

Saint Paul's Hospital Millennium Medical College

Department of Public Health

Ethiopian Field Epidemiology and Laboratory Training program



**Risk factors associated with HIV infection in Public hospitals of
East Shewa Zone, Oromia region**

BY: Zerihun Kassa (MD)

**Thesis Submitted to Saint Paul's Hospital Millennium Medical College
Department of Public Health for Partial Fulfillment of MPH in Field
Epidemiology**

October, 2019

Addis Ababa, Ethiopia

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Abstract

Introduction: Globally, 37.9 million [32.7–44.0 million] people were living with HIV at the end of 2018. Two thirds of all people infected with HIV live in Sub-Saharan Africa, although this region contains little more than 12 percent of the world's population(2). EDHS 2016 showed national HIV prevalence among women and men age 15-49 in Ethiopia was 0.9%(3). The world has committed to ending the AIDS epidemic by 2030. Progress to control it is far slower than what is required to reach the 2020 milestone of less than 500,000 new infections per year(4,5). Ethiopia targets to reduce adult new HIV infection by 50 percent from the 2016 baseline of 9,800 to 4,900 by 2020(6). Due to availability of HAART as HIV-infected persons live longer and healthier lives; secondary prevention (positive prevention) which is strategy of identifying risky behaviors and implementing behavior change programs for PLHIV showed important reduction in HIV infection transmission.

Objective: To assess risk factors associated with HIV infection among patients diagnosed HIV/AIDS from June 2016 to June 2019 in East shewa zone.

Methodology: Unmatched Case control study was conducted in selected public hospitals of East Shewa Zone, Oromia region, Ethiopia. The ratio of cases to controls were 1:2.

Results: From 294 participants included in study 196 were controls and 98 were cases. The mean age of the cases was 35.6 years while that of the controls was 36.55. Multivariate logistic regression showed that educational status had significant association with HIV infection. Those who attend their education at elementary level were five times risk of HIV infection (95%CI 1.849,13.694) when compared with illiterates. Those who had STD were 4.432 likely to develop HIV infection. Odds of substance abuse were 2.4(95% CI 1.04,5.54) times higher among case-patients than controls. Individuals who had other sexual partner were 3.171(95% CI 1.53,6.57) likely to had HIV infection than those who have one sexual partner. Those who reported no condom use had 3.73(95% CI 1.52,9.22) times likely to had HIV than those who used a condom

Conclusion: The findings in this study indicated that age group, marital status, number of sexual partners, sexually transmitted infections and condom use were important predictors of HIV infection. As significant number of HIV positives had different risk factors for HIV infection transmission, prevention effort should give attention for secondary prevention strategy.

Key words: HIV infection, Risk factors for HIV, HIV in East Shewa zone.

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List of Abbreviations

AIDS	Acquired immunodeficiency syndrome
CI	Confidence interval
HIV	Human immunodeficiency virus
NGO	Non-Governmental Organization
OR	Odds ratio
PLHIV	People Living with HIV
SPSS	Statistical package for social science
STD	Sexually transmitted disease
UNAIDS	United Nation's Program on AIDS
VCT	Voluntary counseling and testing
WHO	World Health Organization

1. Introduction

1.1. Background

Human immunodeficiency virus (HIV) is a leading cause of global burden of disease. Globally, 37.9 million [32.7–44.0 million] people were living with HIV at the end of 2018. An estimated 0.8% [0.6-0.9%] of adults aged 15–49 years worldwide are living with HIV(1). Two thirds of all people infected with HIV live in Sub-Saharan Africa, although this region contains little more than 12 percent of the world's population(2). According to 2016 Ethiopian Demographic and Health Survey(EDHS), the estimated national HIV prevalence among women and men age 15-49 in Ethiopia was 0.9%(3).

The world has committed to ending the AIDS epidemic by 2030. Progress to control it is far slower than what is required to reach the 2020 milestone of less than 500,000 new infections per year(4,5). Ethiopia targets to reduce adult new HIV infection by 50 percent from the 2016 baseline of 9,800 to 4,900 by 2020(6).

Although most people aware of their positive HIV status refrain from risky practices, a substantial proportion also continue to engage in high-risk transmission behaviors. They are important source of HIV transmission(7,8). Identifying determinants of HIV transmission risk behavior among this group has become increasingly crucial for HIV prevention(9)

The magnitude of unprotected sexual practice among PLHIV is high in sub-Saharan Africa; about more than 1 in 3 PLHIV were engaged in risky sexual practice(10). In Ethiopia, study conducted at Bishoftu and Addis Ababa showed the magnitude of risky sexual behavior among PLHIV reach 22.2-30.2% (11,12).

PLWHA who engage in unprotected sex may acquire syphilis, gonorrhea, chlamydia, or other STIs. In addition, comorbid STIs among PLWHA can increase HIV transmission and accelerate HIV disease progression. They may also be exposed to more virulent multidrug-resistant strains of HIV or HIV super-infection(13).

Due to availability of HAART as HIV-infected persons live longer and healthier lives, strategies that prevent transmitting their HIV infection to others important(7). Identifying risky behaviors and implementing behavior change programs for PLHIV showed important reduction in HIV infection transmission(14). Traditional HIV prevention programmes mostly targeted people who

are HIV negative. HIV prevention agenda needs to keep pace with the ever-changing demands of the day by responding to the specific prevention needs of people living with HIV. This needs start by identification of risk behaviors of this group and acting on it(6,15).

1.2. Statement of Problems

As HIV-infected persons live longer and healthier lives, they also confront the longterm their chance transmitting their HIV infection to others is high. HIV prevention in Ethiopia focus more on HIV negatives than HIV positives.

Challenges of HIV prevention targeting key populations in Ethiopia are lack of disaggregated and updated data on size estimate, behavior and biological factors for the different population groups according to local condition. There is a need for improved strategies of promoting comprehensive knowledge and behavioral change interventions in the way applicable to local problems.

Mojo, Adama and Bishoftu town are located on Djibouti Addis Ababa road where most of import and export of Ethiopia conducted. They serve long truck drivers from different direction. This three town are among 48 high-burden town/districts need HIV prevention response prioritized by Oromia region as hot spot area. Identifying risky behavior and acting on them in this area is very important.

The reemergence of HIV/AIDS in Ethiopia need new way of action. In resource restricted area positive prevention strategy is important. For this action identifying risky behaviors among HIV positives crucial.

There is few study conducted on risky behaviors among ART enrolled patients in Ethiopia. Most of researches were conducted on risk factors for HIV/AIDS were among community without considering sero status. To know what risk factors expose people living with HIV to this disease by comparing with people who were HIV negative is better way to know risks.

This study, conducted to explore risk factors associated with HIV infection among recently diagnosed HIV patients in Mojo, Adama and Bishoftu hospital.

1.3. Significance of Study

Identifying risky behaviors for HIV infection among HIV positives and making prevention with HIV positive persons an essential strategy to reduce the number of new HIV infections.

This study was conducted on patients diagnosed for HIV and on follow up at Bishoftu, Adama and Mojo hospital from June 2016 to June 2019. This help to know recent risk factors for HIV infection. Thus, the findings of this study come up with recommendations that serve as an input for policy makers, program planners and NGO's to formulate appropriate policies, and strategies capable of preventing the transmission of HIV/AIDS. This is important as positive prevention /secondary prevention is one of strategy recommended by WHO to decrease HIV transmission. In addition, the information obtained from this study will serve as base line information for those who want to conduct further study on this topic area.

2. Literature Review

2.1. Magnitude of HIV/AIDS

According to UNAIDS global AIDS update report of 2019, HIV statics of 2018 showed since the start of the HIV epidemic an estimated 74.9 million [58.3 million–98.1 million] people have become infected with HIV and 770, 000 [570 000–1.1 million] people died from AIDS-related illnesses. 1.7 million [1.4 million–2.3 million] people became newly infected with HIV. There is renewed concern that the annual number of new infections among adults has remained static in recent years(1,4).

