnant mothers as compared to their peers and the decrease fertility observed among women with advanced HIV infection in the oldest age group. (8).

Reports from some of major town of Uganda on the other hand, indicated a declining HIV prevalence since 1992 among women attending ANC (41). And it has been

concluded that changes in the behavior of young people could be the cause of the decline observed (40). The most notable changes being that teens are waiting longer before becoming sexually active, and fewer adolescents are having sex with multiple partners. There is also evidence of greater use of condoms on high-risk sexual encounter (42). Similar findings were also reported from Tanzania and Zambia though clear explanation was not given as the case of Uganda (43). The observed decline in prevalence in the young age group (15-24) is likely to reflect a decline incidence, as much of the infection in this age group is newly acquired. (44).

The declining trend in HIV-1 prevalence among pregnant women, particularly those aged 15-19 years described for Addis Ababa is also in agreement with data from other SS sites in Africa (40) i.e. HIV-1 prevalence among ANC attendees declined from 21.2% (1995) to 17.8% (1996), 16.7% (1997) and 14.3% (2000). The decline was particularly pronounced in young (less than 25) age group (from 24.2 –15.7%). Syphilis prevalence also dropped during the same time period (12.3 to 6.8%)(45).

2.5 Risk Factors Related to Infection with HIV/AIDS

Clearly, the HIV epidemic progresses differently in different situations. It's driven by individual behavior which put people at risk of infection which may in turn be driven by poverty, unequal relationship between men and women, by cultural and religious norms that leave people little control over their exposure to the virus (46). And unprotected sex continues to fuel the HIV epidemic in many countries (11). Many set up sero-surveillance to track the spread of HIV through their population but fewer collected any information on sexual behavior and demographic characteristics that are central to the spread of HIV. Since behavior precede infection, information on

the distribution of risky behaviors can help in comparing the different sub-groups in order to analyze who is having more risky behavior thereby high likely to be infected with HIV.

There is evidence around the world that many factors play a role in kick starting a sexually transmitted HIV epidemic or driving it to a higher level; to site some: multiple sexual partner, little or no condom use, travel away from home, STI, Migration, unemployment, education and marital status (1).

A study done in 1995-6 by A-fontanel and colleagues on determining factors associated with HIV infection in Ethiopia, reported that high income, being currently not married, genital discharge, sex with sex workers, number of life time partners and positive result for syphilis were significantly associated with higher HIV prevalence for males, while low income, low education, living alone, travel more than one week in the past year, drinking alcohol were significantly associated in females (46). Similarly, study done on factory workers in Wonji, revealed number of life time sexual partners, positive syphilis serology and higher monthly income to be associated with HIV infection (47). Studies among STD patients in two-health center (Kazanchis, Teklehaymanot) in Addis found that 30-40% of them were also infected with HIV. This is three times higher than the prevalence among general urban population (42).

Early sexual debut for girls at an age when their biological vulnerability is high is crucial factor for acquisition of HIV infection (17). A study by catania et al (1990-92) on the HIV risk behavior of 4790 heterosexuals aged 18-49 years found male gender, high school education, unmarried status to be associated with high risk

behavior (48). Marriage, divorce, childbirth, widowhood were also reported to influence risk behavior (40).

In the Kenyan city of Kisumu, nearly two fifth of women who had had pre-marital partners were HIV positive while no infection were found in the women who said they were virgins when they married (17). Researches also showed that the risk of becoming infected with HIV during unprotected intercourse is as much as 2-4 times higher for women than males (20). Consistent and correct use of condom was advocated to decrease the sexual transmission of HIV. Killewo.J and colleagues also reported from Tanzania that multiple sexual partners and infection with syphilis to be the major risk factor for HIV infection (49).

Information related to HIV/AIDS is essential in identifying population most at risk for HIV infection (50). It seems that possessing accurate knowledge about HIV and how it can be prevented is a necessary part of the desire to practice safer behavior (46). Traveling outside the town also found to be associated with increased risk of HIV infection (49). Early sexual debut, travel and alcohol were associated with multiple sexual partners from a study done in C. Africa (51).

Since the distribution of these risk factors and other covariates determine the level of infection with HIV in a population, data on the risk factors will help in interpreting the trend of the HIV prevalence, comparing the various sub-groups of population as to their being at more risk, lesser risk or in the same level of risk for infection with HIV-1. So this study in an attempt to validate the ANC based sentinel surveillance will

determine the representativeness of the ANC attendees by collecting information on the distribution of these risk factors related to HIV infection.

2.6 Significance of Evaluating the Sentinel Surveillance

Women attending ANC are the predominant source of HIV prevalence data in countries with generalized epidemics like ours. The extent to which HIV trends among ANC attendees reflect trend in the general population depends on the severity of biases (52).

As we have seen on previous sections, studies in other African countries reported that ANC SS underestimate the level of the prevalence in the general population and contrary to these findings our report documented an overestimation. And since we are depending on the ANC SS for National estimate, we have to have a representative group to accurately monitor trends. But currently we don't have data to clearly state what the relationship is between pregnant women and other women in the population and the male half of the population. To summarize explanations and assumptions forwarded for the discrepancies: - For **Underestimation**

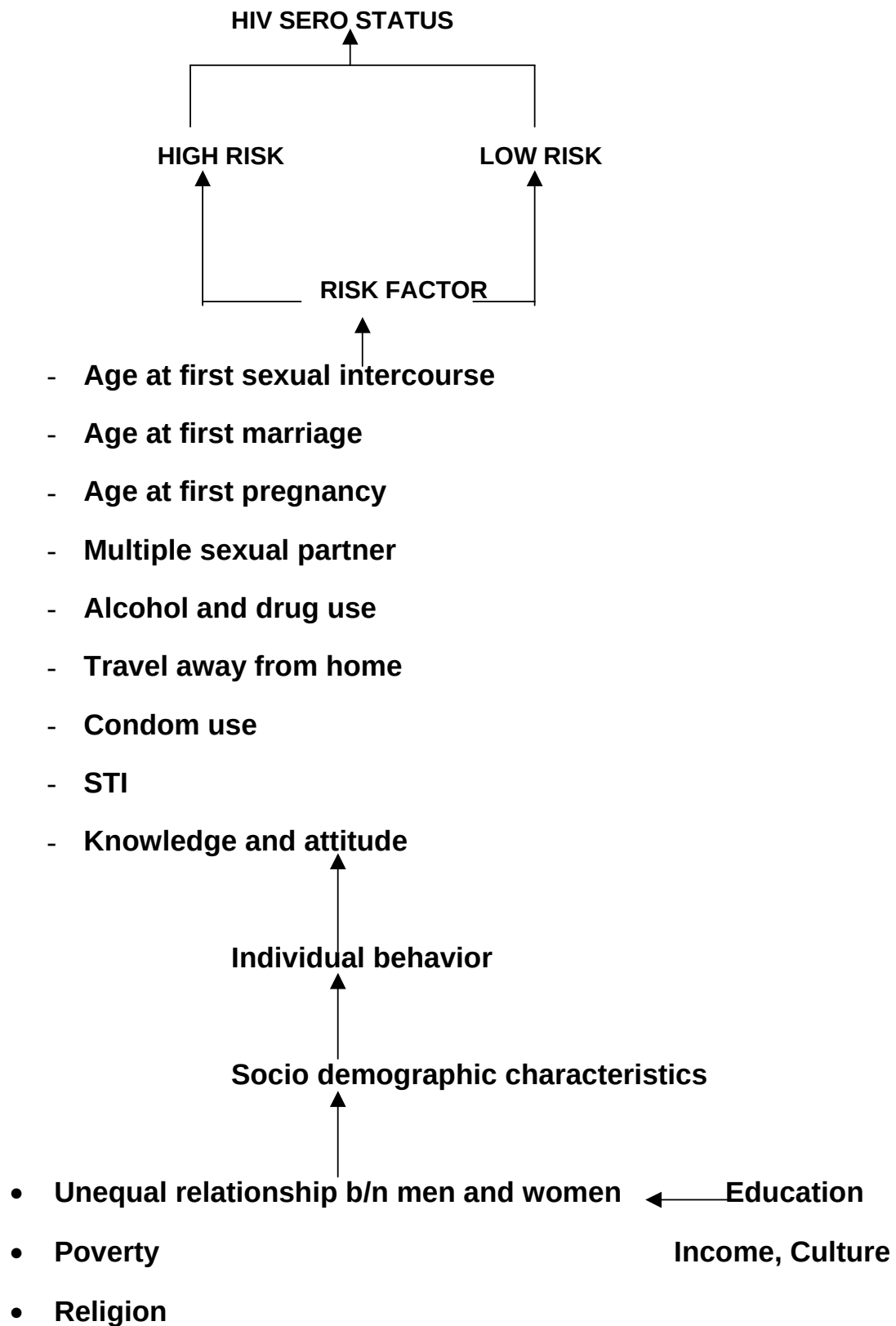
- I. HIV is related with fertility: - studies from several countries have shown that women with HIV have lower fertility than those without infection by 30%. HIV positive women are thus less likely to be pregnant and are missed by SS (17).
- II. Women with high-risk behavior may frequently use contraception to prevent pregnancy, but do not also use condom. They would be expected to have a high HIV prevalence but would not be represented in ANC data (41).
- III. ANC Non-attendance – high risk pregnant may avoid the ANC

Overestimation

- I. Difference in the age distribution of pregnant women compared to all women 15-49 years. ANC have high proportion of 15-24 age groups (high-risk groups).
- II. Difference between female and male prevalence.
- III. ANC data represent sexually active women with fertility higher at younger age.
- IV. Difference in proportion of the population 15-49 years that is sexually active i.e. pregnancy is a consequence of unprotected penetrative sex, a behavior that also allows the virus to be transmitted. Women who have adopted safe sexual practices such as abstinence or consistent condom use will not become pregnant and not be screened. In this case SS may overestimate prevalence.

But despite forwarding these possible theories, as explained earlier, little is known how the sentinel group relates to the general population from which they are derived. Since the ANC attendees are a segment of the population, the validity of the seroprevalence estimate from ANC SS depends on the degree of representativeness of the attendees on whom the screening is done.

Fig1.RISK FACTORS FOR HIV-1 INFECTION



3. OBJECTIVES

3.1 General Objective

To evaluate the representativeness of ANC based Sentinel Surveillance in Addis Ababa.

3.2 Specific Objectives

- To describe the profile of the ANC attendees in Addis Ababa at the four sentinel sites.
- To determine whether the risk profile of ANC attendees at the sentinel sites is different from the larger population of pregnant women and with the general population.
- To determine the representativeness of the ANC surveillance.

4. METHODOLOGY

4.1 Study Area and Period

The study was conducted in Addis Ababa, the capital city of Federal Government of Ethiopia and of Addis Ababa city local government. The data was collected in one-month time at the four health centers of the sentinel sites (Kazanchis, Teklehaymanot, Gullele, Higher 23) and the respective four Woredas (Woreda 3, 9, 15, 23), which are the catchments areas of the sentinel site on April 2001.

Addis Ababa with an estimated population of 2.6 million and male to female ratio of 1:1.041 is located in an area of 540 square kilometer and altitude of 2200 - 2800 meters above sea level with a temperate climate. It is divided into six administrative zones, twenty-eight woredas and 328 kebeles. Women in the childbearing age groups (15 - 49) and under 14 years old children together constitute 62% of the population (53). TFR is 1.9 children per women (54). The four major ethnic groups of the city were Amharas (48%), Oromos (19%), Gurages (17.5%) and Tigraways (7.6%). The population growth is 3.79% per annum, with net immigration of 2.97% and a rate of natural increase of 0.82%. The average household size is 5.2 with 5.5 person per housing unit. Thirty percent of the active population is unemployed (55). The selected four woredas have 52 kebeles with a total population of 539,439 with 60% of them being between the age of 15 - 49 years (56).

4.2 Study Design:

Study design was cross sectional and comparative.

4.3 Study Populations and Sampling

4.3.1 Population

The source populations were all pregnant women attending ANC at the four health centers (Kazanchis, Teklehaymanot, Gullele and Woreda 23) of sentinel site. Pregnant women not attending ANC in the four Woredas and Adult general population (female non-pregnant and adult male) residing at the respective four Woredas (Woreda 3, 9, 15, 23) that are in the catchment's area of the sentinel site were also source population.

