Original article

Assessment of trends of HIV and its opportunistic infections in Ethiopian Police

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Abstract

Background: Human immunodeficiency virus/acquired immune deficiency syndrome is one of Ethiopia's most alarming public health challenges to the socio-economic development and security. Different researches have been done to see the progress of disease from time to time. However, information that shows the trend of HIV among police force over a period of time in Ethiopia is very limited.

Objective: The aim of the study was to assess the prevalence and trends of HIV /AIDS and opportunistic infections in Ethiopian police.

Methods: Descriptive statistics was computed to determine the prevalence and trends of HIV/AIDS and its opportunistic infections and other variables. Data gathered from Health Management Information System office of the Federal Police Hospital, from September, 2010 to August, 2013. Data were cleaned, edited and entered into computer and analyzed with SPSS version 16.0. Then Chi-Square (X2) Statistical test was used for testing associations and P value less or equal to five percent (P <=0.05) was considered significant.

RESULTS: From all federal police health facilities out of the total 26,271 tested for HIV, from September 2010 to 2013, 15,937 (60.3%) were males. Eight hundred forty seven (3.2%) were positive for HIV. The prevalence of HIV infection was 2% for males and 1.2% for females. The age specific prevalence was highest in the age group 26-35 years (2.2%) followed by 36– 45 (1.4%) median age 31.2, with IQR 8.92. Out of the total sampled 356 HIV positive patients, linked on ART and pre-ART, about 125(35%) of them had more than one opportunistic infections.

CONCLUSION: There is decreasing trend of sero-positivity over the years, with higher prevalence among sexually active age groups. Diarrhea, thrush, and pulmonary TB were the leading OIs contracted by HIV-infected patients. Strong STI/HIV educational intervention to alter risk-taking behavior among Police force is recommended. [*Ethiop. J. Health Dev.* 2014;28(3):162-169]

Introduction

Any segment of a population, rich, poor, old, young, male, female of all the races, can be affected by HIV/AIDS (1). No terrorist attack, no war, has ever threatened the lives of more than 34 million people worldwide. Over two million (2.5) people became newly infected, and 1.7 million died of AIDS-related causes, including 230, 000 children. People in developing countries, especially those in sub-Saharan Africa, have been the most affected ones. Two-thirds of all the infected adults and nearly nine in ten infected children live in sub-Saharan Africa (2).

Its prevalence had increased at a high rate during 1990's, but began to decline later (1-5). HIV has been identified as one of the highest causes of morbidity and mortality due to immune-suppression leading to life-threatening opportunistic infections (OIs) during the natural course of the disease (27). HIV-related mortality among adults accounts for a large proportion of adult deaths in Ethiopia, particularly in cities. Young, highly productive adults die at an age they can be economically industrious, which has a considerably adverse impact on the country's economy (3).

According to Ethiopian demographic health survey (EDHS 2011), adult HIV/AIDS prevalence in Ethiopia was estimated at 1.5 percent. Approximately 1.2 million Ethiopians were living with HIV/AIDS. National models of HIV prevalence showed the incidence of HIV infection declined by over 25 percent between 2001 and 2009 (2, 3).

Men and women in uniform, including police forces, are frequently ranked among population groups most affected by sexually transmitted infections (STIs), including HIV. Military personnel are two to five times more likely to contract STIs than the civilian population; during conflict this factor can increase significantly (6).

In some cases, the high level of HIV/AIDS prevalence in the military can undermine its overall preparedness, and, thus, increase the risk of insecurity. Reports by ministries of defense in countries in sub-Saharan Africa indicate that average HIV prevalence ranges from 20-40% within their armed services. This figure could go as high up as 50-60% in countries where HIV/AIDS has been present for more than a decade (7).

The spread of HIV can have far-reaching consequences for the uniformed services including: reduction in uniformed services readiness, gaps in key personnel, loss of skills and experience, teamwork affected as key workers are lost and positions replaced, loss of morale and trust between uniformed services personnel.

As more officers and key personnel fall ill, combat readiness and capability of such military forces are

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expected to deteriorate. In addition, when uniformed services personnel are demobilized or on leave, they return to their homes (with any new diseases), to the far corners of their countries, and to other sexual partners (7).