Two thirds of all people infected with HIV live in Sub-Saharan Africa, although this region contains little more than 12 percent of the world’s population. The vast majority of people living with HIV are located in low- and middle- income countries, with an estimated 66% living in sub-Saharan Africa. Among this group 19.6 million are living in East and Southern Africa which saw 800,000 new HIV infections in 2017 (2).

In Ethiopia estimated number of HIV by 2019 is 737,186 from which 289,156 are male and 448,030 annual new HIV infections are 21,265. Estimated number of HIV/AIDS positive in Oromia region are 185,334 from which 168,515 are adults above age of 15 and new infection in the region are 3,856 (16). The HIV epidemic in Ethiopia is heterogeneous by sex, geographic areas and population groups. It was higher among women than men (1.2% versus 0.6%). It was seven times higher in urban areas than in rural areas (2.9 percent versus 0.4 percent). HIV Prevalence among men age 15-49 is 0.9% with Peak was 1.6% at the age group 40-49 year(17). After remarkable decline in incidence and prevalence of HIV infection among all ages, it started to increase in the last few years Ethiopia(18).

According to Ethiopian HIV/Strategic plan by 2020, 90% of all PLHIV will know their HIV status; 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy (ART); and 90% of all people receiving ART will have viral suppression (19). After remarkable decline, HIV infection started to increase in the last few years among adults in Ethiopia. With the current trend, Ethiopia will achieve the second and third 90% HIV targets, while the first target is

not achievable and without achieving this overarching goal control of the epidemic will not be achieved(18).

2.2. Risk Factors for HIV/AIDS

HIV information systems must be capable of identifying the locations where and among whom new HIV infections are occurring; determining the major modes of HIV transmission and risk behaviors; estimating the size of populations at risk and affected. In sub-Saharan Africa, young women, men who have sex with men, people who inject drugs, sex workers, transgender people, prisoners, mobile population and, migrants(5,20).

Risky sexual behavior increases the likelihood of contracting an STI including HIV/AIDS(21). The available studies show contradicting ideas on the risky sexual practices of HIV positive individuals who are on ART. Some studies suggest risky sexual practice decreased among individuals on ART because of the intensive counseling they were getting during their follow ups; others argued that it showed increases after the initiation of ART because of the physical well-being that followed ART initiation; still others concluded ART has no effect on it (11,13).

Different study show vulnerability of women than man for HIV infection(5,22). Study done on health survey of Zimbabwe in 2012 showed Young females aged 15–24 years are associated with a significant two-fold elevated risk of HIV infection relative to their male peers. Young persons aged 15–24 years who were divorced, widowed or not living together have significantly elevated risk compared with their never-married counterparts (23)

Findings indicate that a substantial proportion of PLWHA use alcohol and engage in sexual risk behaviors. Study conducted in India shows female sex workers were less likely to use alcohol consumption that has 5-9 clients per week. Alcohol using older (25+ years) FSWs were 9 times more likely to have HIV(24). Substance use and alcohol consumption are also risk behavior for HIV/AIDS in Ethiopia. Different studies revealed substance use contributed to engaging in risky sexual practice(11,25). Secondary prevention programs for PLWHA that address alcohol use in the context of sexual behavior are needed(26).

The association between HIV infection and economic status is controversial. Study conducted in Kenya demonstrated that having income whatever the level of socioeconomic status was a

risk factor for HIV infection (27). Analysis of EDHS 2011 also showed that individuals who were in the middle, richer and richest wealth quintiles had increased odds of having HIV over those in the poorest quintile (28). HIV infections in Kenya were predominantly among the resourceful newly married, young educated adults (29). There are scholars who argue that poverty, underdevelopment, the lack of choices and the inability to determine one's own destiny fuel the HIV epidemic (30).

Religion can influence sexual behavior through intermediate factors such as the age at first sex, marital status, and access to information and services. Religion could hamper the effective use of condoms for prevention against HIV infections (29,31).

The prevalence of unprotected sexual practice reached as 22% among PLHIV in Ethiopia (12). There is a need for improved strategies of promoting comprehensive knowledge and behavioral change interventions among HIV positives (32).

Study showed 85% of HIV positive adults in Africa acquired it through sexual intercourse (33). The type of infection in Ethiopia has been determined to be heterogeneous in its nature. The underlining determinants for the rapid spread of the epidemic in Ethiopia include poverty, low literacy rate, gender inequality, recurrent natural and manmade disasters, as well as inadequate institutions and infrastructures to respond to the epidemic effectively. Immediate determinants also fueling the epidemic include multiple sexual partners, unsafe sexual practices, high rate of sexually transmitted infection, and low use of condom. (34).

Worldwide and particularly in developing countries, HIV prevention is mainly concentrated on reducing the risk of HIV acquisition, so focusing primarily on non-infected people or people who are unaware of their HIV status (35). As more and more people infected with HIV live healthier and enjoy longer lives, an increase in HIV transmission may come from those who know they are infected and engage in unprotected sex. It is therefore very important to establish the risky behavior in HIV infected people and to understand the factors that contribute to risky practices in PLWHA in order to design optimal interventions targeting HIV-positive people (36).

PLWHA present show risky behavior than HIV-negative and HIV ignorant. Thus positive prevention strategies should be developed and implemented (35).

When it first appeared, AIDS drew riveted attention from the public, the media, the scientific world, and in the communities. Declines in deaths caused by HIV/AIDS because of better antiretroviral medications may be creating a false sense of public complacency concerning the disease. One of the greatest challenges that will be confronted in the years ahead will be maintaining a sense of public health, scientific, and policy urgency concerning an HIV epidemic that is no longer new but continues unnecessarily to take too many lives. There is a critical need to conceptualize and evaluate intervention that can assist persons with HIV to refrain from high-risk behavior(7,13).

As HIV-infected persons live longer and healthier lives, they also confront the long term challenges of maintaining not only treatment adherence but also personal adherence to strategies that prevent transmitting their HIV infection to others. There is a critical need to conceptualize and evaluate intervention that can assist persons with HIV to refrain from high-risk behavior. When developed, such approaches can be used to reinforce and support the behavior change efforts of HIV-positive persons seen in health care and AIDS service settings(7,37).

In general, different sociodemographic factors operate for different proximate factors which contribute for risk factors for HIV infection.