4.3.2 Sample Size

To determine sample size for the study the following assumptions were made. A 5% Type I error was taken, ($Z_{\alpha/2} = 1.96$), with 80% power of the study. A proportion of 55% high-risk behavior among the ANC attendees and 45% among the general population males, females and non-attendees is preferred to get the largest possible sample size. Furthermore, additional 10% allowance for possible absenteeism and refusal to participate in the study was considered. Based on these, the actual sample size was calculated using the formula for cross sectional comparative studies (using two population proportion).

$$P \text{ (population proportion)} = P_1 + rP_2 / 1 + r$$

$$\frac{[Z_{\alpha/2} \sqrt{(1+1/r) P (1-p)} + Z_{\beta} \sqrt{P_1 (1-p_1) + P_2 (1-P_2)/r}]^2}{(P_1 - P_2)^2}$$

$$\alpha = 0.05$$

$$r = 1$$

$$1-\beta = 80\%$$

$$P_1 = 55\%$$

$$n_1 = 452$$

$$n = \text{Sample size}$$

$$P_2(m) * = 45\% \quad n_2 = 452$$

$P_2(m) *$ = proportion in male

$$P_2(f) * = 45\% \quad n_3 = 452$$

$P_2(f) *$ = proportion in female

$$P_2(\text{non}) * = 45\% \quad n_4 = 452$$

$P_2(\text{non}) *$ = proportion in ANC non attendees

$$\text{Total sample size required} = n_1 + n_2 + n_3 + n_4 = 1808$$

4.3.3 Sampling Technique

For the purpose of this survey four Woredas (Woreda 3, 9, 15, 23) were selected because they are in the same catchment's areas of the ongoing sentinel surveillance site. All the Kebeles found in the Woredas were listed and their corresponding populations were obtained from the zonal health bureau projected for 2000 based on the 1994 census. From the total of 52 Kebeles in the 4 Woredas, 30 Kebeles were selected for the survey by PPS size being the number of population. First household to be approached was identified by SRS and every i^{th} (third) household obtained by dividing total number of household (H) by the number of household to be approached was selected by going clockwise. In each household, one eligible candidate aged 15-49 was selected by SRS using the lottery method. If no eligible candidate identified in the selected household, the interviewers contacted the next i^{th} household selected in clockwise direction, until they get a candidate. A total of 30 (15 adult male, 15 adult female non-pregnant) were selected from each Kebele.

The ANC attendees at the respective 4 health centers of sentinel site were recruited as they came for Antenatal care consecutively. One hundred thirteen attendees were selected from each site with a total of 452 samples. The pregnant women not attending ANC were going to be recruited from the community like the general adult population by approaching households only. The initial assumption was that based on the percentage of pregnant women in Addis considering 40- 30% non-attendance

(from previous studies) it was calculated that, in order to get 452 non-attendees pregnant women, 30 Kebeles were to be approached at a maximum of 100% allowance on the actual calculated figure. But as it happened to be impossible to get the required sample size in one month period solely from the household survey from the Kebeles that were selected, effort was made as much as possible to approach every Kebeles (in the 4 Woredas), and household were contacted door to door, giving priority to the pregnant non-attendees where there occurred more than one eligible candidates in one household. In addition, effort was also made to pick them at the delivery wards of the three health centers (one left out, because it has no delivery). Every delivering mother was approached and asked if she had 'ANC' or not and if she had no ANC at all during her pregnancy, she was given the interview after fulfilling the necessary formalities.

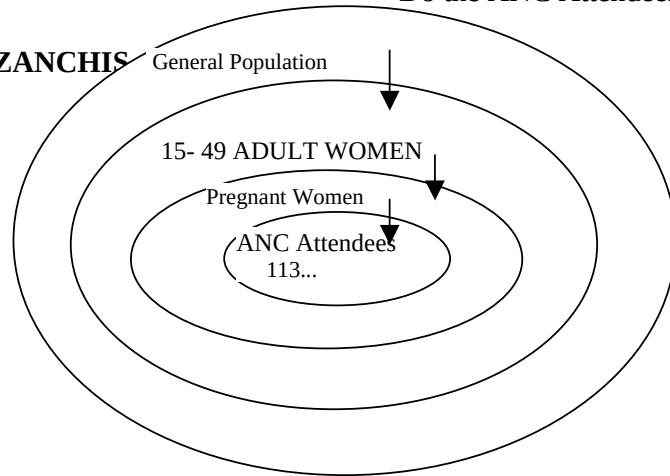
But even with this method it was difficult to get the desired sample size, and it was concluded that the non-attendance rate for Addis has to be revised. Even the reported 30- 40 % non attendance was found out to be 'late attendance' but not absolute non attendance, which is not the interest of this study as blood will be drawn for any pregnant women, at whatever stage she attends, and she will automatically be a sentinel group. The DHS report that was made official after the data collection period of this study further revealed the current situation with a total of 3% current pregnancy for Addis Ababa (as compared to 5% previous report) and only 17% non-attendance.(58)

STUDY AREA / POPULATION SELECTED

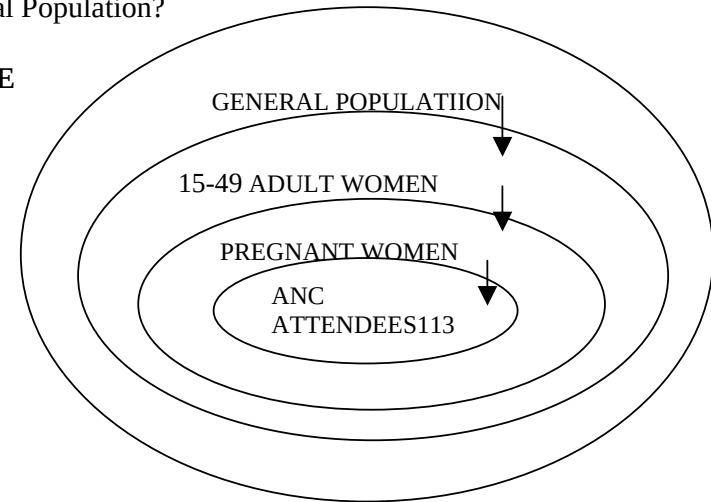
FIG. 1

Do the ANC Attendees Represent the General Population?

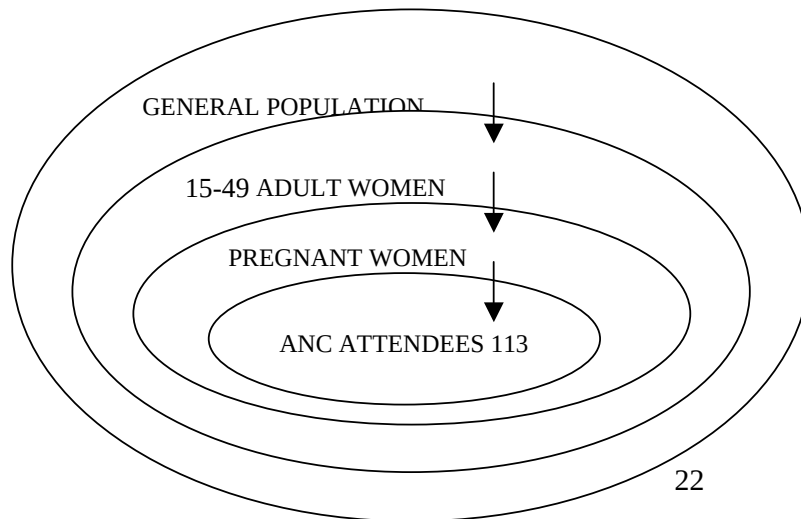
KAZANCHIS



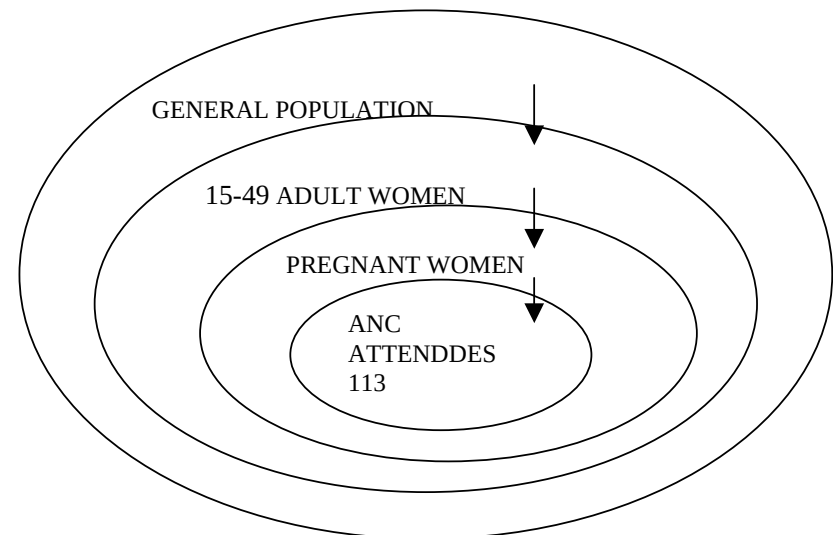
GULELE



TEKLEHAIMANOT HEALTH CENTEER



W0REDA 23 HEALHT CENTER



4.4 Instrument Developments And Data Collection

A standardized structured questionnaire from BSS prepared by FHI was used. No major change was made except to add some questions on one or two sections (Reproductive- history, condom use), which was agreed and corrected as recommended by advisors.

Two individuals who have very good ability of both languages then translated the final English version to Amharic. Differences between two translations were again discussed and some modifications were made as agreed upon the terms. The final Amharic version of the questionnaire was then translated back to English to check for conceptual equivalence. In order to avoid confusion due to the wording inherent to the Amharic word, different sets of questionnaire were prepared for both sexes and another two sets of questionnaire for ANC attendees and non-attendees as they have separate set of questions on one section.

4.4.1 Pre-testing

Pre-testing of the questionnaire was carried out on respondents in the same age group to the study subjects, among Kebeles not included in the study. The questionnaire was assessed for its clarity; understandability, acceptability, flow, repetition and time required interviewing one respondent. Generally the pre-test result was good in relation to the developed question. But questions that were found to be confusing were omitted; as it was believed that their removal would improve the quality of the remaining question.

4.4.4. Data Collection

Data was collected in one-month period-April 2001. In the first part a questionnaire consisting of socio - demographic variables (age, sex, year of stay in the city, educational level, travel history, alcohol and drug intake) economic variables (Income, occupation); In the second part reproductive history (parity, gravidity, gestational age, time of first visit, reason for non-attendance). In the third part sexual history- initiation of sexual intercourse, age at first initiation of sex, reason for first initiation of sex, type and number of sexual partner in the past 12 months. In the fourth part STI - genital discharge, ulcer, frequency and treatment seeking behavior. In the fifth part condom (Male)- knowledge, where to get, frequency, reason (for using and non use) and in the sixth part knowledge and perception- related to HIV/AIDS were administered.

Before the study started the aim of the study was well discussed with respective administrative heads and heads at the respective zonal health bureau and with the medical directors at the health centers. Ten interviewers who completed high school and four nurses were hired. Three supervisors (university graduates) who were familiar with the districts were hired. Their responsibilities were: -

1. Coordinate the activities of interviewers.
2. Check and edit the questionnaires each day. Corrected and submitted to the principal investigator for final checking.
3. Recheck answers by conducting interviews in 5% of those interviewed.

Interviewers were trained for four days by the principal investigator and given a field trial for one day. They were given intensive training on the aim, procedure and problem that may arise during the survey. The trainer gone through the questionnaire carefully explaining the concept of each question, art of

interviewing, the need for proper sequencing, maintaining flow of questions, polite approach, patience, respect, not to be judgmental and not to lead the respondents. On top of this, a six-page interviewer guide with detail guides on each question and on the interviewing art was translated and given to each interviewer.

There were 5 teams, each having three individuals, one trained female, one trained male interviewer with Kebele guide. They, after introducing themselves first to the Kebele office (up on entering a new Kebele) approached the selected household with the help of the Kebele guide, did all the preliminary steps and after having the consent, they wrote age and sex of all the candidates in the house hold (name was avoided) on small piece of paper, then picked blindly by any member of the household. The interview was conducted privately. Questions were identified only by number. When the respondent selected was not at home after three visit, the next ⁱth house was visited. Similarly in case of refusal, the questionnaire was labeled as non-response and the next ⁱth (selected) household was approached.

It was found out that most pregnant women did attend even if it was at the last month. Some who were approached upon delivery, even if they had no ANC attendance at that particular health center did claim to have attended at another center. And it was difficult to get the required sample size even by combining the two methods. As a result, the power was revised based on the sample size obtained and it dropped to 60% specifically for the two groups i.e. for the comparison of attendees and the non- attendees. From this outset, it seems that the ANC coverage for Addis has to be revised.

4.5 Data Management

A pre-coded data was entered using EPI info version 6. Range and skip checks were done automatically during data entry. Computer printouts of frequencies were used to check for outliers, errors were checked after completing data entry. After the data was cleaned backup copies were made and stored in a safe place. The data then transported to SPSS.10 for analysis.

Logistic regression was performed using SPSS Version 10. The results were presented using absolute numbers and proportions, odds-ratio and confidence interval. For each knowledge question one point was given for correct one and zero point for incorrect response. A sum of score was then obtained.

4.6 Ethical Considerations

All the study participants were briefed on the purpose of the study by the respective interviewers. A verbal consent was obtained from the respondents. A letter with introduction of the study, the need and benefits of conducting the study and the issues of confidentiality was attached to the cover page or the questionnaire. It was read to every participant. They were very much assured that the response they gave would by no means connect to them in an identifying ways. A formal letter was written to the four zonal bureaus and to Addis Ababa health bureau, which in turn distribute letter to every Kebele and to the four health centers of sentinel site respectively. Moreover the study proposal had clearance from the ethical committees of the department of community health and the Faculty of Medicine, Addis Ababa University.

LIST OF OPERATIONAL – DEFINITION

Adult- an adult is defined as a person aged 15-49.

General Population – study participants aged 15-49 years male and female (not pregnant during the study period) who are permanent resident of Addis Ababa or who lived for more than one year.

Antenatal care attendants - All pregnant women who attended antenatal care at the respective four-sentinel site at the month of April and who lived in Addis for more than one year.

Antenatal care non- Attendees – all pregnant women at the four study area who didn't attend antenatal care and lived in Addis for more than one year.

