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**Kolla Shell Health Centre, Gamo  
Gofa Zone, Southern Ethiopia**

# **HIV/AIDS**

## **Appraisal of Prevalence**

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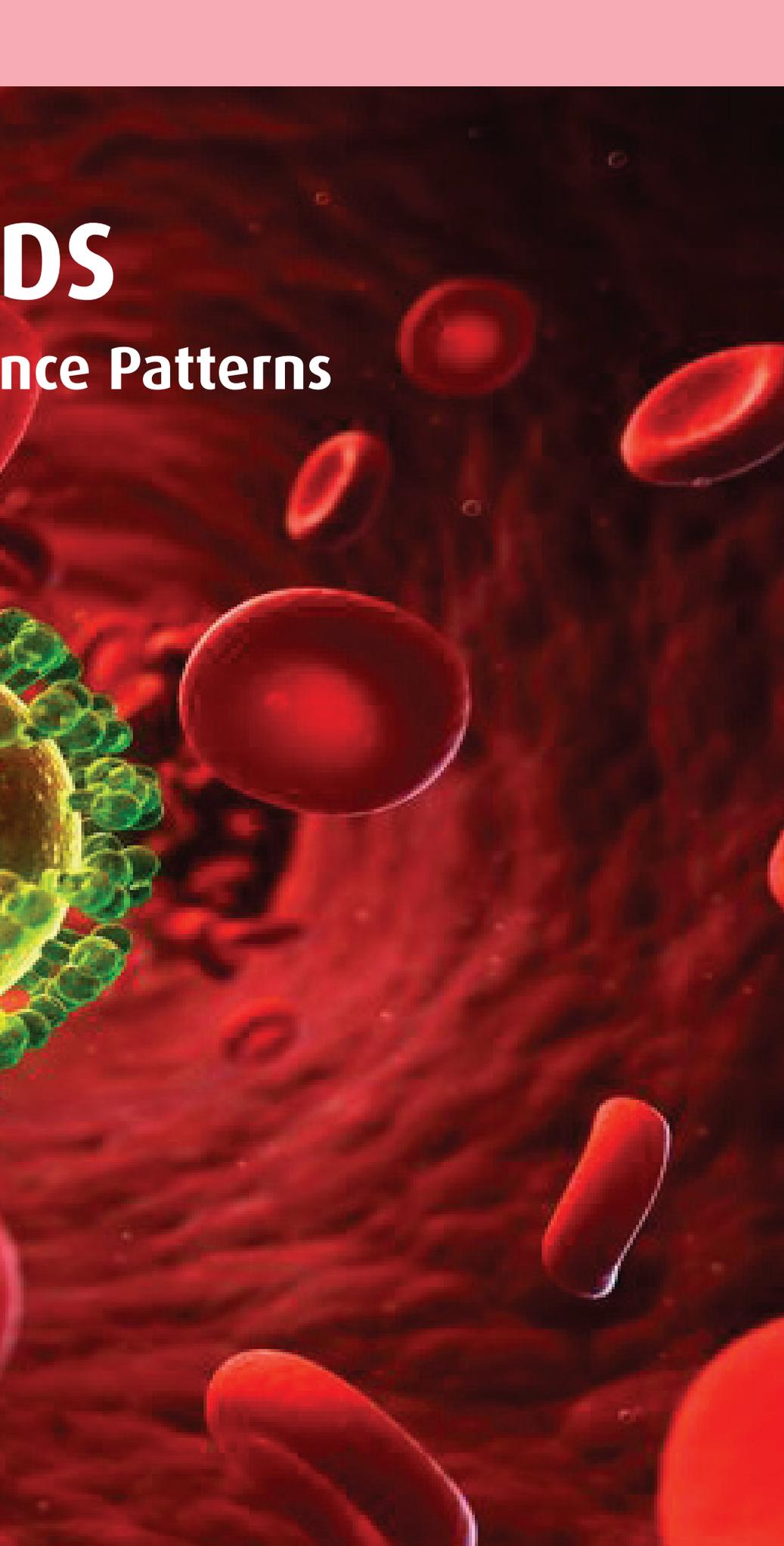
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## Prevalence Patterns

A microscopic view of blood cells, including several red blood cells and a green, spherical virus particle with a textured surface, set against a dark red background.