The following conceptual framework shows risk factors associated with HIV/AIDS

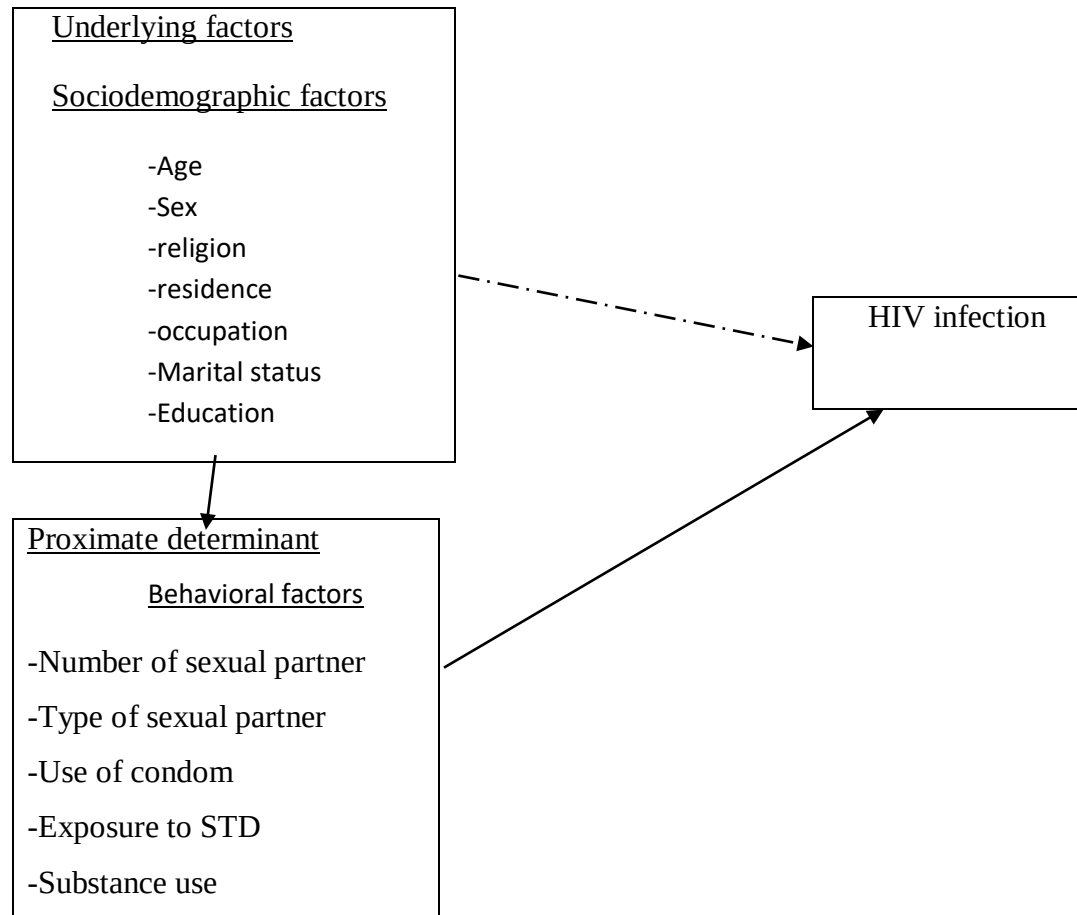


Figure 1. Framework for risk factors for HIV infection

3. Objective of Study

3.1. General objective

- To assess risk factors associated with HIV infection among patients diagnosed HIV/ AIDS from June 2016 to June 2019 in selected public hospital of East Shewa Zone, Oromia region Ethiopia

3.2. Specific objective

- To determine magnitude of risky behaviors for PLWH from June 2016 to June 2019 in selected public hospital of East Shewa zone
- To find out behavioral risk factors associated with HIV/AIDS among patients diagnosed HIV/AIDS from June 2016 to June 2019 in selected public hospital East Shewa zone.

4. Methodology

4.1. Study Area and Period

Oromia regional state is the largest and most populous region in Ethiopia covering an area of 359,619.8 square kms and having total population of 33,914,866 with male to female ratio of 1:1. More than 85% of the population resides in rural areas where subsistence farming and animal husbandry are the main sources of livelihood. Administratively the region divided into 18 zonal and 12 special town administrations. The region has more than 70 functional hospitals. Mojo, Adama and Bishoftu Hospitals are among hospitals in the region giving health service for most of population in east Shewa zone. Adama hospital is Medical college and serve as referral hospital in area. Bishoftu hospital is general hospital and Mojo hospital is district hospital. All three hospitals are giving general health service including ART provision for HIV positive patients. This study conducted from July 05/2019 to August 07/2019 on patients know their sero status enrolled to ART June 01/2016 to June 01/2019 in this three ART providing health institutions.

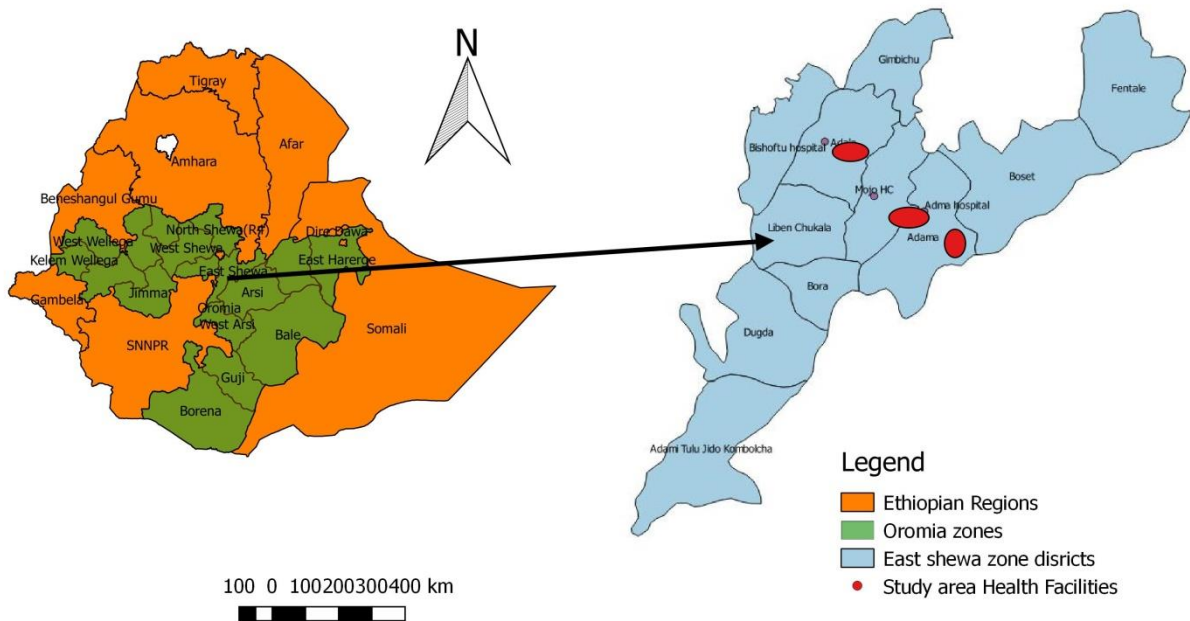


Figure 2. Map of study East Shewa zone showing Adama, Bishoftu and Mojo Hospital

4.2. Study Design

Unmatched Case control study was conducted to determine risk factors associated with HIV infection. Cases were HIV positive patients aged ≥ 18 yrs who were diagnosed June 01/2016 to June 01/2019 on follow up while Controls were HIV negative patients aged ≥ 18 yrs who were tested in five years who come to Adult OPD in study period.

4.3. Source Population

For cases: All HIV positive patients aged 18yrs and above and who have follow up at public hospitals.

For controls: All HIV negative patients aged 18yrs and above who come up for service at Public hospitals.

4.4. Study Population

For cases: All HIV positive patients aged ≥ 18 yrs and who come for ART service at East Shewa zone hospital those who know their sero status from June 01/2016 to June 01/2019

For controls: All HIV negative patients aged ≥ 18 yrs and who come for service at East Shewa zone hospital those who know their serostatus from June 01/2016 to June 01/2019

4.5. Sample Size

Sample size was determined using Epi Info version 7.1 stat calc for unmatched case control. The assumption used were, Considering having multiple sexual factor as risk factor for HIV infection, percent of cases with exposure 13.7% was taken(15) and percent of controls with exposure 4.2% was taken (17). The case to control ratio was 1:2, with 95% confidence interval and 80 % power. Fifteen percent non response rate was added. Number of sample for cases was 103 and 206 for controls. A total of 309 sample was calculated.

4.6. Eligibility Criteria

Inclusion criteria

For cases: People who were 18 years and above, who were HIV sero positives from June 01/2016 to June 01/2019 on follow up at Adama, Bishoftu and Mojo hospital and volunteer to participate in the study were considered as cases.

For controls: People who were 18 years and above, who come to Adama, Bishoftu and Mojo hospital and tested HIV sero negatives from June 01/2016 to June 01/2019 and volunteer to participate in the study were considered as controls.

Exclusion criteria

For Cases: People whose age was below 18 years, those diagnosed other than from June 01/2016 to June 01/2019 those who are unable to speak and those who were non-volunteer to participate in the study will be excluded from cases.

For controls: People whose age was below 18 years, People who were not know their Sero status from June 01/2016 to June 01/2019, those who were unable to speak and difficulty of hearing were excluded from controls.

4.7. Sampling procedures

Among public hospitals in East Shewa zone purposively three hospitals (Adama, Bishoftu and Mojo hospital) were selected for data collection. These hospitals were selected because of they found on Djibouti to Addis Ababa road which is main route of import export for Ethiopia and serve many people including long truck drivers. The town where this hospitas located are among town with high HIV burden prioritized by Oromia region as hotspot area.