Self travel - A respondent who traveled far from his /her residence for at test one month on a continuous basis in the last 12 months.

Income – monthly joint family income in birr.

Regular partner – a sexual partner who is a spouse or live-in partner.

Commercial Sex – Sexual intercourse with exchange of money.

Non – regular partner: For married men /women – any sexual partner other than their spouse or live in partner

For single men/women - any sexual partner other than a relation ship that lasts 12 months.

High Risk Sexual Partner - Commercial and/or nor regular partner.

Dependent - A respondent with no job excluding housewives.

5. RESULT

5.1: SocioDemographic & Economic characteristic of the study population.

The response rate for ANC attendees was 100%. Non-response for GP female and male was 2 and 4% respectively. Remarkably, the proportion of non-attending pregnant women in the districts was much lower than expected as explained earlier. We managed to get only 93 which is only 20.3% of the required sample size. The demographic and economic characteristics of the respondents are given in **Table1**. ANC attendees were 458, non-attendees 93, general population (GP) females 442 and males 433.

Age: Higher proportion of ANC attendees were in the age group 15-24.

Education: Majority of the GP of females and males respondents had secondary education, 320 (72.4%), 380 (87.8%) respectively.

Duration of stay: One hundred sixty five (36.0%) attendees were newcomer to the community with duration of stay less than or equal to 10 years. **Self-Travel:** Fifty six (12.2%) of attendees and 14 (15.1%) of non-attendees reported to be away from their home for more than one month in the past 12 months.

Occupation: Majority of ANC attendees 334 (72.9%) and non-attendees 51 (54.8%) were housewives. Proportion of males employed in formal sector is 57%, 28.5% for females as compared to only 14% of attendees. One hundred fifty two (33.2%) of ANC attendees, reported as having income 500 Birr or more.

Alcohol Intake: The proportion of respondents who reported alcohol intake daily is insignificant for all sub-groups. Injectable drug was not reported by any of the respondents and only one male reported using Hashish. Chat intake is reported by 80 (17.5%) attendees, 62 (14.3%) male, 20 (4.5%) female and 10 (10.7%) non-attendees.

TABLE 1. Socio demographic and economic characteristics of the study subjects-Addis Ababa- April 2001

CHARACTERISTICS	ANC ATTENDEES	ANC NON ATTENDEES	GENERAL POPULATION FEMALE	GENERAL POPULATION MALE
	n (%)	n (%)	n (%)	n (%)
SEX				
FEMALE	458 (100)	93 (100)	442 (100)	- -
MALE	- -	- -	- -	433 (100)
AGE				
15-24	218 (47.6)	46 (49.4)	204 (46.2)	183 (42.3)
25-34	208 (45.4)	42 (45.2)	150 (33.9)	159 (36.7)
35-49	32 (7.0)	5 (5.4)	88 (19.9)	91 (21.0)
EDUCATION				
Not literate	88 (19.2)	22 (23.7)	32 (7.2)	7 (1.6)
Primary	119 (26.0)	28 (30.1)	90 (20.4)	46 (10.6)
Secondary	251 (54.8)	43 (46.2)	320 (72.4)	380 (87.8)
RELIGION				
Orthodox	331 (72.3)	74 (79.6)	376 (85.1)	355 (82.0)
Catholic	3 (0.7)	1 (1.1)	5 (1.1)	2 (0.5)
Protestant	31 (6.7)	3 (3.2)	18 (4.1)	33 (7.6)
Muslim	93 (20.3)	15 (16.1)	40 (9.0)	40 (9.2)
Others	- -	- -	3 (0.7)	3 (0.7)

ETHNICITY

Amhara	220 (48.0)	48 (51.6)	227 (51.3)	226 (52.2)
Oromo	78 (17.0)	20 (21.5)	91 (20.6)	80 (18.5)
Tigraway	27 (6.0)	4 (4.3)	57 (12.9)	52 (12.0)
Gurage	104 (22.7)	18 (19.4)	44 (10.0)	55 (12.7)
Others	29 (6.3)	3 (3.2)	23 (5.2)	20 (4.6)

INCOME

Dependent	17 (3.7)	12 (12.9)	151 (34.2)	138 (31.9)
1-249 Birr	170 (37.1)	40 (43.0)	145 (32.8)	117 (27.0)
250-499 Birr	119 (26.0)	15 (16.1)	74 (16.7)	90 (20.8)
500B /Above	152 (33.2)	26 (28.0)	72 (16.3)	88 (20.3)

TRAVEL *

Yes	56 (12.2)	14 (15.1)	30 (6.8)	46 (10.6)
No	402 (87.8)	79 (84.9)	412 (93.2)	387 (89.4)

**DURATION
OF STAY**

< 10 Years	165 (36.0)	36 (38.7)	70 (15.8)	68 (15.7)
> 10 Years	293 (64.0)	57 (61.3)	372 (84.2)	365 (84.3)

*** Away from home for one month or more**

5.2 Marital status and reproductive history of the study participants

Marital status: Four hundred nine (89.3%) of the attendees and 67 (72.0%) of non-attendees were married, while 234 (52.9%) females and 309 (71.4%) of males were singles. Table 2.

Majorities of attendees, (52.5%), non attendees (54.1%) GP female (57.2%) married at age of 19 years or less while the males (59.8%) at age of 25 years and above. Two hundred thirty (52%) of the GP females were never pregnant. Two hundred and forty four (55.2%) of GP female had no children.

ANC attendance: Of the 280 (61.1%) ANC attendees who had previous pregnancy 232 (83%) reported previous ANC attendance.

Current Attendance:

Majority 287 (62.6%) of the ANC attendants were in their third trimester, 147 (32.1%) second trimester while only 24 (5.2%) were in the first trimester. Higher proportion 283 (61.8%) of ANC attendees reported to start follow-up in the second trimester, and 152 (33.2%) during the first trimester. The reason for non-attendance cited by majority of the non-attendees 49 (52.7%) was being busy, having no time, followed by did not think it was necessary (because they were feeling healthy) reported by 33 (35.5%) and fear because the pregnancy was unofficial was reported by 7 (7.5%) of the non-attendees.

TABLE 2: Marital status and reproductive history of the study subjects Addis Ababa – April 2001

CHARACTERISTIC S	ANC ATTENDEES	ANC NON ATTENDEES	GENERAL POPULATION FEMALE	GENERAL POPULATION MALE
	n= 458	n= 93	n= 442	n= 433
Marital status	n (%)	n (%)	n (%)	n (%)
Married	409 (89.3)	67 (72.0)	161 (36.4)	108 (24.9)
Never Married	31 (6.8)	18 (19.4)	234 (53.0)	309 (71.4)
Others	18 (3.9)	8 (8.6)	47 (10.6)	16 (3.7)
Age at 1ST marriage	n= 427	n= 75	n= 208	n= 124
19 years and less	224 (52.4)	40 (53.3)	108 (52.0)	11 (8.9)
20-24 years	143 (33.5)	29 (38.7)	65 (31.2)	36 (29.0)
25 years and above	60 (14.1)	6 (8.0)	35 (16.8)	77 (62.1)
Parity	n= 458	n= 93	n= 442	
Never Pregnant	- -	- -	230 (52.0)	- -
Primi	178 (38.9)	36 (38.7)	51 (11.6)	- -
Multi – Para	280 (61.1)	57 (61.3)	161 (36.4)	- -
Age at 1ST pregnancy			n= 212	
19 years and less				
20-24 years	193 (42.2)	41 (44.1)	116 (54.7)	- -
25 years	182 (39.7)	40 (43.0)	66 (31.1)	- -
	83 (18.1)	12 (12.9)	30 (14.2)	- -
Number of children			n= 442	n= 433
No children				
1-2 children	232 (50.6)	44 (47.3)	244 (55.2)	324 (74.8)
3 and above	185 (40.4)	36 (38.7)	114 (25.8)	69 (16.0)
	41 (9.0)	13 (14.0)	84 (19.0)	40 (9.2)

5.3 Sexual behavior type and number of partners, and STI -

Equal proportion of GP female and male 322 (72.9%) 312 (72.1%) respectively reported ever had sexual intercourse.

Reason for sexual debut: This was reported to be marriage for the great proportion 328 (71.6%), 62 (66.7%) of attendees and non-attendees respectively. 162 (50.3%) GP females also reported same reason while the majority of GP males 225 (72.1%) reported personal desire to be their reason for sexual debut in contrast to 99 (21.6%) of GP females. Peer-pressure and influence of alcohol was the reason for 57 (13%) males.

Frequency of sexual intercourse ranges from 0-20 in last 30 days. Forty four percent males, 44.8% females, 40% non-attendees and 52.3% attendee had sexual intercourse 1-4 times in a month.

Treatment seeking behavior: Of those who reported STI 55/75 (73.3%) of attendees, 14/18 (77.8%) non-attendees, 26/46 (56.5%) females, and 3 males (60%) did seek treatment.

TABLE 3: Sexual behavior, number and types of sexual partners and STI among study population- April 2001

CHARACTERISTICS	ANC ATTENDEE	ANC NON ATTENDEES	GENERAL POPULATION FEMALE	GENERAL POPULATION MALE
	n= 458	n= 93	n= 442	n= 433
Ever had sexual intercourse	n (%)	n (%)	n (%)	n (%)
Yes	458 (100)	93 (100)	322 (72.9)	312 (72.1)
No	- -	- -	120 (27.1)	121 (27.9)
Age at 1st sexual intercourse			n= 322	n= 312
14 years and less	31 (6.8)	10 (10.8)	37 (11.5)	5 (1.6)
15- 19 years	256 (55.9)	52 (55.9)	170 (52.8)	163 (52.2)
20 years /above	171 (37.3)	31 (33.3)	115 (35.7)	144 (46.2)
Had sexual intercourse in the past 12 months				
Yes	458 (100)	93 (100)	238 (73.9)	228 (73.1)
No	- -	- -	84 (26.1)	84 (26.9)
Had regular partner in the past 12 months			n= 238	n= 228
None	45 (9.8)	21 (22.6)	68 (28.6)	95 (41.7)
1 Partner and above	413 (90.2)	72 (77.4)	170 (71.4)	133 (58.3)
Had sex with high risk partner, past 12 months				
None	409 (89.3)	71 (76.3)	169 (71.0)	126 (55.3)
1 Partner and above	49 (10.7)	22 (23.7)	69 (29.0)	102 (44.7)
STI in the past 12 months			n= 442	n= 433
Yes	75 (16.4)	18 (19.4)	46 (10.4)	5 (1.2)
No	383 (83.6)	75 (80.6)	396 (89.6)	428 (98.8)

5.4 Condom Use

Ever use of condom was reported by 167 (38.6%) of male respondents followed by GP females 87 (19.7%) as compared to 75 (16.4%) attendees and 8 (8.6%) non-attendees. (Table 4)

Condom use with regular partner: - Of those who reported having had regular partner in the past 12 months 383/413 (92.7%) attendees, 63/72 (98.8%) non-attendees, 148/170 (87.1%) females and 111/133 (83.5%) males reported not to ever use condom, with such partners. Only 13 (9.8%) of males reported 'every time' use of condom.

Condom use with high risk partner: - This was assessed initially separately (commercial and non-commercial, non-regular) but as the figures were too small for commercial, condom use with such partner is assessed together with non-commercial non-regular as both reflect a risky behavior. This was then reported to be 60/102 (58.8%) for males, 23/69 (33.3%) females. While twenty-two (90.9%) non-attendees and 38 (77.6%) of attendees reported 'never using' condom with such partner. Overall, 45 (91.8%) attendees and 22 (100%) non-attendees reported having unprotected sexual intercourse with high risk partner as compared to 46 (66.9%), 42 (38.5%) of females and male of GP respectively.

When asked about the time of starting condom use, majority of ANC attendees 35/75 (47%) and non-attendees 62.5% reported 1-2 years while great majority of GP female 47 (54.0%) and males 102 (61.1%) reported above 2 years. The pregnant women started to be user of condom recently.

Reason/Trend: Prevention of pregnancy was the main reason cited by 266 (67.1%) of respondents to why they started to use condom followed by prevention of HIV/AIDS cited by 208 (62%).

When the respondents were asked on the trend of their condom use in the past 12 months compared to the previous times, most 114 (33.8%) reported that the frequency had decreased currently, 52% attendees and 50% non-attendees reported a decreasing frequency and significant proportion, 34.7% and 50% attendees and non-attendees reported as totally avoiding using condom currently as compared to the past. A significant proportion of female 46% reported that they are currently using condom more frequently. Twenty four percent males and 16.1% females reported avoiding using condom currently while 25.3% and 29.3% females and males respectively reported a decreasing frequency.