Police forces globally face a serious risk of HIV/AIDS (8). A report from United Nations Program on HIV/AIDS (UNAIDS) states that uniformed forces, including the police forces, are highly vulnerable to STIs, including HIV/AIDS (9). In the course of their work, the police constantly interact with populations that are most at risk of HIV epidemic, such as commercial sex workers, jail and prison detainees, injection drug users, illegal immigrants, and homosexuals. These predispose the police for risky sexual behaviors (9, 10).

Data on HIV prevalence in the military are notable for their scarcity. There are very few published studies available, and where there are data, there is a great reluctance to release them as they are perceived as confidential or sensitive. Much of the literature relies on an international survey conducted by the Civil–Military Alliance (CMA) to combat HIV/AIDS in the early 1990s, which recorded some alarming prevalence figures in African militaries (mostly reliable, some like Angola, subsequently shown to have been incorrect) (11).

In Cameroon, HIV prevalence in the military in 1993 was 6.2 percent compared to 2% in the general population. In Côte d'Ivoire in 1994, 12 percent of recruits were infected, while in the Central African Republic, prevalence was 22 percent among those entering military service (12).

However, police forces may also become important agents for behavioral change in reversing the spread of HIV within the army and beyond. If equipped with the right information, knowledge and tools, the military can achieve lower HIV prevalence rates than the national average (6). The police forces are central to the good governance of a country, not merely in terms of their defense role, but also in natural disasters. Furthermore, they may be involved in local and regional conflicts and/or may be involved in international peacekeeping operations.

The police forces reach large sections of the population, especially young men. And they are believed to be at increased risk of HIV infection because they tend to be young sexually active people away from home on duty, more inclined to take risks, subject to high stress periods, interspersed with long periods of boredom, engaged in risky sex, often with commercial sex workers and/or casual contacts, suffer occupational stress and relax by abusing alcohol, drugs, less subject to social controls whilst on leave, deployed where drugs are easily available.

The impact of HIV/AIDS on the police force the latter's role in the fight against HIV/AIDS is a neglected area of research. This is partly due to the low frequency of testing and the poor systematic data collection among police services. This lack of information extends to the basic and fundamental issues like the level of prevalence of HIV/AIDS and the vulnerability of the police force to HIV/AIDS (9). Therefore, the purpose of this study will be to assess the prevalence and trend of HIV/AIDS and opportunistic infection in the police referral hospital over the study period which would allow comparison of the sero-positivity over the course of time. The findings could also be used to update intervention programs which focus on the prevention and control of HIV/AIDS; they could also serve as baseline data for further studies.

Methods

***Study Setting*:**

The data for this study were collected from records of the Ethiopian Federal Police Health Directorate's Health Information Management System (HMIS) office in December 2015 in reports of different Federal police health facilities were included. These include the Ethiopian Police Referral Hospital, Harar Police Hospital, Crime Prevention Main Department Clinic, Sendafa Ethiopian Police University College Clinic, Crime Investigation and Forensic Main Department Clinic, Federal Police Riot control and Prevention Clinic (Kolfe) and Mekele Federal Police Crime Prevention Main Department's Clinic. People interviewed on this study were officials and staff from Federal Police Health Directorate. Anti-Retroviral Therapy (ART) has been initiated in Federal Police Referral Hospitals as of 2005, when free access to ART established at a national level, while PMTCT activity was started in 2010. Data were retrieved from records of people who were tested for HIV during the period of September 2009 to August, 2013, and linked for ART starting from 2005- 2013 at FPRH (9).

***Study Design*:**

A descriptive study design was used.

***Study Population*:**

Police members and their partners who had attended the referral hospital and other federal health facilities were screened for HIV, and all HIV infected patients, who came to police referral Hospital and were linked to ART were included in the study population.

Inclusion criteria: All individuals document screened for HIV are included.

Exclusion criteria: Inputs with incomplete information like age and sex were excluded.