Proportional allocation of number of cases to respective hospitals was done based on number of HIV patient load of each hospital.

Selection of cases: The cases were patients aged >18 years, enrolled for ART treatment in the selected hospitals of East Shewa zone from June 01/ 2016 to June 01/ 2019. The data was collected until the required sample size was reached.

Selection of health facility control: For each case two control was selected from each hospital OPD attendee from patients who was tested HIV negative in last three years.

4.8. Data Analysis

Data entry and analysis was performed using SPSS version 23.0. Descriptive statistics, bivariate analysis, and multivariate analysis were used as important. Results were presented in the form of figures, tables and texts.

4.9. Data Collection

Documents from Health Institutions and others research were reviewed. A structured questionnaire was designed. The interviewers were ART providing nurses at respective hospitals. Training was given for interviewers. Pre-testing and standardizing of the questionnaire was carried out at Mojo health center which was not included in the study on 5% sample required.

4.11. Study Variables

Dependent Variables: HIV sero status was considered as dependent variable

Independent Variables: Socio demographic variables (age, sex, residence, religion), socioeconomic variables (income, occupation), and risky behaviors (number of sexual partners, and history of sexually transmitted diseases, condom use, history of substance use) were considered as independent variables.

4.12. Ethical consideration

Ethical clearance was obtained from IRB of Saint Paul's hospital millennium medical college, and Oromia regional health bureau. Respective hospitals directors were informed about objective of the study and permission was obtained. During the interview, each individual had told about the aim of study and consent was obtained from each respondent. The participation was

completely voluntary, and no one was disadvantaged in any way by a refusal to take part in this study. Participant had right to stop interview at any place. Assurance was given that the information they provided to the researcher would be treated in complete confidential and anonymity way.

4.13. Data Dissemination

Report will be prepared in both hard and soft copies to be submitted for Saint Paul's hospital millennium medical college department of Public Health and Oromia Regional Health Bureau

4.14. Operational definition

Risky behaviors: behavior that increases one's risk of contracting or transmitting sexually transmitted infections

Primary Prevention: Prevention activities focuses on people who are not HIV infected.

Secondary prevention (Positive prevention): Prevention activities directed toward people who are living with HIV, with the intention of preventing transmission to those who are HIV negative. Secondary HIV prevention is sometimes referred to as prevention with positives.

5.Results

From a total population who has visited the study sites from July 05/2019 to August 07/2019, 309 study participants were eligible subjects for the study. From these 294 participants were Completed the interview, making a response rate of 95.14 %. Among these 196 were controls and 98 were cases. Males were 105(53.6%) from controls and 52(53.1%) from casess. Sociodemographic characteristics of study participants are presented in table below. The mean age of the cases was 35.6 years while that of the controls was 36.55. Most of participants were in age category of 35-39 (23.8). The majority of the study participants were followers of orthodox religion 136(46.3%) followed by Muslim and Protestant. From study participant 51(52%)of cases and 123(62.8%)of controls live in town. The majority of the study population 121(41.2%)were married. Regarding to educational status 14(14.3%)of cases and 19(9.7%)of controls were illiterate

Table 1: Distribution of the study subjects by sociodemographic characteristics, East Shewa zone, Ethiopia, August 2019.

	Category	Case(N=98)	Control(N=196)	Total(294)
Sex	Male	52(53.1%)	105(53.6%)	157(53.4%)
	Female	46(46.9%)	91(46.4%)	137(46.6%)
Age category	18-24	9(9.2%)	20(10.2%)	29(9.9%)
	25-29	13(13.3%)	28(14.3%)	41(13.9%)
	30-34	21(21.4%)	38(19.4%)	59(20.1%)
	35-39	23(23.5%)	47(24.0%)	70(23.8%)
	40-44	13(13.3%)	23(11.7%)	36(12.2%)
	45-49	14(14.3%)	28(14.3%)	42(14.3%)
	50 & above	5(5.1%)	12(6.1%)	17(5.8%)
Educational status	Illiterate	13(13.3%)	53(27%)	66(22.4%)
	read & write	25(25.5%)	64(32.7%)	83(28.2%)
	Elementary(1-8)	26(26.5%)	27(13.8%)	53(18%)
	High school (9-12)	17(17.3%)	33(16.8%)	50(17%)
	College & above	17(17.3%)	19(9.7%)	36(12.2%)

Current marital status	Never married	64(32.7%)	28(28.6%)	92(31.3%)
	Married	28(28.6%)	24(24.5%)	118(40.1%)
	Divorced	22(22.4%)	21(10.7%)	43(14.6%)
	Widowed	24(24.5%)	17(8.7%)	41(13.9%)
Address	Rural	47(48.0%)	73(37.2%)	120(40.8%)
	Town	51(52.0%)	123(62.8%)	174(59.2%)
Religion	Muslim	42(42.9%)	51(26.0%)	93(31.6%)
	Orthodox	34(34.7%)	102(52.0%)	136(46.3%)
	Protestant	20(20.4%)	42(21.4%)	62(21.1%)
	catholic	2(2.0%)	0	2(0.7%)
	other	0(0.0%)	1(0.5%)	1(0.3%)
Income	less than 1000	22(22.4%)	29(14.8%)	51(17.3%)
	1001-2500	33(33.7%)	88(44.9%)	121(41.2%)
	2501-4000	29(29.6%)	72(36.7%)	101(34.4%)
	4001-5500	8(8.2%)	0	8(2.7%)
	5501-7000	5(5.1%)	7(3.6%)	12(4.1%)
	7001 & above	1(1.0%)	0	1(0.3%)

From total respondents 121(41.2%) were from Adama medical college, 113(38.4%) were from Bishoftu general hospital and 60(20.4%) were from Mojo district hospital. Most of participants included in study were living in town 179(60.9).

Among all participants, 55(18.7%) were responded as they had history of sexually transmitted disease. Among this 35(35.7%) were HIV positive. From those who had STD, urethral discharge was most common (47.3%) followed by genital ulcer (36.4%) and groin swelling (14.5%).

Table 2. Sexually transmitted disease history among study participants East Shewa zone, Ethiopia, August 2019

		Cases	Control	Total
STD history	Yes	35(35.7%)	20(10.2%)	55(18.7%)
	No	63(64.3%)	176(89.8%)	239(81.3%)
Type of STD	urethral	16(45.7%)	10(50.0%)	26(47.3%)
	Genital ulcer	11(31.4%)	9(45.0%)	20(36.4%)
	Swelling groin	7(20.0%)	1(5.0%)	8(14.5%)
	other	1(2.9%)	0(0.0%)	1(1.8%)

From subjects in study, 74(25.2%) were use different substance. From this 36 were cases. The most commonly used substance was alcohol both by cases and controls followed by khat.

Table 3. Substance use among study participants East Shewa zone, Ethiopia, August 2019.

		Control	Case	Total
Substance use	Yes	45(23.0%)	56(57.1%)	101(34.4%)
	No	151(77.0%)	42(42.9%)	193(65.6%)
Type of substance used	chew Khat	16(8.2%)	15(15.3%)	31(10.5%)
	drink alcohol	15(7.7%)	24(24.5%)	39(13.3%)
	shisha	5(2.6%)	6(6.1%)	11(3.7%)
	Smoking	9(4.6%)	11(11.2%)	20(6.8%)

Among study participant 31(31.6%)cases and 24(12.2%) controls had more than one sexual affair. From this 21(21.4%)of cases and 9(4.6%) of controls were had affair in last one year

Table 4. History of more than one sexual affair among study participants East Shewa zone, Ethiopia, August 2019.

		Case	Control	Total
Other sexual affair	Yes	31(31.6%)	24(12.2%)	55(18.7%)
	No	67(68.4%)	172(87.8%)	239(81.3%)
Affair last year	Yes	21(67.7%)	9(37.5%)	30(54.5%)
	No	10(32.3%)	15(62.5%)	25(45.5%)

The use of condom in last three months before the study period was 103(34.79) of study participant. From cases 38.8%(38) reported as they used condom in last three months.