Most frequent reason cited by majority of the respondents for decreasing frequency of using condom or totally avoiding it or never using it were in descending order, being married and having a faithful partner (55%), though not married, being in a reliable one to one relationship (41.3%), don't like condoms (6.8%), religion and want of a child (6.1%)

5.5 Knowledge and belief related to condom, STI, HIV/AIDS, VCT

Condom: Almost all 1414 (99.2%) of the respondents have heard about condom with similar proportions among the sub-groups, 1364 (96.5%) also knew places where they could get condom, 99.5% of males and 95.4% of attendees, the remaining having proportions in between. The most cited place by majority of groups 1275 (94%) was

shop, followed by pharmacy 853 (63%). All sub-groups have similar distribution of proportions. Reason for use of condom during intercourse was reported by majority 94% females, 96% males, 91%, attendees and 90.3% non-attendees to be prevention of acquisition of HIV/AIDS followed by prevention of pregnancy (84%) and other STI (80%). (Table 4)

STI – Almost all have heard about STI but their knowledge on citing symptoms of STI, be it in females or males was surprisingly very low. The pregnant women have the higher proportion 75 (17.6%) and 21 (24.7%) attendees and non-attendees respectively gave 3 correct answer compared to 34 (7.9%) and 40 (9.3%) of the GP female and male respectively. For symptoms of STI in males 234 (17.1%) gave 3 correct answer, 17 (20%), 120 (28%), 73 (17%) and 24 (5.6%) of non-attendees, males, attendees and females respectively.

HIV/AIDS: All 1426 (100%) respondents reported having heard about HIV/AIDS. The commonest reported source being radio reported by 97% of respondents followed by television (73%), friends/relatives (57%), health professions (36%), magazines and Newspaper by (27%). (Similar percent for all groups). Almost half of the respondents from each category 661 (46%) said they know someone who has AIDS or died of AIDS. Out of those who reported knowing of a person with HIV or died of AIDS majority reported as having no close relative or friend who is sick or died because of HIV/AIDS. 22 (66.7%) non-attendees, 133 (60.2%) males, 108 (58.4%) females and 107 (48.2%) attendees are in this group. Knowledge on the three ways of HIV/AIDS transmission was assessed by, summing the correct answer given for the three commonest ways, namely consistent condom, use, abstinence and faithfulness. (The

two ways considered most important were consistent condom use and being in one to one relationship with a partner not already infected) knowledge was found to range between 50 - 65%. Sixty five percent attendees, 57 (61.3%) non-attendees, 225 (50.9%) females, and 284 (65.6%) males.

Misconception on the three ways of HIV/AIDS transmission was also assessed by three questions. First; by asking whether mosquito transmits the virus, second; whether the virus could be transmitted by feeding together, third: whether a healthy looking person could be infected with HIV/AIDS. Misconception for all the three items was low (8.7%). This was also calculated the same way as knowledge i.e. by summing those who answered in correctly for all three or for all two. Those who correctly answered two were, 198 (43.2%) of attendees, 41 (44.1%) non-attendees 206 (46.6%) females and 254 (58.7%) males.

HIV testing and perception: Majority of the respondents 1085(76.1%)said that it is possible for people to have a confidential HIV testing in their area. But only 163(11.4%) did report to have had HIV testing. Of these 110(67.5%) responded as being tested voluntarily. Majority of those tested 161(98.8%) reported that they knew the result and the most recent HIV test was done in the past one year for 84(51.5%) of the respondents followed by in the past 1-2 years for 28(17.8%), in the past 2-4 years for 22(13.5%) of the respondents. Nine hundred and one (63.2%) of the respondents reported the chance of their being infected is nil, while 278(19.5%) said that they are not sure, 104 (7.3%) said that it is very low and 67(4.7%) very high.

Table 4. Condom use with different type of partners, knowledge and belief among study subjects, Addis Ababa- April 2001

CHARACTERISTICS	ANC ATTENDEES	ANC NON ATTENDEES	GENERAL POPULATION FEMALE	GENERAL POPULATION MALE
	n= 458	n= 93	n= 322	n= 312
Ever use of condom	n (%)	n (%)	n (%)	n (%)
Yes	75 (16.4)	8 (8.6)	87 (27.0)	167 (53.5)
No	383 (83.6)	85 (91.4)	355 (73.0)	145 (46.5)
Condom use with regular partner/ past 12 months	n= 413	n= 72	n= 170	n= 133
Every time	-	-	3 (1.8)	13 (9.8)
Not always	30 (7.3)	3 (4.2)	19 (11.2)	9 (6.8)
Never	383 (92.7)	63 (95.8)	148 (87.0)	111 (83.5)
Condom use with high risk partner / 12 months	n= 49	n= 22	n= 69	n= 102
Every time	4 (8.2)	-	23 (33.3)	60 (58.8)
Not always	7 (14.2)	2 (19.1)	24 (34.8)	20 (19.6)
Never	38 (77.6)	20 (90.9)	22 (31.9)	22 (21.6)
Knowledge on the 3 ways of HIV/AIDS prevention *				
All correct	233 (50.9)	44 (47.3)	173 (39.1)	234 (54.0)
Two correct	298 (65.1)	57 (61.3)	225 (50.9)	284 (65.6)
All incorrect	45 (9.8)	10 (10.8)	36 (8.1)	13 (3.0)
Belief on the 3 ways of HIV/AIDS transmission				
All correct	53 (11.6)	12 (12.9)	38 (8.6)	22 (5.0)
Two correct	198 (43.2)	41 (44.1)	206 (46.6)	254 (58.7)
One correct	196 (42.8)	38 (40.9)	184 (41.6)	148 (34.2)
All incorrect	11 (2.4)	2 (2.1)	14 (3.2)	9 (2.1)

* Percentage not add up to 100% because there is overlapping of responses

TABLE 5:Condom use with different partners among the study subjects Addis Ababa, April 2001.

Factors	Regular Partner	Commercial partner	Non regular-Non-commercial partner
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Condom use in the	n= 788	n= 29	n= 225
last intercourse	n %	n %	n %
Yes	48 (6.1)	28 (96.6)	98 (43.6)
No	740 (93.9)	1 (3.4)	127 (56.4)
 Condom use was	 n= 41	 n= 28	 n= 98
initiated by			
Self	9 (18.8)	15 (53.6)	33 (33.7)
Partner	6 (12.5)	- -	5 (5.7)
Both	33 (68.8)	13 (46.4)	60 (61.2)
Reason for not using	n= 740	- -	n= 127
condom			
-Did not think it was necessary	424 (57.3)	- -	63 (49.6)
-Used other method	181 (24.5)	- -	23 (18.1)
-Did not think of it	97 (13.1)	- -	31 (24.4)
-Partner objected	21 (2.8)	- -	16 (12.6)
-Do not like	61 (4.3)	- -	4 (3.1)
-Do not know	11 (1.5)	- -	4 (3.1)

Logistic Regression Analysis

ANC Attendees Vs Non-Attendees

The analysis among these groups revealed a statistical significant difference related to income. ANC non-attendees were observed to have more respondents with low

income [OR = 3.65, 95% CI 1.50, 8.56]. Except on this factor, there was no difference observed among these groups.

ANC attendees Vs General population of Adult females

Multivariate analysis revealed statistical significant differences for age group 25-34 [OR = 0.03, 95% CI = 0.01, 0.05] and 35-49 [OR = 0.11, 95%, CI = 0.06, 0.18] age groups 35.49 were more represented in GP females. Differences were also observed related to education and income which was statistically significant [OR = 0.38, 95% CI = 0.21, 0.71] GP females were more educated and ANC attendees had more respondents with high income.

Majority of ANC attendees were married having a higher proportion of multipara. Age at sexual debut 15 - 19 years was more a feature of ANC attendees. Significant proportion of GP females stayed for more than ten years [OR = 0.63, 95%, CI = 0.41, 0.96].

Sexual intercourse with high-risk partner was associated with GP females and never use of condom was observed to be more likely among ANC attendees [OR = 11.32, 95%, CI = 2.36, 54.09]. Knowledge on the three ways of HIV/AIDS prevention was found to be associated with ANC attendees [OR = 1.54, 95%, CI = 1.06, 2.23].

ANC Attendees Vs Adult Male

Here too, a statistical significant difference was observed among the groups in age, education, income and duration of stay among the socio-demographic variables. Age groups 15-24, 25-34 were associated more with ANC attendees, while like the general population of females, age group 35-49 years were more represented in males [OR = 0.07, 95%, CI = 0.04, 0.13]. On marital status, married respondents were found to be associated with ANC attendees [OR = 18.92, 95%, CI = 6.19, 57.83].

Sex with high-risk partner was associated with males. Never use of condom was associated among ANC attendees (OR = 6.29, 95% CI = 1.23, 32.1). STI was reported more among ANC attendees (OR = 16.54, 95% CI = 6.00, 46.35).

TABLE 6 - Comparison of socio demographic and sexual behavior of ANC attendees and non-attendees pregnant women, Addis Ababa- April 2001.

Attendees and non attendees pregnant women, Addis Ababa April 2001								
FACTORS	ANC		NON		CRUDE OR		ADJUSTED OR	
	ATTENDEES		ATTENDEES		95% CI		95% CI	
Age								
15-24	218	(47.6)	46	(49.5)	1.00		1.00	
25-34	208	(45.6)	42	(45.2)	1.04	(0.64,1.70)	1.13	(0.40,3.25)
35-39	32	(7.0)	5	(5.4)	1.35	(0.47,4.18)	NS	
Education								
Not – Literate	88	(19.2)	22	(23.7)	1.00			
Primary	119	(26.0)	28	(30.1)	1.06	(0.54,2.07)	NS	
Secondary	25	(54.8)	43	(46.2)	1.15	(0.07,0.38)*	NS	
Income								
Dependent	17	(3.7)	12	(12.9)	1.00			
1-249 birr	170	(37.1)	40	(43.0)	3.00	(1.23,7.28)*	3.65	(1.50,8.96)*
250-499 birr	119	(26.0)	15	(16.1)	5.60	(2.5, 15.43)*	NS	
500 br/above	152	(33.2)	26	(28.0)	4.13	(1.63,10.45)*	NS	
Marital status								
Married	409	(89.3)	67	(72.0)	1.00			
Never-married	31	(6.8)	18	(19.4)	0.28	(0.14,0.56)*	NS	
Other	18	(3.9)	8	(8.6)	0.37	(0.14,0.97)*	NS	
Ageat1 st intercourse								
≥20 Years	171	(37.3)	31	(33.3)	1.00			
15-19 Years	256	(55.9)	52	(55.9)	1.89	(0.53,1.49)	NS	
≤14 Years	31	(6.8)	10	(10.8)	0.56	(0.23,1.37)	NS	
Sex with high risk partner								
None	415	(90.6)	71	(76.3)	1.00			
1Partner/Above	43	(9.4)	22	(23.7)	0.33	(0.18,0.62)*	NS	
STI/ 12 months								
None	383	(83.6)	75	(80.6)	1.00			
Once or Above	75	(16.4)	18	(19.4)	0.82	(0.45,1.50)	NS	

*** Significant association. NS: Non significant**

Table 7: Comparison of socio demographic and relevant risk factors related to HIV/AIDS among ANC attendees and GP Adult females.

FACTORS	ANC ATTENDEES	GENERAL POPULATIO N FEMALE	CRUDE OR 95% CI	ADJUSTED OR 95% CI
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Age								
15-24	21	(47.6)	204	(46.2)	1.00		1.00	
25-34	8	(45.6)	150	(33.9)	1.30	(0.97,1.74)	0.03	(0.01,0.05)*
35-49	20	(7.0)	88	(19.9)	0.34	(0.21,0.54)*	0.11	(0.06,0.18)*
Education								
	8							
Not Literate	32	(19.2)	32	(7.2)	1.00		1.00	
Primary		(26.0)	90	(20.4)	0.48	(0.29,0.81)*	0.38	(0.21,0.71)*
Secondary	88	(54.8)	320	(72.4)	0.29	(0.18,0.45)*	NS	
Income								
	11							
Dependent	9	(3.7)	150	(34.2)	1.00		1.00	
1-249 birr	25	(37.1)	145	(32.8)	10.41	(5.85,15.75)*	10.67	(5.17,22.0)*
250-499 birr	1	(26.0)	74	(16.7)	14.28	(7.74,26.65)*	2.64	(1.26,2.57)*
500br/above		(33.2)	72	(16.3)	18.75	(10.5,34.81)*	19.04	(9.85,36.8)*
Duration of stay								
	17							
< 10 Years	17	(36.0)	70	(15.8)	1.00		1.00	
> 10 Years	0	(64.0)	372	(84.2)	0.33	(0.24,0.47)*	0.63	(0.41,0.96)*
Marital status								
	11							
Widow/Divorce	9	(3.9)	47	(10.6)	1.00		1.00	
Never Married	15	(6.8)	234	(53.0)	0.35	(0.17,0.70)*	0.17	(0.08,0.35)*
Married	2	(89.3)	161	(36.4)	6.63	(3.62,12.26)*	3.14	(1.39,7.12)*
Parity								
	16							
Primi	5	(38.9)	51	(11.6)	1.00		1.00	
Multi Para	29	(61.1)	161	(36.4)	0.50	(0.34,0.73)*	0.10	(0.12,0.23)*
Age at 1st intercourse								
	3							
20 Years/ Above	18	(37.3)	115	(35.7)	1.00		1.00	
15-19 Years	31	(55.9)	170	(52.8)	1.01	(0.74,1.39)	2.60	(1.34,5.05)*
14 Years & Less	40	(6.8)	37	(11.5)	0.56	(0.32,0.99)*	NS	
	9							
	17							
	8							

28

0

17

1

25

6

31

*** Significant association.**

NS: Non- significant

Cont'd

FACTORS	ANC ATTENDEES			GENERAL POPULATION FEMALE			CRUDE OR 95% CI	ADJUSTED OR 95% CI
Sex with high risk partner /12 months								
None	409	(89.3)	169	(71.0)	1.00		1.00	
1Partner/Above	49	(10.7)	69	(29.0)	0.29	(0.19,0.45)*	0.31	(0.18,0.52)*
Freq. of condom use with high risk partner / 12 months								
Every time	4	(8.2)	23	(33.3)	1.00		1.00	
Not always	7	(14.2)	24	(34.8)	1.68	(0.38, 8.02)*	21.69	(3.26, 144)*
Never	38	(77.6)	22	(31.9)	9.93	(2.75,39.20)*	11.32	(2.36,54.09)*
STI/ 12 months								
None	383	(83.6)	396	(89.6)	1.00			
Once and above	75	(16.4)	46	(10.4)	1.69	(1.12,2.55)*	NS	
Knowledge on 3 ways of HIV/AIDS transmission⊗								
All correct	233	(50.9)	173	(39.0)	1.00		1.00	
Two Correct	298	(65.1)	225	(50.9)	0.98	(0.75, 1.29)*	1.83	(1.15,2.92)*
All Incorrect	45	(9.8)	36	(8.1)	0.93	(0.56,1.54)*	1.54	(1.06,2.23)*
* Significant association.			NS: Non- significant					

⊗ More than the total n (more than 100%) since respondents with correct answers for all were included in the two correct category also.