Sampling Technique:
Sample size determination: To examine rate and trends of HIV, all four year records and reports from September 2009-August 2013 were used. In order to identify opportunistic infections in HIV infected persons 356 sample records were examined from 4947 HIV infected persons who were also linked to ART. The sample size was calculated using single population proportion formula by considering 50 % prevalence of opportunistic infection, a standard score corresponding to 95% confidence level.

***Data Collection Instrument*:**
Data were collected by the researcher and data collector who had been working in the HMIS and ART units. Demographic information, presence or absence of OIs, year of test and serologic status of the subjects were abstracted from their records using structured inquiry format of the enquiry form.

Variables: Dependent variable: HIV result, opportunistic infection status of HIV-infected patients.

Independent variable: Socio- demographic information (age& sex) year of test.

Data Processing and Analysis:
Data were cleaned, edited and entered into computer and analyzed with SPSS version 16. Descriptive statistics was computed to determine the prevalence proportion of HIV/AIDS and its opportunistic infections and other variables indicated by tables and graphs. Then Chi-Square (χ^2) Statistical test was used for testing associations and P value less or equal to five percent (P<=0.05) was considered significant.

Data quality control: Data collecting enquiry format was prepared by principal investigators prior to the actual data collection time, pre-testing was done on the basis of 20 police referral hospital patent cards. The participants for pre-testing were not included in the final study participants. Data collectors were trained for one day on the study instrument and data collection procedures. The principal investigator checked the collected data for completeness and corrective measures were taken accordingly. The collected data were cleaned, coded and explored before analysis.

Ethical Considerations:
The proposal was approved by Research Institute of the Ethiopian Police University College (EPUC) before conducting the study. Official letter was obtained from EPUC. Officials from the Federal Police Health Directorate were communicated through letters addressed to them by the EPUC. Data were kept confidential and anonymous.

Results

***General Data Characteristics*:**
A total of 26,271 subjects had been tested for HIV at different Ethiopian police health facilities over a four-year period (2010 to 2013) of whom 15,937 (60.7%) were males. Male to female ratio was 3:2. Most of the subjects 15147 (57.7%) were in age group 26-35, followed by 8,239 (31.4%) of them falling in the age group ranging from 18-25. The median age was found to be 31.2 with IQR 8.92 (Table 1). The magnitude of HIV testing and counseling over four years varied from 15.5% in 2010 through 38.8%, 21.9%, 24.2% in 2011, 2012 and 2013, respectively (Figure 1).

Table 1: **Overall prevalence of HIV sero-positivity by different socio-demographic variables at different Police health facility sites (PICT, VCT), Addis-Ababa Ethiopian Police Referral Hospital, from September 2009-August 2013**

Socio-demographic variable	HIV sero-positive						P-value
	Positive		Negative		Total		
	No	(%)	No	(%)	No	(%)	
Sex							
Male	534	2.0	15,403	58.6	15937	66.6	0.165
Female	313	1.2	10,121	38.5	10434	39.7	
Age							
18-25	18	0.1	8221	31.3	8239	31.4	
26-35	624	2.4	14,523	55.3	15147	57.7	0.04
36-45	126	0.5	2923	11.1	3049	11.6	
>45	79	0.2	604	2.2	683	2.5	