Table 5. Condom use among study participants East Shewa zone, Ethiopia, August 2019.

		Control	Case	Total
Condom use	Yes	16(8.2%)	21(21.4%)	37(12.6%)
	No	180(91.8%)	77(78.6%)	257(87.4%)
Condom use in last 3 month	Yes	65(33.2%)	38(38.8%)	103(35.0%)
	No	131(66.8%)	60(61.2%)	191(65.0%)

Study participants were assessed on their knowledge about HIV transmission and prevention methods. Respondents were designated as knowledgeable in that specific situation if he/she mentioned four methods of HIV transmission and three methods of HIV prevention correctly.

Accordingly ,76 (77.6%) of the cases and 145 (74%) of the controls knew three or more of methods of HIV transmission included in the questionnaire. With regard to HIV prevention methods; 75(76.5) of the cases and 140 (71.4%) of the controls knew three or more methods of HIV prevention asked.

Table 6. Knowledge about HIV infection risk and prevention among study subjects East Shewa zone, Ethiopia, August 2019.

		Cases	Control	Total
Risk knowledge	Yes	76(77.6%)	145(74.0%)	221(75.2%)
	No	22(22.4%)	51(26.0%)	73(24.8%)
Prevention knowledge	Yes	75(76.5%)	140(71.4%)	215(73.1%)
	No	23(23.5%)	56(28.6%)	79(26.9%)

Bivariate analysis show that educational status, marital status, having sexually transmitted disease history, substance abuse, using condom and having more than one partner were significantly associate with HIV infection. In this analysis age category, income, religion, knowledge about HIV transmission and Knowledge about HIV prevention were not showed association with HIV infection.

Table 7. Bivariate analysis of factors associated with HIV infection East Shewa zone, Ethiopia, August 2019.

	Category	Case(N=98)	Control(N=196)	Crude OR	95% CI	P
Sex	Male	52(53.1%)	105(53.6%)	0.98	(.603,1.593)	0.934
	Female	46(46.9%)	91(46.4%)	0.505		
age category	18-24	9(9.2%)	20(10.2%)	1.08	(.292,3.989)	0.908
	25-29	13(13.3%)	28(14.3%)	1.114	(.325,3.825)	0.863
	30-34	21(21.4%)	38(19.4%)	1.326	(.411,4.280)	0.637
	35-39	23(23.5%)	47(24.0%)	1.174	(.370,3.733)	0.785
	40-44	13(13.3%)	23(11.7%)	1.357	(.390,4.713)	0.631
	45-49	14(14.3%)	28(14.3%)	1.2	(.353,4.084)	0.77
	50 & above	5(5.1%)	12(6.1%)	0.417		0.1
Educat	illiterate	13(13.3%)	53(27%)	1.529	(.710,3.292)	0.278

Educational status	read & write	25(25.5%)	64(32.7%)	4.077	(1.818,9.144)	0.001
	Elementary(1-8)	26(26.5%)	27(13.8%)	2.1	(.904,4.879)	0.084
	High school (9-12)	17(17.3%)	33(16.8%)	3.648	(1.495,8.903)	0.004
	college & above	17(17.3%)	19(9.7%)	0.245		0
Current marital	Never married	64(32.7%)	28(28.6%)	0.584	(.311,1.097)	0.094
	Married	28(28.6%)	24(24.5%)	2.395	(1.137,5.043)	0.022
	Divorced	22(22.4%)	21(10.7%)	3.227	(1.504,6.926)	0.003
	Widowed	24(24.5%)	17(8.7%)	0.438		0
Address	Rural	47(48.0%)	73(37.2%)	1.553	(.950,2.537)	0.079
	Town	51(52.0%)	123(62.8%)	0.415		0
Religion	Muslim	42(42.9%)	51(26.0%)	.769	(.104,5.700)	.797
	Orthodox	34(34.7%)	102(52.0%)	.323	(.044,,2.389)	.268
	Protestant	20(20.4%)	42(21.4%)	.455	(.060,3.461)	.447
	catholic	2(2.0%)	0	2.500	(.194,32.194)	.482
	other	0(0.0%)	1(0.5%)	1.000		1.000
income	less than 1000	22(22.4%)	29(14.8%)	.460	(.115,1.841)	.272
	1001-2500	33(33.7%)	88(44.9%)	.252	(.067,,954)	.042
	2501-4000	29(29.6%)	72(36.7%)	.255	(.067,,977)	.046
	4001-5500	8(8.2%)	0	1.222	(.244,6.111)	.807
	5501-7000	5(5.1%)	7(3.6%)	.381	(.065,2.222)	.283
	7001 & above	1(1.0%)	0	1.500		.530
STD history	Yes	35(35.7%)	20(10.2%)	4.889	(2.629,9.090)	0
	No	63(64.3%)	176(89.8%)	0.358		0
Substance use	Yes	45(23.00%)	56(57.10%)	4.474	(2.659,7.529)	0
	No	151(77.00%)	42(42.90%)	0.278		0
Other sexual affair	Yes	31(31.60%)	24(12.20%)	3.316	(1.814,6.060)	0
	No	67(68.40%)	172(87.80%)	0.39		0
Risk knowledge	yes	76(77.6%)	145(74.0%)	1.215	(.686,2.152)	0.504
	No	22(22.4%)	51(26.0%)	0.431		0.001
Prevention knowledge	yes	75(76.5%)	140(71.4%)	1.304	(.745,2.285)	0.353
	No	23(23.5%)	56(28.6%)	0.411		0
condom use	Yes	21(21.40%)	16(8.20%)	0.428		
	No	180	77	3.068	1.519	0.002
		91.80%	78.60%			

Multivariate analysis was done to determine the associations between the various independent (demographic, socio-economic and behavioral) factors and the dependent variable (HIV sero-status). All variables which had shown statistically significant association during the bivariate analysis, were collectively entered in the multivariable analysis, and according to the multivariable logistic regression analysis, five variables were found to be independent predictors for HIV infection. Current marital status, Educational level, having multiple sexual partner, condom use and history of substance use showed significant association.

Table 8. Multivariate analysis of factors associated with HIV infection East Shewa zone, Ethiopia, August 2019.

characteristics	category	Case(N=98)	Control(N=196)	AOR	95%CI	P - value
Educational status	Illiterate	13(13.3%)	53(27%)			.
	Read & write	25(25.5%)	64(32.7%)	1.823	(.722,4.604)	.204
	Elementary(1-8)	26(26.5%)	27(13.8%)	5.032	(1.849,13.694)	.002
	High school (9-12)	17(17.3%)	33(16.8%)	2.408	(.828,7.000)	.107
	College & above	17(17.3%)	19(9.7%)	4.966	(1.648,14.968)	.004
Current marital	Never married	64(32.7%)	28(28.6%)			
	Married	28(28.6%)	24(24.5%)	.516	(1.137,5.043)	.084
	Divorced	22(22.4%)	21(10.7%)	1.938	(1.504,6.926)	.145
	Widowed	24(24.5%)	17(8.7%)	3.509	(.311,1.097)	.007
STD history	Yes	35(35.7%)	20(10.2%)	4.432	(1.666,11.788)	.003
	No	63(64.3%)	176(89.8%)			
Substance use	Yes	45(23.00%)	56(57.10%)	2.396	(1.035,5.543)	.041
	No	151(77.00%)	42(42.90%)			

Other sexual affair	Yes	31(31.60%)	24(12.20%)	3.171	(1.531,6.566)	.002
	No	67(68.40%)	172(87.80%)			
Condom use	Yes	16(8.20%)	21(21.40%)			
	No	180	77	3.738	(1.516,9.215)	.004
		91.80%	78.60%			
Address	Rural	47(48.0%)	73(37.2%)	1.505	(.816,2.778)	.191
	Town	51(52.0%)	123(62.8%)			