TABLE 8 - Comparison of socio demographic and relevant risk factors related to HIV/AIDS between ANC attendees and general population Adult males.

HIV/AIDS between ANC attendees and general population Adult males.								
FACTORS	ANC ATTENDEES		GENERAL POPULATION MALE		CRUDE OR 95% CI		ADJUSTED OR 95% CI	
Age								
15-24	218	(47.6)	183	(42.3)	1.00		1.00	
25-34	208	(45.6)	159	(36.7)	1.10	(0.82,1.48)	0.02	(0.01,0.04)*
35-49	32	(7.0)	91	(21.0)	0.30	(0.18,0.47)*	0.07	(0.04,0.13)*
Education								
Not –Literate	88	(19.2)	7	(1.6)	1.00		1.00	
Primary	119	(26.0)	46	(10.6)	0.21	(0.08,0.50)*	0.04	(0.02,0.12)*
Secondary	251	(54.8)	380	(87.8)	0.05	(0.02,0.12)*	0.25	(0.14,0.45)*
Income								
Dependent	17	(3.7)	138	(31.9)	1.00		1.00	
1-249 birr	170	(37.1)	117	(27.0)	11.79	(6.57,21.43)*	23.42	(12.08,45.4)*
250-499 birr	119	(26.0)	90	(20.8)	10.73	(5.86,19.89)*	2.63	(1.67, 4.14)*
500 birr & above	152	(33.2)	88	(20.3)	14.02	(7.70,25.83)*	1.96	(1.24,3.10)*
Duration of stay								
< 10 Years	165	(36.0)	68	(15.7)	1.00			
≥10 Years	293	(64.0)	365	(84.3)	0.33	(0.24,0.46)*	NS	
Marital status								
Widowed/Divorce	18	(3.9)	16	(3.7)	1.00		1.00	
Never-married	31	(6.8)	309	(71.4)	0.09	(0.04,0.21)*	0.20	(0.07,0.60)*
Married	409	(89.3)	108	(24.9)	3.37	(1.57,7.19)*	18.92	(6.19,57.83)*
Age at 1st intercourse								
≥20 Years	171	(37.3)	144	(46.2)	1.00		1.00	
15-19 Years	256	(55.9)	163	(52.2)	1.32	(0.97,1.80)*	NS	
14 Years & less	31	(6.8)	5	(1.6)	5.22	(1.87,15.72)*	6.28	(2.93,13.47)*
Sex with high risk partner / 12 month								
None	409	(89.3)	126	(55.3)	1.00		1.00	1.00
1 Partner /above	49	(10.7)	102	(47.7)	0.15	(0.10,0.22)*	0.10	(0.06,0.17)*

* Significant association.

NS: Non- significant

Cont'd

FACTORS	ANC ATTENDEES		GENERAL POPULATION MALE		CRUDE OR 95% CI		ADJUSTED OR 95% CI	
condom use								
with high risk								
partners / 12								
months								
Every time	4	(8.2)	60	(58.8)	1.00		1.00	
Not always	7	(14.2)	20	(19.6)	5.25	(1.20,24.33)*	NS	
Never	38	(77.6)	22	(21.6)	25.91	(7.61,97.35)*	6.29	(1.23,32.1)*
STI / past 12								
months								
None	383	(83.6)	428	(98.8)	1.00		1.00	
Once / above	75	(16.4)	5	(1.2)	16.76	(6.44,47.52)*	16.54	(5.9,46.35)*
Knowledge on								
the 3 ways of								
HIV/AIDS⊗								
transmission								
All Correct	233	(50.9)	234	(54.0)	1.00		1.00	
Two Correct	298	(65.1)	284	(65.6)	1.05	(0.82,1.35)*	0.28	(0.13,0.59)*
All Incorrect	45	(9.8)	13	(3.0)	3.48	(1.76,6.97)*	NS	
Belief on the 3								
ways of								
HIV/AIDS								
transmission								
All Correct	53	(11.6)	22	(5.1)	1.00			
Two Correct	198	(43.2)	254	(58.7)	0.32	(0.18, 0.57)*	NS	
All In correct	11	(2.4)	9	(2.1)	0.51	(0.16, 1.56)		

* Significant association.

NS: Non- significant

⊗ More than the total n (more than 100%) since respondents with correct answers for all were included in the Two correct category also.

DISCUSSION

The socio- demographic characteristics were compared with that of the 1994

census to see the similarities of the distribution with that of the general population of the city from which the samples were drawn. Forty seven percent of the census populations were in the age group 15-24 as compared to 46% of the study subjects. The 25-34 age group are 28% of the census while they comprise 35% of the study population. Twenty percent of the census population were in the age group 35-49 as compared to 20.5% of the study subjects of the GP. The 1994 literacy showed 86% for the districts and the 89% of literacy rate among the study subjects is comparative, the year in between accounting for the increase for literacy and as the areas are so urban, literacy could be high. Religious and ethnic distribution is surprisingly comparative with the 1994 census (Amhara 48.3%, Oromo 19.2% Gurage 17.5%, Tigraways 8% and Orthodox Christian 81.9%, Protestant 4%, Catholic 0.8%, Muslim 12.6%). (56)

The age distribution of the ANC attendees was similar to a study done in Addis Ababa in Gullele district on pregnant women (58), which showed the majority (46.3%) of the pregnant women to belong to this age band (25-34). The 1995 FHS also showed 56.9% of women (15-49) to have secondary schooling (53).

Comparison done among ANC attendees and non-attendants pregnant women revealed no significant difference in relation to the prevalence of factors except on income which showed a majority of non-attendants to have low income. And this same fact might be the reason for their non-attendance. On analyzing reasons for non-attendance a very small proportions account their problem to be financial and a great majority reported being too busy, having no time followed by a state of good health and not seeing the importance of coming to attend. Being busy could be a

confounder and the real reason may be financial problem making the mothers busy in search of job, work load as they couldn't hire a house maid or having too much work in order to get money. The possibility that pregnant women might avoid the sentinel site because of the ongoing surveillance for fear of being screened because they might exhibit high-risk behavior is unlikely i.e. the ongoing surveillance was not sited to be a problem for non-attendance.

Even if low income is associated with risk taking behaviors related to HIV-1 prevalence, we cannot reach to any conclusions by the difference of one factor not substantiated with another risk factor. The absence of difference among the sub-groups might be due to the low sample size of the ANC non-attending group.

But with this problem as it is, we can say that the ANC attendees can be representative of all pregnant women. This assumption is based on the absence of significant difference from the ANC non-attendees, the observed high attendance rate and prior reports of 83% attendance rate (54).

ANC – Attendees Vs General Population Of Adult Females

Statistical significant associations of risk factors were observed among ANC attendees. Younger age groups, those with low education, high income, and duration of stay less than ten years were seen to significantly associate with ANC attendees. The presence of younger population with a risky sexual behavior (37, 59), that increase vulnerability to HIV infection (60, 61) will lead to a bias in using the ANC attendees. The bulk of GP females especially in the age group 15-24 are sexually inactive (62) compared to the ANC attendees who are experiencing risky behavior

which could be exhibited by the mere fact of their pregnant state. Their being sexually active at young age is a risk behavior (17, 51) and being pregnant which is a result of unprotected sexual intercourse is another factors which doubles their risk (20). For older age groups, this might be minimal, in that more females would start sexual activity and the picture wouldn't be that different. Considering this younger age groups it would be comparing two groups with different status. The observed over-estimation of HIV prevalence from ANC attendees (27) on previous study (fontanet.et.al), could be due to the presence of high proportion young age groups who are experiencing unprotected sexual intercourse as compared to the GP of females, of same age.

Teenage women in the general population may be less likely to be infected than those pregnant because the bulk of them were waiting longer before having sex for the first time. Report from the regional conference in east Africa stated that teenage pregnant women were far more likely than their peers in the general population to be HIV positive (63). Therefore sentinel population who are pregnant and by definition sexually active with unprotected sex would less likely be representative of the GP in those age groups.

The finding in this study showing that the ANC attendees have low education might signify, that they are highly likely to initiate sexual activity at an earlier age (17,46). This is because those who have higher education would wait longer to start sexual activity at an age and stage, which might make them more in control. The ANC attendees have more of respondents with better income compared to their female counterparts and seem to be better financially in that dependents are represented

more on GP females. But on analyzing their occupational status, the picture showed a different story.

The majority of ANC attendees (72%) are housewives, while GP females with employment are almost as twice as those among attendees. So the mere fact of their high income doesn't make them to have a better social status, i.e. even if they seem to be having high monthly income from the outset, internally the ANC attendees exhibit a more dependent status; they are unemployed, with low education and are more younger. This makes them less powerful and more dependent on their husband, less able to negotiate on their sexual preference and more likely to be at high risk (46, 47, 49, 51, 62, 64).

On the other hand, it's also documented that men with high income (46,47) are more at risk because of their social activity and high mixing. And since the reported monthly income for most of the attendees is that of their husbands it seems likely that the majority of the attendees who are the wives of these high income-earning husbands are at a higher risk on top of their already jeopardized social status.

Majority of GP females were observed to be longer residents of Addis, while duration of stay ten years was seen more with ANC attendees. This shows that the majority of GP females lead a stable life while those attendees with short duration of stay are assumed to be more vulnerable. Although not addressed in the study, it's possible that the major reason for migration, most of the time, could be poverty, as a result of limited employment opportunities in rural areas. These individuals coming to the city, will be involved in various risk taking behavior as a means of getting money

(64), exposing themselves to HIV infection. So from this conclusion, it seems that ANC attendees are more vulnerable as they have a significant number of people who are new comers to the community, so would likely over-estimate the HIV prevalence among the more stable general population of females. Self-travel away from home for more than one month was also reported by 13% of attendees while GP females reported 6.8%. This might be explained by the above findings of presence of immigrants; they might be going out to the countryside or to other cities. This was also, one risk factor for the attendees (1, 28, 46, 51).

More ANC attendees were married than GP females. And for a woman with low social status (low education, unemployed) being married is not a guarantee. It was documented in various studies to be associated with high HIV-prevalence, as the women have no say on their sexual preference and it was also observed that monogamy is not the feature of many marriage. Studies revealed that men tend to have more extra marital affair. This is supported by a review of studies done in 63 countries, which reported many married men having sex with other partner (18). And this was found to be a risk behavior that has high association with high HIV-prevalence (42).

So for a woman in Ethiopia, like other developing countries, marriage may not be safe, rather could be considered a risk factor (18, 50). Considering this in relation to the status of our attendees, it can be said that they are more at risk. It's believed that a single female (though subject to have multiple sexual partner) also has a higher chance of abstinence and negotiating for her sexual preference than the poor woman who is at the mercy of her marriage.

Having low-education also reflected by young age (15-19) at sexual debut which is considered to be high risk i.e. the illiterates or those with low education are likely to initiate sexual intercourse at an age when they are more vulnerable biologically and socially, increasing the risk (17, 18, 51). Reason for sexual debut was marriage for a majority of attendees (72%) and half of the females (50.3%). Considering this fact, in relation to a report of high proportion of regular partnership with spouse among the attendees in this study, the documented high HIV-prevalence among the attendees would most probably be the result of their being infected through their husband strengthening the previous assumption that marriage for such women is a risk posing relation. So having a great majority of married attendees, exhibiting unprotected sex as observed in this study, with report of high percent of STI, it is can be said that these groups are at high risk.

The majority of the ANC attendees observed to be multiparous but on analyzing the number of children, small proportion of them reported having children above two. As infection with HIV is reported to be associated with infertility, abortion and stillbirth, the discrepancy between the parity and number of children could be explained by the high HIV prevalence already reported from the ANC attendees. This may further show the high-risk profile of the attendees.

It's reported from many countries that, despite increasing sale and distribution of condoms from 699 thousand in 1990 to 41.8 million in 1999 (8) and 50 million, in year 2000 condom (DKT Report) use by individuals is very, very low especially reported condom use among married couples which might be the risk associated with high HIV prevalence (20). It was documented that prevalence is very low in

developing countries among married women of reproductive age between 2.6% in about half of the countries, surveyed and below two percent in the other half. In Cameroon, Ghana, and Zambia for example fewer than four percent of couples used condom (18). So the reported low level of condom in this study is in agreement with the findings.