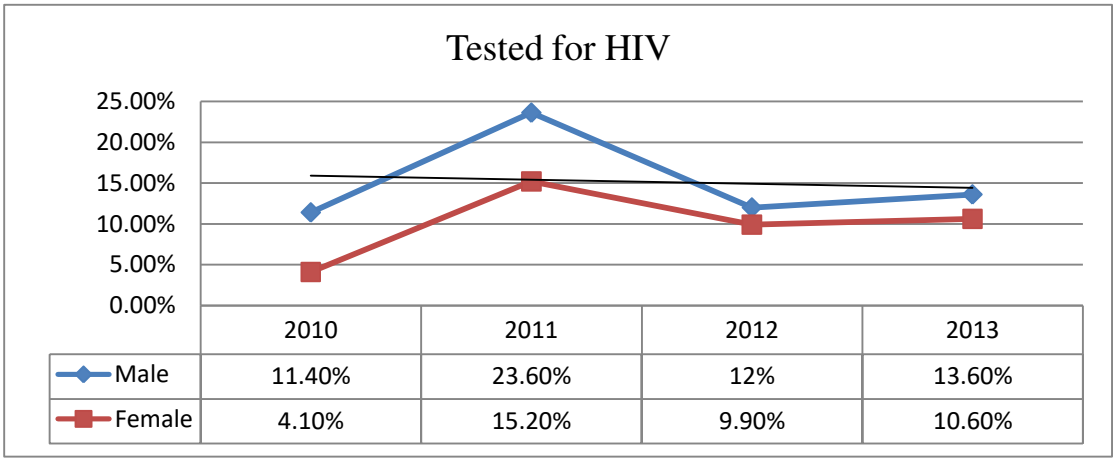

Figure 1: **Trend of HIV tested individuals by sex at different police health facilities site (VCT&PICT), Addis Ababa Ethiopian Police Referral Hospital, from September2009-August 201**3

Magnitude and Trends of HIV at Police Health Facilities:

Overall, 847 (3.2%) of the subjects tested positive for HIV. The sex specific prevalence of HIV infection was 2% for males and 1.2% for females; the difference however was not statistically significant (P= 0.165). The age specific prevalence was highest among those in the 26-35 years age group, followed by 36-45 year-olds, making the difference statistically significant (P=0.04) (Table 1). The prevalence over 4 years varied from 1 % in 2010 through 1.2%, 0.6%, 0.4% in 2011, 2012 and 2013, respectively (Figure 2).

Table 2: **Overall prevalence of opportunistic infections by socio-demographic characteristics among HIV positive patients at Federal Police Referral Hospital, from 2005-2013**

Socio-demographic variable	Does the patient have OIS?				P-value
	Yes		No		
	No.	%	No.	%	
Sex					
Male	66	19.5	119	33.4	0.23
Female	60	26.9	11	31.2	
Age					
18-25	5	1.4	50	14.0	
26-35	49	13.8	77	21.6	
36-45	54	15.2	78	21.9	0.021
46-55	9	2.5	16	4.5	
>45	9	2.5	9	2.5	

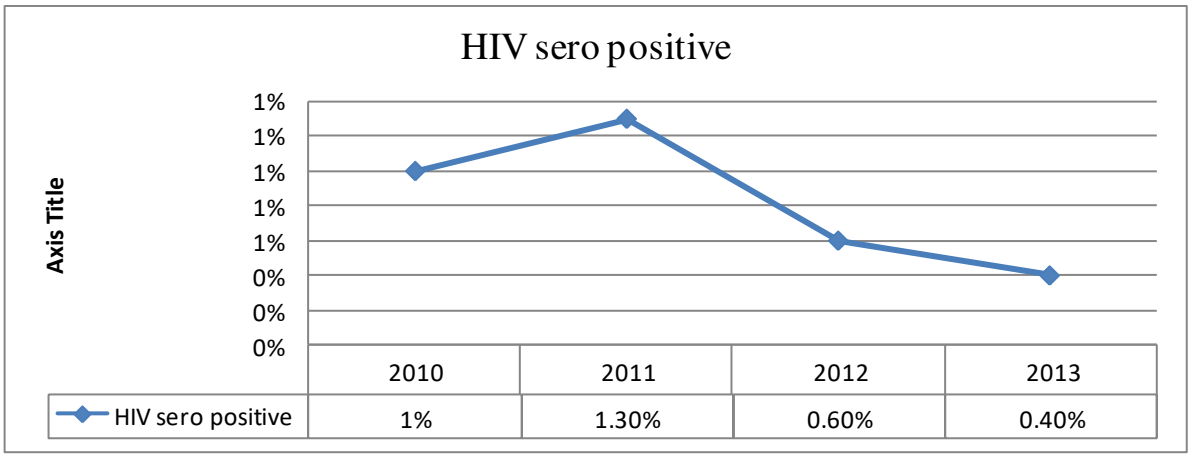

Figure 2: **Trend of HIV positive individuals by year at police health facility site, Addis Ababa, Ethiopia, Federal Police Referral Hospital from September 2009 to August 20**

HIV sero-positivity showed a decreasing trend over the years except from 2010 to 2013 (Fig 3&2). The trends slightly increase for both females and males in the years 2010 up to 2011. However, in the years 2012 -2013, there was a sudden drop for both females and males.