Those who were literate had likely to be HIV infected than illiterates. Those who attend their education at elementary level were five times risk of HIV infection (95%CI 1.849,13.694) when compared with illiterates. Those who had STD were 4.432 likely to develop HIV infection. Having more than one sexual affair was 3.171(95% CI 1.531,6.566) likely to had HIV infection. Substance use was significantly associated with HIV infection. Odds of substance abuse were 2.4(95%CI 1.035,5.543) times higher among case patients than controls. Individuals who had more than one sexual partner were 3.171(95%CI 1.531,6.566) likely to had HIV infection than those who have one sexual partner. Those who reported no condom use had 3.73(95%CI 1.516,9.215) times likely to had HIV than those who used a condom

6. Discussion

Marital status of residences, particularly women, such as divorced, separated and widowed are cited as possible case for vulnerability to HIV (38). Marriage provides checks and balances on individuals' sexual behavior. Societal norms in Africa expect faithfulness in marriage(29).In thIS study those who were divorced (AOR 1.87; CI 1.50-6.92) and widowed (AOR 3.5; CI 1.14-5.04) were at high risk to HIV infection when compared to never married. This is similar to study conducted in Kenya which showed being divorced (AOR 1.87; CI 1.16–3.01) and widowed (AOR 0.83; CI 1.78–4.45) compared to being never married were risk for HIV infection (39). EDHS 2016 finding also showed only 0.3% of women and men who have never been married are HIV positive, compared with 11.5% of women and men who are widowed, 2.9% of those who are divorced or separated(3). In contrast to our finding study done in Addis Ababa among ART attendee showed married respondents were more likely engaging in risky sexual practices as compared with single and widowed respondents(40).This may be due to different in design of study.

The result indicated that educational status had significant association with HIV infection. Those who were at elementary (AOR 5.032 CI;1.83-13.7) and college or university level (AOR 4.96 CI;1.65-14.8) had more likely to be HIV infected than illiterates. This may be due to those educated are make movement in urban to search work which make them at risk of HIV infection. Study conducted in Kenya also showed illiterate had less chance than literate to be HIV infected(27). Study in Malawi also revealed those people who attend primary school were 1.67 more likely to be HIV infected than illiterates(41). But study in in Uganda showed Never having attended school was associated 2.46 likely to be exposed than who attend schools(42).

Sexual and reproductive tract infections have been consistently shown to be associated with HIV acquisition. In this study those who had STD were 4.432 likely at risk of HIV infection when compared to those who don't had STD. Study conducted in Tanzania and south Africa also showed that having STI was increase likely would of HIV infection. Having STI associated with twice the likelihood of HIV infection compared with those reporting not having an STI (43,44).

Among PLWHA, alcohol use was significantly associated with unprotected sex. Increase in number of place for substance abuse like Alcohol, chat, shisha increased vulnerability of population for risky sexual behavior in different urban of Ethiopia (26,38). Finding of our study showed substance use was significantly associated with HIV infection. Odds of substance abuse were 2.4(95%CI 1.035,5.543) times higher among case-patients than controls. Similarly, two studies conducted in Addis Ababa showed that those who consumed alcohol were two times more likely to have risky sexual practice than those who did not use alcohol(40). This may be as result of substance abuse decrease self-control prevent person to negotiate for safer sex.

Multiple Sexual Partners is one of risky sexual behavior for the spread of HIV. In our study 21(21.4%) of cases and 9(4.6%) of controls were had affair in last one year. Individuals who had other sexual partner were 3.171(95%CI 1.531,6.566) likely to had HIV infection than those who have one sexual partner. Further analysis of nationally representative surveys from Ethiopia EDHS 2016 and 2011 also showed the lifetime number of sex partners to be one of the main predictors of HIV sero positivity. Study conducted in 31 African countries showed in all countries except Malawi and Zimbabwe, over 20 percent of HIV-positive men who had sex in the last 12 months had multiple sex partners(10).

Those who reported no condom use had 3.73(95%CI 1.516,9.215) times likely to had HIV infection than those who used a condom. In this study 30.4% had a history of risky sexual practice, which was inconsistent condom use in the last three months prior to the study period This result is consistent with the results of the study conducted in South Africa and Kenya, which had a prevalence of 30% and 28%, respectively. Condoms have been a central part of the HIV prevention programme in Ethiopia since the beginning of the response to the HIV epidemic(6). Condom use at last sexual intercourse among these adults with a non-regular and non-cohabiting partner in the past 12 months was 20 percent and 51 percent for women and men respectively in 2016 of EDHS(17). Another study conducted in Dares Salaam, Tanzania, showed that the prevalence of unprotected sex was around 40%(40). 31% of HIV sero-negative/sero-ignorant respondents always use condoms, while only 7% of HIV infected people always used condoms(35)

Knowledge about how HIV Infection transmission and its prevention method is important for HIV infected people to prevent further transmission and for those who not infected to protect themselves from acquiring HIV. According to this study ,76 (77.6%) of HIV infected and 145 (74%) of HIV negative knew three or more of methods of HIV transmission included in the questionnaire. With regard to HIV prevention methods; 75(76.5) of the cases and 140 (71.4%) of the controls knew three or more methods of HIV prevention asked. This is better than a report by global health which showed compressive knowledge about HIV prevention in 37 countries 36% in 2016(45). This may be due their frequent visit of hospital. Ethiopian health survey result of 2016 showed 24 percent of women aged 15-24 and 39 percent of men aged 15-24 have comprehensive knowledge of HIV. About 5 in 10 women (49 percent) and 7 in 10 men (69 percent) know that both using condoms and limiting sexual intercourse to one uninfected partner are means of preventing HIV(17).

Limitation

This study has some limitations. Self-reported data may be subject to biases such as social desirability or recall bias. To decrease this training was given for data collectors. In addition, updated HIV result was not obtained for controls. As much as possible Patients whose result was recently known and those physicians decide there was no need to do test again was included

7. Conclusion

Based on the study the following conclusions are made; risk factors associated with HIV infection includes different sociodemographic and risky behavioral factors. In this study being in town, educational status at elementary and at college and above, having more than one sexual partner, having frequent STI and substance abuse were risk factors associated with HIV infection for HIV positive patients when compared with HIV negative patients. It was anticipated that knowledge of HIV would have been significantly higher in the HIV negative group than in the HIV positive group. But in this study it shows there is no significant difference. Significant number of HIV positive had risky behavior for HIV infection transmission.

8. Recommendation

The following recommendation are forwarded based on the findings

- As significant number of HIV positives have risky behaviors Oromia regional health bureau should give focus to them to decrease HIV transmission.
- Health education given should more focus on behavioral change communication among ART providers with focus on substance abuse, condom use and faithfulness
- Screening for risky sexual behaviors and providing education on safer sex practices is important.
- HAPCO should focus on secondary prevention strategy to decrease further transmission of HIV infection.