Though levels of condom use within marriage do not necessarily imply high risk of HIV/AIDS or STI, in generalized epidemics, where everybody is at risk and where monogamous cannot be taken for granted, low percent of no condom use even in marriage could mean, a high-risk behavior (18). Since suggesting condom use to many women in our country, is unthinkable, because it shows a sign of distrust rather than care in a longer relation-ship, a woman chooses to remain silent and prefer to face the risks than put her marriage at stake. Ever use of condom was reported by small proportion of pregnant and on top of that even those small proportions reported a decrease in frequency of use and still a majority of them reported stopping use. And when analyzing the duration of starting condom use (even the inconsistent use) the majority of the pregnant women said one-two years in contrast to the GP females who reported longer duration. The attendees, even if their current practice is not safe, worse than this, it is observed, they were not having a safe sexual experience even in the past; always being subjected to unprotected sexual intercourse.

Reported STI is also high, even if there is an underlying pregnancy. The difference might be a real one or a result of being symptomatic during pregnancy and the GP female might remain to be asymptomatic. Serological studies would resolve this problem. So since STI is highly associated with HIV both biologically and through

behavior (12, 17, 18, 61, 65, 66) the high report of STI among attendees show how much more at risk are they in comparison to the GP of female. Females of the GP had relationship with high-risk sexual partner. This in addition to the report of inconsistent condom use with such partner showed the presence risk, which cannot be ignored.

When seeing the profile of ANC attendees, it can be summarized as more younger, with low education, unemployed, with a significant number of new comers, travel history here and for, married, young age at first sexual intercourse, never use of condom and high percentage of STI. These are highly related to high prevalence of HIV affection, so caution should be taken in using the prevalence obtained from these groups.

Using a sentinel population with high risk profile to make generalization on the whole of general population of adult females which contains a significant proportion of sexually inactive (30%), never pregnant (52%), childless (55%) comparable to the report on FHS (53), that cannot be captured by the existing sentinel surveillance may give a distorted picture. DHS reported a higher proportion (41.2%) of respondents who never had sexual intercourse further showing the presence of significant proportion of individual who are sexually inactive. The report of 53% of GP females who were never married in this study is also substantiated by similar report from FHS that documented 52.5% of the women in their reproductive age group to be 'never married'.

ANC Attendees Vs General Population Of Adult Males

In comparing the ANC attendees with that of the general population of adult males, the associations of factors with this sub-group were observed to be more or less similar to that of the previous comparison. But the interpretation differs.

Age group 15-24, 25-34 years, low education, high income, currently married, never use of condom and STI were seen to significantly associated with ANC attendees while older age group (35-49), secondary education, dependents, duration of stay more than ten years, sex with high risk partner were analyzed to have significant association with males on multivariate analysis. The justifications for each risk factor were discussed in detail earlier. As it's reported that women tended to become infected earlier than males (15-24) (27). The presence of high proportion of this groups among ANC attendees, will tend to overestimate the prevalence of HIV infection, as they exhibit high risk sexual experience, in contrast to their male counterparts.

Factors seen in previous comparison like low education, unemployment and marriage also apply here making the attendees more at risk. Though there is no significant difference among the groups for age at first sexual intercourse (both groups aggregate in 15-19 years band) this doesn't imply that both are at same risk regarding this factor. It's a known fact in most times, that females tend to have sexual intercourse with a partner older than themselves, who is more experienced and most probably more at risk for HIV infection (27). So for attendees this is a high risk factor. Males, contrarily at this age (15-19) drift to females of same age or even younger, who are at low risk as they recently made their entrance to this group. This makes the males less at risk than their female counterparts.

It was reported in many studies that casual partnership, being single, STI to be a risk factors for males (27, 48, 54). In this study, it was found out that males were more single, having high proportions of sexual intercourse with high-risk partner, exhibiting high proportions of inconsistent and never use of condom. Similar findings were also seen in a study done in 1993 in Ethiopia (3). But the reported STI was much less for males. Males have more of secondary education, and higher educational level was said to be of risk factor for males (48) because it is highly associated with high income (46) which cause high social desirability and mixing, leading to experiencing high risk behavior. But in this case high income level was not associated with males rather they were more dependent, ruling out the association of education here as a risk factor for males.

The high proportion of never use of condom with regular partner, less consistent and

high proportion of never use of condom with high risk partner, with the statistically significant association of STI with females, justify the presence of more risk factor in attendees. All in all, with these factors, it might be difficult to say who is more at risk. So canceling out some of the risk factors like the high proportion of never use of condom and high proportion of STI in females with significant proportion of high risk sexual partnership and inconsistent use of condom with such partners in males might even out the major differences.

The risk posed by marriage for the attendees, could also be seen in parallel with the risk of being singles for males (40, 46, 48). Reason for sexual debut was reported to be personal desire for majority of males as compared to marriage for the ANC attendees, further showing the presence of risky sexual behavior among the male. But the presence of younger age group among the attendees who initiated unprotected sexual intercourse as compared to their male counterpart should be taken with caution in estimating the HIV prevalence, as it will likely give a distorted picture. So this is the loophole of the ANC based sentinel surveillance concerning its relation with the males. This age-band would definitely overestimate and couldn't be used to make generalization to the male population at this age band (15-19).

Factors like knowledge on condom, STI, and HIV/AIDS in addition to misconception reported on the transmission of HIV/AIDS were observed to have no statistical significant differences among the sub-groups.

Strength And Limitation Of The Study.

Strength

This comparative cross sectional study is the first of its kind in the country to evaluate the existing ANC based sentinel surveillance in terms of its representativeness to the pregnant woman not attending and the general adult population as a whole in relation to risk profile. The study tried to pick associations of sub-groups with the possible risk factors in terms of socio-demographic, economic, reproductive, sexual behavior, condom use and knowledge related to HIV/AIDS.

Since the survey included detailed measure of a number of different parameters of sexuality, the result may also be helpful in estimating baseline levels of risk factors particularly related to HIV/infection in the general population.

Paves way for other studies of same nature, as it's the first ever done at community level in Addis with such detailed behavioral issues.

Would contribute to a clearer interpretation of the HIV prevalence as it includes the entire sentinel site with high number of samples.

The similarity of the population with 1994 census in terms of age, education, religion and ethnicity, and to that of other studies done in Addis on pregnant women.

LIMITATIONS

Being a cross sectional study, the results should be interpreted with caution.

The sample size issue with the non-attending pregnant way below the required sample size makes generalization for this group impossible.

Issues on behavior are always subject to presentation biases (that is participants giving socially desirable responses rather than truthful ones). Maximum effort employed in use of private rooms for interview, gender matches, use of nurses at the sentinel site to interview so that attendees could open up to a health professional. Nurses were not allocated at their usual sites again to minimize biases. It was also tried to reduce the frequency of untruthful answers by reassuring respondents that their answers were anonymous. Nevertheless, there could probably be some presentation bias, considering our socio cultural context.

CONCLUSION AND RECOMMENDATION.

This study has demonstrated that the ANC attendees have a higher proportion of younger age groups relative to other age groups and subgroups of populations, with low education, unemployment, and relatively higher proportions of newcomer. More married respondents (considering their pregnant state, this response might be over reported due to social desirability) with age at first marriage and sexual debut in the same age band. Significant proportion of females never used condom either with regular or high-risk partner. Reported STI was also found to be higher from the general population.

Comparison with non-attendees reveal a statistical significant difference only on monthly income, which cannot be a good indicator to assess risk, as issues of family size and home ownership were not considered. High ANC attendance rate may preclude definite statements on non-attendees. Education, self travel history, duration of stay, marital status, parity, condom use and STI were found to be associated with attendees making them at more risk so high likely to increase HIV prevalence as compared to the GP of females. Males were also found to exhibit high-risk profile. And this fact will further substantiate the state of high risk of the attendees as their husbands are also assumed to be males from the general population; it's likely that their behavior is also similar with the reported responses. Generally the people were at young age, with low condom use, low knowledge on symptoms of STI. ANC non-attendance was mainly attributed to being busy and feeling healthy. It was then concluded:

1. The ANC attendees are representative of the general population of pregnant women. This was concluded based on the distribution of risk factor, which

revealed no statistical significant difference and the reported high attendance rate (83%). And even the remaining 17% are not absolute non-attendance but late attendance, as observed during this survey. Considering our issue, late attendance is not a problem unless it's never attendance as a woman is likely to have blood drawn for serology at what ever stage she attended ANC. So the prevalence from the ANC attendees can be generalized to all pregnant women in Addis Ababa.

2. The generalization of the sentinel surveillance prevalence to the whole of adult female general population, who has a bulk of sexually inactive population (even though this might be under reported), never pregnant and childless should be with caution. It is unlikely that ANC attendees in Addis Ababa are representative of the GP of females. This is because their HIV relative risk profile are different, the ANC attendees showing a high risk profile. Therefore generalization of the HIV/prevalence result to this group wouldn't be without discrepancy and tend to overestimate the prevalence in the general population of Adult females.
3. The GP of males and ANC attendees both exhibit a high-risk profile and the ANC attendees are likely to be representative of the male population. This further substantiates the presence of heterosexually driven epidemic in Addis. But as there are also a significant proportion of sexually inactive and younger population, whose sexual experience does not match that of their female counterparts caution should be taken in interpreting the result for this (15-19) age group.

Recommendations

Though ANC-based sentinel surveillance is feasible and sustainable considering our

situation aside being the best “window” through which to look into the epidemic, to compensate for the differences observed so far, on distribution of risk factors among ANC attendees and the other sub-groups, the following recommendations are made.

1. Strengthen the already existing SSS to ensure its continuity and improve its quality by creating and maintaining strong and close alliances with the donors like ENARP. Since age based measures (already done by SS) could be subject to rapid fluctuations if there are significant changes in age at sexual debut (52), having parity-based measure will further improve the quality as it is less affected by changes in age at first sex. Antenatal prevalence data classified by parity are likely to reflect the dynamics of infection in the sexually active population.
2. Initiate another sentinel population as an adjunct to the already existing ones. General population of blood donors could be considered as a best candidate. Since the Red Cross is already carrying out the procedure (blood donation), the sentinel population could be established in collaboration with the already existing unit. It will also help us to capture the non-pregnant, childless women and the sexually inactive ones.
3. For males especially for the younger age groups, using a representative sentinel population like male blood donors may give a clearer picture of the epidemic in the male half. The method also feasible, asking no additional set up or expertise.
4. Collect basic demographic and economic data among the ANC attendees, so the trend can be observed rather than having a cross-sectional study once in a while. Collection of basic socio-demographic data (age, education, income, occupation, parity) had been tried on the four sentinel sites (as a residency program) and was found to be feasible and sustainable.
5. Conduct behavioral surveillance on the general population in order to compare it

with the prevalence and determine or interpret the various feature of the epidemic. The increase or decline of prevalence for example can easily be explained if such data are available.

6. Increase awareness of using condom, not only for singles, but in a supposedly long relationship and in marriage too. In the advent of no cure or treatment for HIV/AIDS and with the sexually transmitted nature of the virus, condom use has no alternative measure in a relationship where monogamy is not certain. The high prevalence of HIV infection, documented in an exclusively married population of pregnant women, would have been avoided if not totally but significantly, had condom use, even in marriage been advocated.
7. The currently popular agenda for women's empowerment will help in raising the status of women and make them in a position to protect themselves, choose their sexual preference and preserve their right. Though, this wouldn't bring a change in a short term, improvement of women's status is something to long for.
8. The motto men make a difference also should be given enough emphasis at every sector, as the gate to the betterment of women's life is through males.
9. Repeat similar study in other urban centers where SS is being carried out.

Since estimates to the general adult populations are based on prevalence figures from the ANC based surveillance, as well as assessment of intervention, efforts should really be made in strengthening the site (as explained above by addition of another sentinel population) and improve the quality.

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QUESTIONNAIRE FOR USE WITH ANC ATTENDEES AGED 15- 49
EVALUATION OF THE REPRESENTATIVENESS OF ANC BASED
SENTINEL SURVEILLANCE IN ADDIS ABABA, 2001.

001 QUESTIONNAIRE IDENTIFICATION NUMBER |__| __| __|

002 WOREDA_____

003 KEBELE_____

004 KETENA_____

Introduction: “My name is... I’m working for a research undertaken by the Addis Ababa University in collaboration with ENARP and DKT. We’re interviewing people here in this kebele to gather information on the general background of the adult population and special factors associated with sexual behavior. This information will be useful in designing a better intervention program for HIV/ AIDS for the city and the country as a WHOLE.

Confidentiality and consent: “I’m going to ask you some very personal questions that some people find difficult to answer. Your answers are completely confidential. Your name will not be written on this form, and will never be used in connection with any of the information you tell me. You do not have to answer any questions that you do not want to answer, and you may end this interview at any time you want to. However, your honest answers to these questions will help us better understand what people think, say and do about certain kinds of behaviors. We would greatly appreciate your help in responding to this survey.

Would you be willing to participate?”

YES, I want to participate.

No , I do not want to participate.