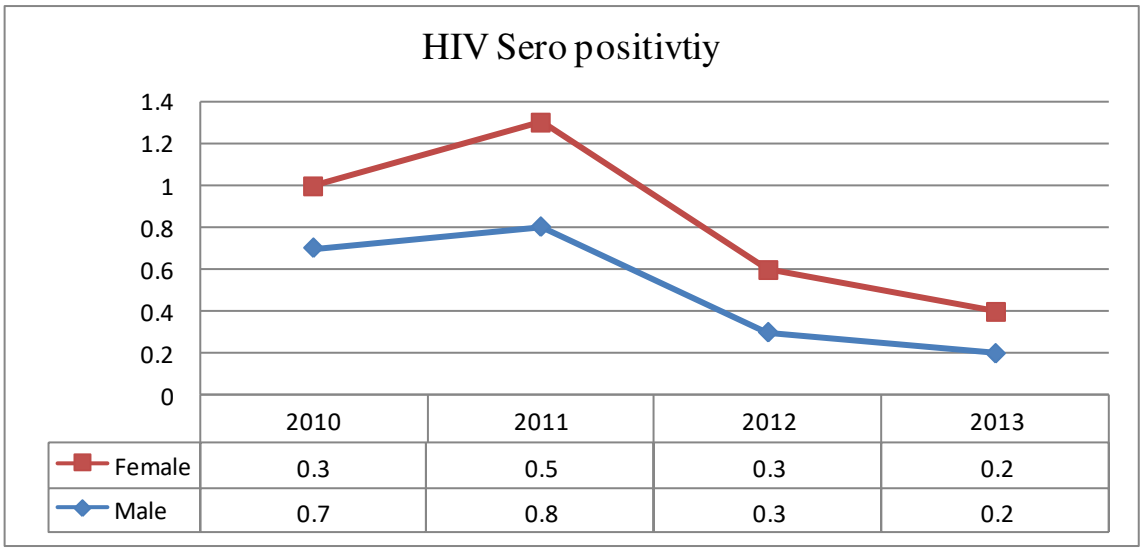

Figure 3: **Trend of HIV positive individuals by sex at police health facility site, Addis Ababa, Ethiopia, Police Referral Hospital from September 2009 to August 2013**

HIV Sero-positivity among Pregnant Women:
About 4,095 clients attended new ANC follow-up from the year 2010-2013, of whom 4,026 (98.3%) were tested for HIV. Among the total pregnant women tested for HIV 49 (1.2%) were positive. From the clients tested for HIV 756 (18.8%), 1135 (28.2%), 984 (24.4%) and 1152 (28.6%) were tested in 2010, 2011, 2012 and 2013 respectively. Of those 14 (0.3%), 17 (0.4%), 12 (0.3%) and 6 (0.1) were detected as HIV positive in 2010, 2011, 2012 and 2013 respectively (figure 4).