9. References

1. Factsheet - July 2018: 2017 Global Hiv Statistics [Internet]. Available from: https://www.unaids.org/sites/default/files/media_asset/UNAIDS_FactSheet_en.pdf%0Ahttps://www.unaids.org/en/resources/fact-sheet
2. Kharsany AB, Karim QA. HIV Infection and AIDS in Sub-Saharan Africa: Current Status, Challenges and Opportunities. *Open AIDS J.* 2016;10:34–48. Published 2016 Apr 8. doi:10.2174/1874613601610010034.
3. Ethiopian Demographic and Health Survey HIV Prevalence Report 2016. 2018. <https://www.dktethiopia.org/publications/2016-ethiopian-demographic-and-health-survey-hiv-prevalence-report>.
4. Joint United Nations Programme on HIV/AIDS (UNAIDS. Ending AIDS. 2017;
5. World health organization, Global health sector strategy on HIV 2016-2021 Towards Ending AIDS. 2016.
6. Federal HIV/AIDS Prevention and Control Office. HIV Prevention in Ethiopia National Road Map.
7. Kelly JA, Kalichman SC. Behavioral Research in HIV / AIDS Primary and Secondary Prevention : Recent Advances and Future Directions. 2002;70(3):626–39.
8. Ping Du, Tonya Crook CW e t al. HIV transmission risk behaviors among people living with HIV/ AIDS: The need to integrate HIV prevention interventions and public health strategies into HIV care. *J Public Heal Manag Pr.* 2015;21(2):1–15.
9. Shuper PA, Macdonald S, Africa S, Christie S. HIV Transmission Risk Behavior Among HIV-Positive Patients Receiving Antiretroviral Therapy in KwaZulu-Natal, South Africa. *AIDS Behav.* 2014;18(8):1532–40.
10. Wang, Wenjuan, Soumya Alva, and Shanxiao Wang. 2012. HIV-related knowledge and behaviors among people living with HIV in eight high HIV prevalence countries in sub-Saharan Africa. DHS Analytical Studies No. 29. Calverton, Maryland, USA: ICF International.
11. Tadesse WB. Risky sexual practice and associated factors among HIV positive adults visiting ART clinics in public hospitals in Addis Ababa city , Ethiopia : a cross sectional study. 2019;5:4–11.

12. Engedashet E, Worku A, Tesfaye G. Unprotected sexual practice and associated factors among People Living with HIV at Ante Retroviral Therapy clinics in Debrezeit Town , Ethiopia : a cross sectional study. 2014;1–9.
13. DiClemente JLB and RJ, Rollins. Secondary HIV Prevention: Novel Intervention Approaches to Impact Populations Most at Risk. *Curr HIV/AIDS Rep.* 2015;8(4):269–76.
14. Centers for Disease Control and Prevention (CDC). Proven HIV Prevention Methods. 2016.
15. Molla AA, Gelagay AA. Risky sexual practice and associated factors among HIV positive adults attending anti- retroviral treatment clinic at Gondar University Referral Hospital , Northwest. *PLoS One.* 2017;12(3):1–12.
16. Ethiopian public health institute. HIV Related Estimates and Projections for Ethiopia. 2017.
17. Central Statistical Agency Addis Ababa E. Ethiopian Demographic and Health Survey. 2016.
18. Girum T, Wasie A, Worku A. Trend of HIV/AIDS for the last 26 years and predicting achievement of the 90-90-90 HIV prevention targets by 2020 in Ethiopia: a time series analysis. *BMC Infect Dis.* 2018;18(1):320. Published 2018 Jul 11. doi:10.1186/s12879-018-018.
19. EPHIA. Ethiopia Population-Based HIV Impact Assessment. 2018;(DECEMBER):4–7.
20. Joint United Nations Programme on HIV/AIDS (UNAIDS). Ending AIDS Progress towards the 90–90–90 targets. 2017;
21. Rutaremwa G, Agaba P, Nansubuga E, Nankinga O. Association between Risky Sexual Behaviour and having STIs or HIV among young persons aged 15-24 years in Uganda. :1–18.
22. Girum T, Wasie A, Lentiro K, Muktar E, Shumbej T, Difer M. Gender disparity in epidemiological trend of HIV / AIDS infection and treatment in Ethiopia. *Arch Public Heal.* 2018;76(51):1–10.
23. Kembo J. Risk factors associated with HIV infection among young persons aged 15 – 24 years : Evidence from an in-depth analysis of the 2005 – 06 Zimbabwe Demographic and Health Survey. *SAHARA-J J Soc Asp HIV/AIDS.* 2012;(August):37–41.
24. Sharma SK. Understanding the Factors Associated with Alcohol Use among Female Sex

- Workers in a High HIV Prevalence Northeast State of India. *J Infect Dis Treat*. 2016;2(1):1–8.
25. Daniel D. Risk Factors of HIV/AIDS Among Secondary and Preparatory School Students in Dire Dawa City, Ethiopia. *Am J Heal Res*. 2017;5(3):83.
 26. Lori A., Scott s. PW etal. Alcohol Use and Sexual Risk Behaviors among Individuals Infected with HIV: A Systematic Review and Meta-Analysis 2012 to Early 2013. *Curr HIV/AIDS Rep*. 2014;10(4):314–23.
 27. Anne W, Mary W, Donald A. Socio-Demographic Characteristics of HIV-Infected Patients at Kenyatta National Hospital (KNH) Comprehensive Care Centre (CCC), Nairobi Kenya. International.
 28. Lakew Y, Benedict S, Haile D Social determinants of HIV infection, hotspot areas and subpopulation groups in Ethiopia: evidence from the National Demographic and Health Survey in 2011 *BMJ Open* 2015;5:e008669. doi: 10.1136/bmjopen-2015-008669.
 29. Akwara PA, Madise NJ, Hinde A. Perception of risk of HIV / AIDS AND sexual behavior in Kenya. *J biosoc Sci*. 2003;385–411.
 30. Parkhurst JO. Understanding the correlations between wealth , poverty and human immunodeficiency virus infection in African countries. 2010;1–17.
 31. Aniley AB, Ayele TA, Zeleke EG, Kassa AA. Factors associated with late Human Immunodeficiency Virus (HIV) diagnosis among peoples living with it , Northwest Ethiopia : hospital based unmatched case-control study. *BMC Public Health* [Internet]. 2016;1–8. Available from: <http://dx.doi.org/10.1186/s12889-016-3727-0>
 32. Gile PP. Exploration of HIV/AIDS Related Knowledge, Attitude and Practice of University Community: The Case of Ethiopian Civil Service College. Vol. 2, Working Paper of Public Health. 2016.
 33. Hellandendu JM. Contributory Factors To the Spread of Hiv / Aids and It Impacts in Sub-Saharan African Countries. *Eur Sci J*. 2012;8(14):144–56.
 34. Kibera AW, Kuria MW, Kokonya DA. Socio-Demographic Characteristics of HIV-Infected Patients at Kenyatta National Hospital (KNH) Comprehensive Care Centre (CCC), Nairobi Kenya. *Int J Res Stud Med Heal Sci*. 2017;2(8):1–10.
 35. Gouekem J, Socpa A, Kampa BN, Ndzi N, Nkoum A, Njolo A. Differential Risky Behaviors among HIV Positive and HIV Negative People. 2017;4(1):1–7.

36. Joint United Nations Programme on HIV/AIDS. Combination HIV Prevention: Tailoring and Coordinating Biomedical, Behavioural and Structural Strategies to Reduce New HIV Infections. 2010.
37. Fisher JD. Secondary Prevention of HIV Infection: The Current State of Prevention for Positives. *Curr Opin HIV AIDS*. 2010;4(4):279–87.
38. Kaba M, Taye G, Gizaw M, Mitiku I, Adugna Z, Tesfaye A. A qualitative study of vulnerability to HIV infection : Places and persons in urban settings of Ethiopia. *Ethiop J Heal Dev*. 2016;30(3):105–12.
39. Kim AA, Parekh BS, Umuro M, Galgalo T, Bunnell R, Makokha E, et al. Identifying Risk Factors for Recent HIV Infection in Kenya Using a Recent Infection Testing Algorithm : Results from a Nationally Representative Population-Based Survey. *PLoS One*. 2016;11(5):1–21.
40. Kassahun Demissie¹ Shifera Asfaw² Lakew Abebe² Getachew Kiros. Sexual behaviors and associated factors among antiretroviral treatment attendees in Ethiopia. *HIV/AIDS - Res Palliat Care*. 2015;183–90.
41. Fabiani M, Nattabi B, Pierotti C, Ciantia F, Opio AA, Musinguzi J, et al. HIV-1 prevalence and factors associated with infection in the conflict-affected region of North Uganda. *BioMed Cent Confl Heal*. 2007;8:1–8.
42. Edelstein ZR, Santelli JS, HELLERINGER S, Schuyler AC, Wei Y, Mathur S, et al. Factors associated with incident HIV infection versus prevalent infection among youth in Rakai , Uganda. 2015;85–91.
43. Mmbaga EJ. HIV Prevalence and Associated Risk Factors : Analysis of Change over Time in Mainland Tanzania. 2013;(February).
44. Wand H, Ramjee G. Short report Biological impact of recurrent sexually transmitted infections on HIV seroconversion among women in South Africa : results from frailty models. 2015;1–6.
45. UNAIDS. Global HIV and AIDS statistics. 2017.