_____(Signature of interviewer certifying that informed consent has been given verbally)

Interviewer visit

	Visit 1	Visit 2	Visit 3
Date			
Interviewer			
Result			

Result codes: Completed 1; Respondent not available 2; Refused 3; partially completed 4;

005 INTERVIEWER: Code [____|____]

Name_____

006 DATE INTERVIEW: ____ \ ____ \ ____

CHECKED BY SUPERVISOR: Signature _____ **Date** _____

SECTION 1: BACKGROUND CHARACTERISTICS

No .	<u>Questions and filters</u>	Coding categories	Skip to
Q101	RECORD SEX OF THE RESPONDENT	MALE 1 FEMALE 2	
Q102	In what month and year were you born?	MONTH [][] DON'T KNOW MONTH 88 NO RESPONSE 99 YEAR [][] DON'T KNOW YEAR 88 NO RESPONSE 99	
Q103	How old were you at your last birthday? (COMPARE AND CORRECT Q102 IF NEEDED)	AGE IN COMPLETED YEARS [][] DON'T KNOW 88 NO RESPONSE 99 ESTIMATE BEST ANSWER	
Q104	Have you ever attended school?	YES 1 NO 2 NO RESPONSE 9	→Q107
Q105	What is the highest level of school you completed: primary, secondary or higher? <u>CIRCLE ONE</u>	READ AND WRITE 1 PRIMARY (1-6) 2 JUNIOR SECONDARY (8-9) 3 SECONDARY (9-12) 4 HIGHER 5 NO RESPONSE 9	
Q106	How many total years of education have you completed up to now?	# YEARS COMPLETED [][] NO RESPONSE 99	
Q107	How long have you lived here in this city?	NUMBER OF YEARS [][] DON'T KNOW 88 NO RESPONSE 99	
Q108	In the last 12 months have you been away from your home for more than one month altogether?	YES 1 NO 2 DON'T KNOW 88 NO RESPONSE 99	

No .	Questions and filters	Coding categories	Skip to
Q109	What religion are you? <u>CIRCLE ONE</u>	NORELIGION 1 ORTHODOX 2 CATHOLIC 3 PROTESTANT 4 MUSLIM 5 OTHERS (SPECIFY)..... 6 NO RESPONSE 9	
Q110	To which ethnic group do you belong? <u>CIRCLE ONE</u>	AMHARA 1 OROMO 2 TIGRIE 3 GURAGE 4 OTHERS (SPECIFY)... 5 NO RESPONSE 9	
Q111	During the last 4 weeks how often have you had drinks containing alcohol? Would you say READ OUT. CIRCLE ONE.	EVERY DAY 1 AT LEAST ONCE A WEEK 2 Less than once a week or never 3 DON'T KNOW 8 NO RESPONSE 9	
Q112	Some people have tried a range of different types of drugs. Which of the following, if any, have you tried? READ LIST.	YES NO DK NR CHAT 1 2 8 9 HASHISH 1 2 8 9 TIMBAHO 1 2 8 9	
Q113	Some people have tried injecting drugs using a syringe. Have you injected drugs in the last 12 months? Drugs injected for medical purposes or treatment of an illness do not count	YES 1 NO 2 DON'T KNOW 8 NO RESPONSE 9	

No .	Questions and filters	Coding categories	Skip to
Q114	Occupation	UNEMPLOYED 1 DAILY LABOURER 2 GOV 'T EMPLOYEE 3 STUDENT 4 MERCHANT 5 HOUSE WIFE 6 HOUSE MAID 7 OTHERS 8 NORESPONSE 99	
Q115	Joint family income/month in birr.	BIRR..... [] DEPENDENT ON OTHERS 00 DON T KNOW 88 NO RESPONSE 99	

SECTION 2 MARRIAGE AND LIVE-IN PARTNERSHIPS

No.	Questions and filters	Coding categories	Skip to
Q201	Have you ever been married?	YES 1 NO 2 NO RESPONSE 9	→Q203
Q202	How old were you when you first married?	AGE IN YEARS [][] DON'T KNOW 88 NO RESPONSE 99	
Q203	Are you currently married or living with a man with whom you have a sexual relationship?	Currently married, living with spouse 1 Currently married, living with other partner 2 Currently married, not living with spouse or any other sexual partner 3 Not married, living with sexual partner 4 Not married, not living with sexual partner 5 NO RESPONSE 9	→Q205 →Q205

Q204	IF MARRIED: Does your husband have other wives?	YES 1 NO 2 NO RESPONSE 9	
Q205	If you are not married currently what is your status?	WIDOWED 1 DIVORCED 2 SEPARATED 3 NEVER MARRIED /SINGLE 4 NO RESPONSE 9	

SECTION 3 - REPRODUCTIVE HISTORY

Q301	How many pregnancies do you have in your life (spontaneous + elective abortion)?	NUMBER [][] DON'T KNOW 88 NO RESPONSE 99	
Q302	Age at first pregnancy?	AGE IN YEARS [] [] DON'T KNOW 88 NO RESPONSE 99	
Q303	Do you have Children? How many?	# OF CHILDREN [][] I DON'T HAVE 00 NO RESPONSE 99	
Q304	Did you attend ANC during the previous pregnancies? Where?	HEALTH CENTER 1 GOVERNMENT HOSPITAL 2 PRIVATE HOSPITAL 3 NOT AT ALL 4 DID ATTEND BUT NOT FOR ALL 5 NO RESPONSE 9	
Q305	What was the reason for not attending ANC then?	YES NO DISTANCE 1 2 BEING BUSY 1 2 DIDN'T THINK IT WAS NECESSARY 1 2 DON'T LIKE THE CARE GIVEN AT H.C 1 2 PARTNER OBJECTED 1 2 OTHERS 1 2 NO RESPONSE 1 2	

Q306	What is the gestational age?	MONTHS [__ __] WEEKS [__ __] DON'T KNOW 88 NO RESPONSE 99	
Q307	At what gestational age did you start to attend ANC?	MONTHS [__ __] WEEKS [__ __] DON'T KNOW 88 NO RESPONSE 99	

SECTION 4 SEXUAL HISTORY: NUMBERS AND TYPES OF PARTNERS

Now the following questions will continue to ask you about your sexual experience in the past three years. Please try to remember all the sexual encounters you had in the past three years.

Again all this information will remain completely anonymous.

No.	Questions and filters	Coding categories	Skip to
	Filter: Check Q 201, 203, 205, 301, 302		
Q401	Have you ever had sexual intercourse? MARK THE ANSWER W/O ASKING [For the purposes of this survey, “sexual intercourse,” is defined as vaginal or anal sex.]	YES 1 NO 2 NO RESPONSE 9	→Q803
Q402	At what age did you first have sexual intercourse?	AGE IN YEARS [__ __] DON'T KNOW 88 NO RESPONSE 99	
Q403	What made you have your first sexual intercourse?	I HAD PERSONAL DESIRE 1 WAS PERSUADED BY FRIENDS 2 EFFECT OF ALCOHOL AND DRUGS 3 WANTED TO TRY IT 4 WAS FORCED/ RAPED 5 EXPECTED GIFT, MONEY FROM PARTNER 6 MARRIAGE 7 DON'T KNOW 88 NO RESPONSE 99	

Q404	Have you had sexual intercourse in the last 12 months? MARK THE ANSWER W/O ASKING	YES 1 NO 2 NO RESPONSE 9	
Q405	Think about the MALE sexual partners you've had in the last 12 months. How many were: - Your spouse(s) or live-in sexual partners ("regular" partners) - "Commercial" (partners with whom you had sex in exchange for money) - Sexual partners that you are not married to and have never lived with and did not pay ("non-regular" partners) – DO NOT INCLUDE CURRENT SPOUSE (S) OR LIVE-IN SEXUAL PARTNERS)	REGULAR [__ __] DON'T KNOW 88 NO RESPONSE 99 COMMERCIAL [__ __] DON'T KNOW 88 NO RESPONSE 99 NON-REGULAR [__ __] DON'T KNOW 88 NO RESPONSE 99	

SECTION 5 SEXUAL HISTORY: REGULAR PARTNERS

No.	Questions and Filters	Coding categories	Skip to
Q501	<u>FILTER: CHECK Q405</u> HAD SEX WITH REGULAR PARTNER DURING PAST 12 MONTHS. [__] ↓	DID NOT HAVE SEX WITH REGULAR PARTNER DURING PAST 12 MONTHS [__] ▶	Q601
Q502	Think about your most recent regular sexual partner. How many times did you have sexual intercourse with this person over the last 30 days? [REGULAR PARTNER INCLUDES SPOUSE OR LIVE-IN SEXUAL PARTNER]	Number of times [__ __] DON'T KNOW 88 NO RESPONSE 99	
Q503	The last time you had sex with a regular partner, did you and your partner use a condom?	YES 1 NO 2 DON'T REMEMBER 8 NO RESPONSE 9	Q505 Q506

Q504	Who suggested condom use that time? <u>CIRCLE ONE</u>	Myself 1 My partner 2 Joint decision 3 DON'T KNOW 8 NO RESPONSE 9	Q506 Q506 Q506 Q506																																	
Q505	Why didn't you and your partner use a condom that time? CIRCLE ALL ANSWERS MENTIONED	<table border="0"> <tr> <td></td> <td>Y</td> <td>N</td> </tr> <tr> <td>Not available</td> <td>1</td> <td>2</td> </tr> <tr> <td>Too expensive</td> <td>1</td> <td>2</td> </tr> <tr> <td>Partner objected</td> <td>1</td> <td>2</td> </tr> <tr> <td>Don't like them</td> <td>1</td> <td>2</td> </tr> <tr> <td>Used other contraceptive</td> <td>1</td> <td>2</td> </tr> <tr> <td>Didn't think it was necessary</td> <td>1</td> <td>2</td> </tr> <tr> <td>Didn't think of it</td> <td>1</td> <td>2</td> </tr> <tr> <td>Other_____</td> <td>1</td> <td>2</td> </tr> <tr> <td>DON'T KNOW</td> <td>1</td> <td>2</td> </tr> <tr> <td>NO RESPONSE</td> <td>1</td> <td>2</td> </tr> </table>		Y	N	Not available	1	2	Too expensive	1	2	Partner objected	1	2	Don't like them	1	2	Used other contraceptive	1	2	Didn't think it was necessary	1	2	Didn't think of it	1	2	Other_____	1	2	DON'T KNOW	1	2	NO RESPONSE	1	2	
	Y	N																																		
Not available	1	2																																		
Too expensive	1	2																																		
Partner objected	1	2																																		
Don't like them	1	2																																		
Used other contraceptive	1	2																																		
Didn't think it was necessary	1	2																																		
Didn't think of it	1	2																																		
Other_____	1	2																																		
DON'T KNOW	1	2																																		
NO RESPONSE	1	2																																		
Q506	With what frequency did you and all of your regular partner(s) use a condom during the past 12 months?	EVERY TIME 1 ALMOST EVERY TIME 2 SOMETIMES 3 NEVER 4 DON'T KNOW 8 NO RESPONSE 9																																		

SECTION 6 SEXUAL HISTORY: COMMERCIAL PARTNERS

No.	Questions and Filters	Coding categories	Skip to
Q601	<u>FILTER: CHECK Q405</u> HAD SEXUAL INTERCOURSE WITH A COMMERCIAL PARTNER IN <u>LAST 12 MONTHS</u>...[] ↓	HAS NOT HAD SEXUAL INTERCOURSE WITH A []→ COMMERCIAL PARTNER IN <u>LAST 12 MONTHS</u>....	Q701
Q602	Think about your most recent commercial sexual partner. How many times did you have sexual intercourse with this person over the last 30 days?	Number of times [][] DON'T KNOW 88 NO RESPONSE 99	
Q603	The last time you had sex with a commercial partner, did you and your partner use a condom?	YES 1 NO 2 → Q605 DON'T KNOW 8 → Q606 NO RESPONSE 9	
Q604	Who suggested condom use that time? <u>CIRCLE ONE.</u>	Myself 1 → Q606 My partner 2 → Q606 Joint decision 3 → Q606 DON'T KNOW 8 → Q606 NO RESPONSE 9	
Q605	Why didn't you and your partner use a condom that time? ADD OTHER LOCALLY APPROPRIATE CATEGORIES CIRCLE ALL ANSWERS MENTIONED	Y N Not available 1 2 Too expensive 1 2 Partner objected 1 2 Don't like them 1 2 Used other contraceptive 1 2 Didn't think it was necessary 1 2 Didn't think of it 1 2 Other _____ 1 2 DON'T KNOW 1 2 NO RESPONSE 1 2	

No.	Questions and Filters	Coding categories	Skip to
Q606	With what frequency did you and all of your commercial partner(s) use a condom during the past 12 months?	EVERY TIME 1 ALMOST EVERY TIME 2 SOMETIMES 3 NEVER 4 DON'T KNOW 8 NO RESPONSE 9	
Q607	When was the last time you had sexual intercourse with a <u>“commercial”</u> partner?	DAYS __ __ MONTHS __ __ YEARS __ __ .	