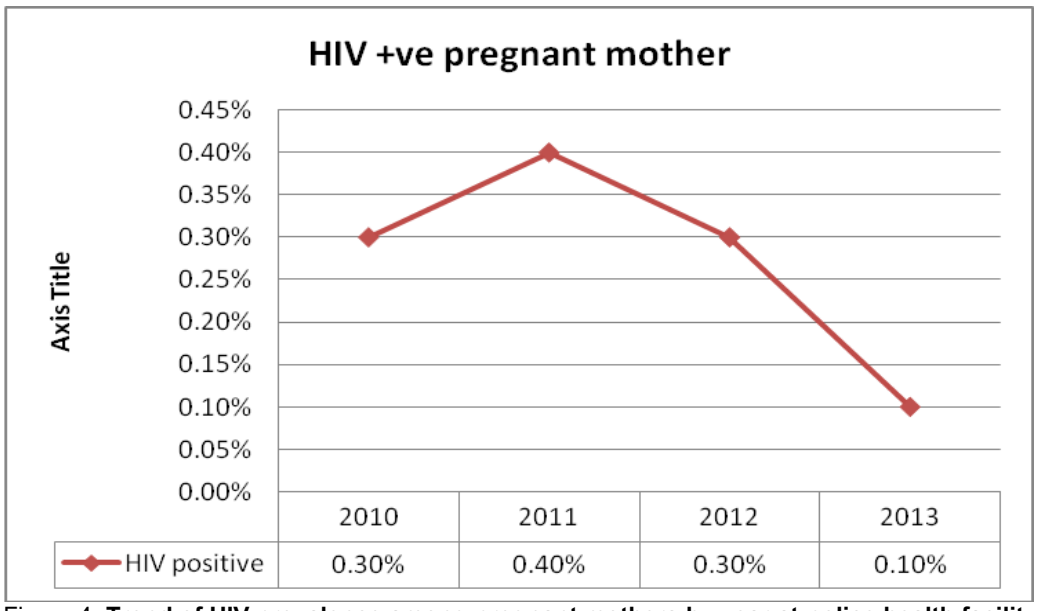

Figure 4: **Trend of HIV prevalence among pregnant mothers by year at police health facility site in Addis-Ababa, Federal Police Referral Hospital, from September 2010- August 2013.**

Opportunistic Infection among HIV Positive Patients on ART:

Out of the total sampled 356 HIV positive patients, on ART and pre-ART 185 (52%) were male and 171 (48%) were female, with a median age of 35.8, with IQR 11.9 about 146 (41%) found in the age ranging from 36-45 years. About 126 (35.4%) of them had one and above opportunistic infection. From those who had opportunistic infections, 66 (18.5%) were male (Table 2). Majority of them were affected by chronic diarrhea 46 (31%), Thrush 36 (24%), and Pulmonary TB (PTB) 17 (12%) (Table 3).

Table 3: **Distribution of opportunistic infections by sex at Federal Police Referral Hospital, from 2005-2013.**

Opportunistic infection (OI)	Sex of the patients		Total
	Male	Female	
H. Zoster	3 (2%)	5 (3%)	8 (5%)
Bacterial pneumonia(BP)	3 (2.2%)	1 (0.8%)	4 (3%)
Pulmonary TB(PTB)	13 (9%)	4 (3%)	17 (12%)
Thrush	18 (12%)	18 (12%)	36 (24%)
Diarrhea Chronic (DC)	24 (16%)	22 (15%)	46 (31%)
Toxoplasmosis(CT,CNS)	2 (1.2%)	1 (0.8)	3 (2%)
Grand total	63 (53%	51 (47%)	114 (100)

Discussion

In this study, significantly declining trends of HIV sero-prevalence were observed among the study subjects over the study period except for the period between 2010 and 2011. There was a statistically significant difference in prevalence of HIV infection throughout the years. This finding is consistent with the observed declining trend of HIV sero-prevalence among the general population (3, 13). Additionally, this result was similar with the study done in Ethiopia in 1999, 2001, 2003 and 2007 with prevalence rate 10.63%, 6.4%, 4.4% and 2.1% respectively (14). The subsequent decline in HIV sero-prevalence could be attributed to prevention programs that have been instituted in recent years. They have increased public and police force awareness about the problem and decreased HIV infection incidence (15).

Out of 26,271 subjects who were tested and counseled for HIV over the four years, only 847 (3.7%) of them were positive for HIV. This is significantly higher than the finding documented in the study in Ethiopian demographic health survey of 2005 and 2011, which reported that the prevalence of HIV positive among adults were 2.4% and 1.5 respectively (3, 16). This could be attributed to the fact that "Uniformed Services" including defense and civil defense forces, are a highly vulnerable group to sexually transmitted infections (STIs) mainly due to their work, environment mobility, age and other facilitating factors that expose them to higher risk of HIV infection. A study was done in many countries, on male population groups, military and police generally shows higher levels of HIV/AIDS infection than the national average. (17, 18).

The age-specific prevalence was highest among the 30-39 years age group, followed by those who were 26-35 years. This difference was statistically significant (p=0.032) and consistent with previous studies conducted in the Ethiopia (18**).** The higher rate of sero-prevalence in these age groups might be attributed to their being sexually active, as well as the work factor.