10. Annexes

8.1. Annex I. Consent Form

Introduction:

We are interviewing people here in East shewa zone in different health institutions for study. The purpose of this study is to identify to identify risk factors associated with HIV /AIDS to help policy makers to plan and take measures regarding health and health related problems.

Confidentiality and consent: “I am going to ask you some very personal questions. 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 question 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 risk factors associated with HIV AIDS. We would greatly appreciate your help in responding to this survey. The survey will take about 20 minutes to ask the questions.

Would you be willing to participate?

1. Yes 2. No

If you are willing to participate, please continue to respond to the interview.

Name of data collector_____ signature_____

Thank you very much for your cooperation

8.2 Annex II: Questionnaires

Questionnaires for the survey of risk factors associated with HIV/AIDS at East Shewa zone

Name of Facility_____ Questionnaire identification number_____

Test result

1. Positive

2. Negative

1. How old are you? _____Years sex_____

2. What is your religion?

1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Other (specify

3. Where is your permanent residence?

1. Rural 2. Town

4. Have you ever married?

1. Yes 2. No

5. What is your current marital status?

1. Never married 2. Married 3. Divorced 4. Widowed

6. What is the highest education level you have attained?

1. Illiterate 2. Read and write 3. Grade 1-8th

4. Grade 9-12th 5. College or university graduate-----

7. What is your occupation?

1. House wife 2. Private business 3. Government employee

4. Non-government employee 5. Daily laborer

6. Other (specify) -----

8. How much you get monthly?_____

9. Where is your work place?

1. inside the town 2. Outside the town

10. How often do you usually be away from home for work or for any other reason?

- 1. At least once in a week 2. At least once in a month
- 3. At least once in 3 months 4. At least once in 6 months
- 5. Occasionally 6. Never

11. Where is your husband's/wife's work place?

- 1. inside the town 2. Outside the town

12. How often does your husband/wife usually be away from home for work or for any other reason?

- 1. At least once in a week 2. At least once in a month
- 3. At least once in 3 months 4. At least once in 6 months
- 5. Occasionally 6. Never

13. Does your husband have another marital relationship?

- 1. Yes 2. No 3. I don't know

14. With whom did you have first time sexual intercourse?

- 1. Wife 2. Commercial sex worker 3. Casual partner
- 4. Regular partner 5. Other

15. During your stay in the town have you ever use the following substance?

- 1. Chew Khat 2. Drink Alcohol 3. Shisha 4. Injectable drugs
- 5. Use other substances (specify)_____

16. Have you ever had STD over the past one year?

- 1. Yes 2. No

If yes, what was the sign of the illness?

- 1. Urethral discharge 2. Urethral ulcer
- 3. Swelling on the groin 4. Others

17. Have you tested for HIV in last one year?

- 1. Yes 2. No

18. If yes where were you tested when you first discovered your sero status?

1. In government health facility 2. Private clinic
 2. Other (specify)_____
19. By which HIV counseling and testing approach was you tested
1. VCT 2. PIHCT
 3. Other (Specify_____)
20. How do you think you acquired HIV AIDS? (For HIV Negative)
1. Unprotected sex 2. Sharp material injury 3. Blood transfusion 4. other
21. What is HIV Sero- status of your sexual partner(s)?
1. Positive 2. Negative 3. I don't know
22. Have you disclosed your sero status to your sexual partner? (for HIV positive)
1. Yes 2. No
23. Have you had sexual affair other than your husband/wife?
1. Yes 2. No 3. Do not know
24. Was this sexual affair within the last 12 months?
1. Yes 2. No
25. With whom do you usually practice sex?
1. Drivers 2. Government employees
 3. Merchants 4. Students
 5. Soldiers 6. Farmers 7. Others
26. Have you used condom in all occasion?
1. Yes 2. No
27. What is/are the HIV sero status of the person/s with whom you had sex in the last one year?
1. Negative 2. Positive 3. Not known (more than one answer are possible)
28. Did you use condom in the last three months?
1. Yes 2. No
29. If yes, how often you used condom?
1. Always 2. Almost always (more than half)

3. Sometimes (Half) 4. Almost never

30. What prevention methods of HIV/AIDS do you use? (More than one answer is possible)

A. Abstinence B. Faithful C. Using condom

D. sterilization of materials contaminated with blood and other body fluids

E. Others

1. Torabanitti yeroo tokko 2. Ji'atti yeroo tokko 3.Ji'aa jahatti yeroo tokko 5. Darbee darbee 6. Konkummaa

11. Abbaan mana kee eessaa hojjata? 1.Magaala kessa 2.Magaalan ala

12. Abbaan mana kee manan ala sababa hojiif ykn dhimma biraf bahe hangam tura?

1. Torabanitti yeroo tokko 2. Ji'atti yeroo tokko 3.Ji'aa jahatti yeroo tokko 5.Darbee darbee 6. Konkummaa

13.Abbaan mana kee sii malee nama biroo bira ni dhaqaa?

1.Eeyyeen 2.Lakki

14. Yeroo jalqabaf walqunamtti saala enyuu waliin gootee?

1. Haadha warra koo wajjiin 2.Warra mana buna wajjiin 3.Hiriyaa koo yeroo wajjiin 4.Hiriyaa koo dhaabbata wajjiin

15. Yeroo magaala turtu kanneen gadii kessa kam fayyaadamta?

1.Caatti/Jimmaa 2. Alkoollii 3.Sigaaraa 4.Shiishaa 5.kan biroo

16. Waggaa darbee kessa dhukkuboota saalan daddarban sirratti mul'ate bekaa?

1. Eeyeen 2. Lakki

Yoo eeyyeen jette kaneen kessa kamii?

1. Dhangala'a qaama hormaata ya'uu 3.hoksiisuu

3.dhitta qaama hormata 4. Kan biroo(ibsi)

17. Waggaa darbee HIV qoraatamte? 1.eeyyee 2.Lakki

18. Yoo qooratamte essatti qoraatamte?

1.Fedhiin iddoo qorrannoo deemuun 2.yaaala biroof mana yaala deeme 3. Kan biroof(ibsi)

19.HIV/AIDSiin akkamin nama qaba jette yaada?

20. Hiriya kee bu'aan qorraannoo dhigaa isaa maalii?

1. Positivaa 2. Negaativaa 3. Hin beekuu

22. Bu'aa qorraannoo kee hiriya kettif ibsitte jirta?

1. Eeyyeen 2. Lakki

23. Yeroo bay'ee walqunnamti saala eenyuu wajjiin tasiftaa?

1. Konkolachistoota 2. Hojjaatoota motummaa 3. Daldaaltoota 4. Baratoota 5. Rayyaa warana/poolissii 6. Qonnaa bultoota 7. Kan biroo(ibsi)

24. Yeroo hundaa kondomii fayyaadamtee jirta?

1. Eeyyeen 2. Lakki

25. Qorraannon dhigaa nama wajjiin walqunnamti saala waggaa darbee kessa gote bu'an isaa maal fakkaata?

1. Negaativaa 2. Positivaa 3. Hin beekuu

26. Ji'oota darban sadeen kessa kondomii fayyaadaamte?

1. Eyyeen 2. Lakkii

27. Eeyyen yoo jette kondomii hangam fayyaadamta?

1. Yeroo hundaa 2. Yeroo bay'ee 3. Darbee darbee 4. Yeroo muraasa.

28. Karaalee daddarbuu HIV/AIDS ittisan kessa kam fayyadamta?

1. Of dangessu 2. Waliif ammanamamu 3. Kondoomii fayyaadamu 4. Kan biro 5. omaa