SECTION 7 SEXUAL HISTORY: NON-REGULAR NON-PAYING SEXUAL PARTNERS

No.	Questions and Filters	Coding categories	Skip to
Q701	<u>FILTER: CHECK Q405</u> HAD NON-REGULAR NON-COMMERCIAL SEX PARTNER DURING <u>LAST 12 MONTHS</u>.....[__] ↓	DID NOT HAVE NON-REGULAR NON-COMMERCIAL SEX PARTNER DURING <u>LAST 12 MONTHS</u>	[__]→ Q801
Q702	Think about your most recent non-regular, non-commercial sexual partner. How many times did you have sexual intercourse with this person over the last 30 days?	Number of times __ __ DON'T KNOW 88 NO RESPONSE 99	
Q703	The last time you had sex with non-regular, non-commercial partner, did you and your partner use a condom?	YES 1 NO 2 DON'T KNOW 8 NO RESPONSE 9	→Q705 →Q706
No.	Questions and Filters	Coding categories	Skip to

Q704	Who suggested condom use that time? CIRCLE ONE.	MYSELF 1 → Q706 MY PARTNER 2 → Q706 JOINT DECISION 3 → Q706 DON'T KNOW 8 → Q706 NO RESPONSE 9
Q705	Why didn't you and your partner use a condom that time? ADD OTHER LOCALLY APPROPRIATE CATEGORIES AFTER PRE-TESTING CIRCLE ALL ANSWERS MENTIONED	Y N Not available 1 2 Too expensive 1 2 Partner objected 1 2 Don't like them 1 2 Used other contraceptive 1 2 Didn't think it was necessary 1 2 Didn't think of it 1 2 Other _____ 1 2 DON'T KNOW 1 2 NO RESPONSE 1 2
Q706	With what frequency did you and all of your non- non-regular, non-commercial partner(s) use a condom during the past 12 months?	EVERY TIME 1 ALMOST EVERY TIME 2 SOMETIMES 3 NEVER 4 DON'T KNOW 8 NO RESPONSE 9

SECTION 8 MALE CONDOMS

No.	Questions and Filters	Coding categories	Skip to
Q801	FILTER: SEE Q503, Q506, 603, Q606, Q703, Q706 CONDOMS NOT USED...[] ↓	CONDOMS USED [] →	→Q804
Q802	Have you and a sexual partner <u>ever</u> used a male condom? (Show picture or sample of one.) (The respondent may not have used a condom with partners in sections 4-6, but may have used a condom at some other time in the past.)	YES 1 NO 2 DON'T KNOW 8 NO RESPONSE 9	→Q804
Q803	Have you ever heard of a male condom?	YES 1 NO 2 DON'T KNOW 8	→Q901 →Q901

No.	Questions and Filters	Coding categories		Skip to
	(If necessary, give some description)	NO RESPONSE	9	
Q804	Do you know of any place or person from which you can obtain male condoms?	YES NO NO RESPONSE	1 2 9	→Q807
Q805	Which places or persons do you know where you can obtain male condoms? PROBE AND RECORD ALL ANSWERS Any others?	Yes No Shop 1 2 Pharmacy 1 2 Market 1 2 Clinic 1 2 Hospital 1 2 Family planning center 1 2 Bar/guest house/hotel 1 2 Peer educator 1 2 Friend 1 2 OTHER _____ 1 2 NO RESPONSE 1 2		
Q806	How long would it take you to obtain a male condom close to your house or to where you work?	10 TO 15 MINUTES 15 TO 30 MINUTES 30 MINUTES TO 1 HOUR MORE THAN 1 HOURS DON'T KNOW NO RESPONSE	1 2 3 4 8 9	
Q807	FOR SEXUALLY ACTIVE RESPONDENTS ONLY: During the past 12 months, did you ever have sexual intercourse without using a condom with any commercial sexual partner or any other sexual partner who you have never lived with and are not married to?	YES NO DON'T KNOW NO RESPONSE	1 2 8 9	
Q808	Why did you start to use condom?	CHANGE OF PARTNER START TO ENCOUNTER COMMERCIAL PARTNER	1	

No.	Questions and Filters	Coding categories	Skip to
		COMMERCIAL PARTNER 2 FEAR OF HIV/AIDS 3 OTHER (SPECIFY... 4 NO RESPONSE 9	
Q809	How long have you been using condom?	LESS THAN 3 MONTH 1 3 MONTHS 2 6 MONTHS 3 1 YEAR 4 2 YEARS 5 MORE THAN 2 YEARS 6 NO RESPONSE 9	
Q810	Generally, how do you perceive your act of using condoms currently compared to the previous three years?	UNCHANGED 1 USED MORE THAN BEFORE 2 USED LESS THAN BEFORE 3 HAVE NOT USED CONDOMS AT ALL 4 DON'T KNOW 8 NO RESPONSE 9	1 → 812 2 → 811 3 → 812 4 → 813
Q811	If the pattern increases, what brought the change?	SEPARATION WITH REGULAR PARTNER 1 BEING SUSPICIOUS OF A PARTNER 1 STARTED TO ENCOUNTER COMMERCIAL PARTNER 1 BEING AWARE OF ITS USE IN PREVENTING STI/HIV 1 TO PREVENT PREGNANCY 1 OTHER (SPECIFY)..... 1 DO NOT KNOW 1 NO RESPONSE	Yes No 2 2 2 2 2 2 2 2

Q812	If the pattern is not changed or if you are using less than before why?		Yes	No	
		MARRIAGE	1	2	
		STOP TO ENCOUNTER COMMERCIAL SEX			
		WORKERS	1	2	
		BEING FAITHFUL TO REGULAR PARTNER	1	2	
		CONDOM IS NOT AVAILABLE MOST OF THE			
		TIME	1	2	
		OTHERS (SPECIFY).....	1	2	
Q813	If you never use a condom why? (Circle all mentioned)	DO NOT KNOW	1	→2	
		NO RESPONSE	1	2	
		IT IS EXPENSIVE	1	2	
		IT IS USELESS	1	2	
		I CAN'T GET IT EASILY	1	2	
		I DON'T KNOW FROM WHERE I CAN GET IT	1	2	
		MARRIED/ HAVE A FAITHFUL HUSBAND.	1	2	
		I AM INVOLVED IN 1to1 RELATIONSHIP	1	2	
		IT DECREASES SATISFACTION	1	2	
		OTHER (SPECIFY).....	1	2	
		DO NOT KNOW	1	2	
		NO RESPONSE	1	2	

SECTION 9 STDS

Q901	Have you ever heard of diseases that can be transmitted through sexual intercourse?	YES	1		
		NO	2		→Q904
		NO RESPONSE	9		
Q902	Can you describe any symptoms of STDs in women? Any others? DO NOT READ OUT THE SYMPTOMS CIRCLE 1 FOR ALL MENTIONED. CIRCLE 2 FOR ALL NOT MENTIONED. MORE THAN ONE ANSWER IS POSSIBLE.	Yes	No		
		ABDOMINAL PAIN	1	2	
		GENITAL DISCHARGE	1	2	
		FOUL SMELLING DISCHARGE	1	2	
		BURNING PAIN ON URINATION	1	2	
		GENITAL ULCERS/SORES	1	2	
		SWELLINGS IN GROIN AREA	1	2	
		ITCHING	1	2	
		OTHER _____	1	2	
		NO RESPONSE	1	2	
No.	Questions and filters	Coding categories			Skip to

Q903	Can you describe any symptoms of STDs in men? Any others? DO NOT READ OUT THE SYMPTOMS CIRCLE 1 FOR ALL MENTIONED. CIRCLE 2 FOR ALL NOT MENTIONED. MORE THAN ONE ANSWER IS POSSIBLE.	Yes No GENITAL DISCHARGE 1 2 BURNING PAIN ON URINATION 1 2 GENITAL ULCERS/SORES 1 2 SWELLINGS IN GROIN AREA 1 2 OTHER _____1 2 NO RESPONSE 1 2	
Q904	Have you had a genital discharge during the past 12 months?	YES 1 NO 2 DON'T KNOW 88 NO RESPONSE 99	→ 906
Q905	Have you had a genital ulcer/sore during the past 12 months?	YES 1 NO 2 DON'T KNOW 88 NO RESPONSE 99	→ 906
Filter: Check Q904 and Q905 If Yes Go to Q 906 If No Go to Q1001			
Q906	In the past 12 months how many times did you have STD?	# OF ATTACK [/] DON'T REMEMBER 88 NO RESPONSE 99	
Q907	Was it necessary to seek medical help in case of STI?	YES 1 NO 2 NO RESPONSE 99	→ Q1001
Q908	Where did you seek help?	GOVT./PVT. HEALTH INSTITUTION 1 TRADITIONAL HEALER 2 FROM WORK PLACES 3 FRIENDS AND RELATIVES 4 PHARMACY 5 OTHERS(SPECIFY).....6 NO RESPONSE 9	

SECTION 10 KNOWLEDGE, OPINIONS, AND ATTITUDES

No.	Questions and filters	Coding categories	Skip to
Q1001	Have you ever heard of HIV or the disease called AIDS?	YES 1 NO 2 NO RESPONSE 99	1002 →END
Q1002	From where did you hear about HIV/AIDS?	RADIO 1 TELEVISION 2 NEWS PAPER/MEGAZIN 3 PAMPHLET/POSTERS 4 HEALTH PERSONNEL 5 CHURCH AND MOSQUE 6 SCHOOL/TEACHER 7 CONFERENCE/FUNERAL/PUBLIC GATHERINGS 8 FRIENDS/RELATIVES 9 WORK PLACE 10 DRAMA AND THEATER 11 OTHERS 12 NO RESPONSES 9	
Q1003a	Do you know anyone who is infected with HIV or who has died of AIDS?	YES 1 NO 2 NO RESPONSE 9	1004
Q1003b	Do you have a close relative or close friend who is infected with HIV or has died of AIDS?	YES, A CLOSE RELATIVE 1 YES, A CLOSE FRIEND 2 NO 3 NO RESPONSE 9	

No.	Questions and filters	Coding categories	Skip to
Q1004	What do you think is the use of condom?	PREVENT PREGNANCY 1 PREVENT STD 2 PREVENT HIV/AIDS 3 OTHERS /SPECIFY/ 4 DON'T KNOW 8 NO RESPONSE 9	
Q1005	Can people protect themselves from the virus that causes AIDS by using a condom correctly every time they have sex?	YES 1 NO 2 DON'T KNOW 8 NO RESPONSE 9	
Q1006	Can a person get the HIV from mosquito bites?	YES 1 NO 2 DON'T KNOW 8 NO RESPONSE 9	
Q1007	Can people protect themselves from the HIV by having one uninfected faithful sex partner?	YES 1 NO 2 DON'T KNOW 8 NO RESPONSE 9	
Q1008	Can people protect themselves from the HIV by abstaining from sexual intercourse?	YES 1 NO 2 DON'T KNOW 8 NO RESPONSE 9	
Q1009	Can a person get the HIV by sharing a meal with someone who is infected?	YES 1 NO 2 DON'T KNOW 8 NO RESPONSE 9	
Q1010	Can a person get the HIV by getting injections with a needle that was already used by someone else?	YES 1 NO 2 DON'T KNOW 8 NO RESPONSE 9	
No.	Questions and filters	Coding categories	Skip to

Q1011	Do you think that a healthy-looking person can be infected with HIV, the virus that causes AIDS?	YES 1 NO 2 DON'T KNOW 8 NO RESPONSE 9	
Q1012	Can a pregnant woman infected with HIV or AIDS transmit the virus to her unborn child?	YES 1 NO 2 DON'T KNOW 8 NO RESPONSE 9	
Q1013	What can a pregnant woman do to reduce the risk of transmission of HIV to her unborn child? <u>DO NOT READ LIST</u> <u>CIRCLE ALL THAT ARE MENTIONED.</u>	Yes No TAKE MEDICATION (Antiretroviral) 1 2 OTHER_____ 1 2 DON'T KNOW 1 2 NO RESPONSE 1 2	
Q1014	Can a woman with HIV or AIDS transmit the virus to her newborn child through breastfeeding?	YES 1 NO 2 DON'T KNOW 8 NO RESPONSE 9	
Q1015	Is it possible in your community for someone to get a confidential test to find out if they are infected with HIV? By confidential, I mean that no one will know the result if you don't want them to know it.	YES 1 NO 2 DON'T KNOW 8 NO RESPONSE 9	
Q1016	I don't want to know the result, but have you ever had an HIV test?	YES 1 NO 2 NO RESPONSE 9	→ END
Q1017	Did you voluntarily undergo the HIV test, or were you required to have the test?	Voluntary 1 Required 2 NO RESPONSE 9	
No.	Questions and filters	Coding categories	Skip to

Q1018	Please do not tell me the result, but did you find out the result of your test?	YES 1 NO 2 NO RESPONSE 9	
Q1019	When did you have your most recent HIV test?	WITHIN THE PAST YEAR 1 BETWEEN 1-2 YEARS 2 BETWEEN 2-4 YEARS 3 MORE THAN 4 YEARS AGO 4 DON'T KNOW 8 NO RESPONSE 9	
Q1020	What is your chance of being infected with HIV/AIDS?	VERY HIGH 1 VERY LOW 2 MINIMAL 3 DON'T THINK I WILL BE INFECTED 4 I AM NOT SURE 5 NO RESPONSE 9	

This is the end of this questioning. As promised at the beginning, your individual response will not be exposed.

Thank you!!

DECLARATION

I the undersigned, declared that this thesis is my original work, has not been presented for a degree in this or any other university, and that all sources of materials used for the thesis have been fully acknowledged.

Name and signature:

Place:

Date of Submission:

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

.....

Advisor's Name

.....

Signature