The prevention of HIV transmission from mothers living with HIV to their infants is built around the routine offer of HIV counseling and testing to all pregnant women along with other interventions. This are implemented with the routine ANC services. In this study an attempt was made to look at a total of 4,095 clients who had attended new ANC follow-up, 4,026 (98.3%) of whom were tested for HIV. On the contrary, according to a study conducted in two ANC clinics in Addis Ababa, the overall refusal rate for HIV screening was 27.5% (19, 20). The reason for this variation calls for further investigation.

Furthermore, there were significantly declining trends of HIV sero-prevalence observed among pregnant mothers over the study period except for the period between 2010 and 2011. There was statistically significant difference in prevalence of HIV infection throughout the years.

Compared to the Country Progress Report on HIV/AIDS Response 2012, ANC surveillance results, HIV prevalence among pregnant women aged 15–24 in Ethiopia declined from 5.6% in 2005, to 3.5% in 2007, and then to 2.6% in 2009. So the trend of HIV in both sections of the population is decreasing which could be put down to the effort made by the government in order to have HIV-free generation. The prevention of HIV transmission from mothers living with HIV to their infants is built around the routine offer of HIV testing and counseling to all pregnant women; counseling on

infant feeding and supporting exclusive breastfeeding; safer obstetrical practices; and ensuring availability of antiretroviral drugs and other supplies for PMTCT (13, 20).

Out of 365 sampled HIV cases, the overall proportion of OIs in the present study was found to be 125 (35%), which is a bit higher than 27.4% reported prevalence of OIs among new adult AIDS cases in New York City's Department of Health and Mental Hygiene, and 19.7% reported prevalence of common opportunistic infections and their CD4 cell correlates among HIV-infected patients attending an antiretroviral therapy clinic at Gondar University Hospital, Northwest Ethiopia. The difference in this finding might be due to the difference in study subjects. On the contrary, this finding is by far lower than studies conducted in Kolkata, India and Bahir-Dar, Ethiopia which documented 53.4% and 88.9% prevalence respectively. This difference might be explained by methodological difference (21-24).

The present study revealed that diarrhea (chronic), thrush (oral, vaginal), followed by pulmonary TB emerged as the predominant OIs identified with prevalence of 12.6%, 36 (9.9%), and 17 (4.7%) respectively. Compared to the study undertaken in Gondar University Hospital in 2013, tuberculosis infection, followed by oral candidacies and diarrheal diseases were pointed out as the predominant OIs identified with the prevalence of, 9.7 %, 5% and 3.3%. This might possibly be explained by differences in the prevalence of OIs in the general population or differences in the methodology (25).

Limitations of the study: Since the study design is cross-sectional, it cannot show cause and effect;

In addition, the study was conducted based on secondary data, and cannot be generalized to police members in the country. Furthermore, since the Hospital where this study was conducted does not routinely perform culture for the diagnosis of OIs due to unavailability of culture for OIs, this study was limited to identify etiology of most of the OIs. Hence majority of the OIs were screened clinically, which may affect the diagnostic accuracy.

Conclusions:

In summary, there had been a decreasing trend of HIV sero-prevalence in the last three years (from 2011 to 2013 G.C), though it had increased from 2010 to 2011. The prevalence of sero-positivity was higher among the sexually active age group (25-36). The overall proportion of OIs in the present study was found to be 125 (35%). The present study revealed that diarrhea (chronic), thrush (oral, vaginal), followed by Pulmonary TB emerged as the predominant OIs identified with prevalence of 12.6%, 36 (9.9%), and 17 (4.7%) respectively.

Based on these findings the following recommendations were forwarded:

1. The Federal Police Referral Hospital should strengthen the conduct STI/HIV educational intervention to alter risk-taking behaviors among the police; the social, cultural and environmental forces and motives which may have immediate and direct impact on their personal health behavior and practices vis-a-vis safer sexual activity should be addressed first; and
2. Since this study was restricted to only secondary data, further study should be conducted with primary data by concerned bodies.

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