### BACKGROUND

Worldwide HIV/AIDS has created an enormous challenge to the survival of mankind. Since its discovery, the virus has caused serious health disorders that have resulted in lost lives across the African continent. All regions of the world have been affected by the HIV epidemic; sub-Saharan Africa has the largest portion of victims compared to the rest of the world. Ethiopia is one of the sub-Saharan Africa countries that is hard hit by the HIV pandemic. The aim of this study is to assess the five years HIV/AIDS prevalence in Kola Shell.

### METHODS

Descriptive analysis of the prevalence study was conducted among the study population, which was HIV/AIDS infected individuals registered from September 2012 up to 2016. Secondary data were collected from February to March 2017 at Kola Shell Health Centre. The data were collected using structured data abstraction form. Data were entered into Excel-Windows version 2013 for analysis. All the collected data for each of the five consecutive years were analysed with average and percentage. The study evaluated the prevalence of the disease and the significantly affected age and sex groups. Additionally, the Ethiopian Demographic and Health Survey (EDHS) (2005, 2011) prevalence data were used.

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## RESULTS

The number of HIV infected individuals was highest in 2015, followed by 2016 and 2014 (25, 22 and 21 respectively). The percentage comparison shows that the female to male ratio of infection was 70:30 from 2012 to 2016. The average number of HIV infections was 5 for males and 13 for females. The majority of the people (57%) that live with the HIV virus were in their productive age (15–49) among both males and females. Type-1 HIV was the most infectious virus, and responsible for the largest number (90.4%) of HIV/AIDS infections and deaths among patients within the adolescent age groups.

## CONCLUSION

This study has shown that the prevalence of HIV/AIDS was more among females than males and common in the productive age groups (15–49). In addition, Type-1 HIV was the most infectious virus.

## KEYWORDS

Prevalence; HIV/AIDS; Type-1 HIV

## BIOGRAPHY

**Nuredin Nassir Azmach** has been a senior statistician and lecturer at the Department of Statistics at Arba Minch University, Ethiopia since 2011. He received his MPH in Epidemiology and Biostatistics from Arba Minch University in 2015. He has been a frequent participant in the Supportive and Independent Monitoring Program on Neglected Tropical Disease among Soil-transmitted helminths and Schistosomiasis at the Ethiopian National School Based Deworming Program since 2015. He is also a participant in health related research works. Nuredin currently lives in Ethiopia.

**A**cquired Immune Deficiency Syndrome (AIDS) is one of the major health disasters that compromise the immune system of the human body, making it easily susceptible to different types of opportunistic infections (Joint United Nations Program on HIV/AIDS, 2014; World Health Organization, 2014). It is a global epidemic that is caused by the Human Immunodeficiency Virus (HIV), a type of retrovirus that infects white blood cells including T-helper cell and macrophages (Joint United Nations Program on HIV/AIDS, 2014; World Health Organization, 2014; World Health Organization, 2011).

Worldwide, HIV/AIDS has created an enormous challenge to the survival of mankind. Since its discovery, the virus has caused serious health problems, particularly on productive human resources and livelihoods across the globe. All regions of the world have been affected by the HIV epidemic (Antiretroviral Drugs, 2017; Braitstein et al., 2011). Although the epidemic is global, there is a remarkable regional variation in its distribution. Some regions are highly affected by the epidemic as compared to other regions. Sub-Saharan Africa is one of the most affected regions where HIV/AIDS is more widely spread than other parts of the world. It is the region where the highest number of victims of HIV/AIDS is found (Palella et al., 1998; Musumari et al., 2014; Edimo et al., 1996).

Similarly, East and Southern Africa are the regions most affected by HIV. This area represents 6.2% of the world's population with 19 million people living with HIV (over 50% of the total number of people living with HIV in the world) (Joint United Nations Program on HIV/AIDS, 2014; World Health Organization, 2011). In 2016, in sub-Saharan Africa, nearly 1 in every 25 adults (4.2%) were living with HIV, accounting for nearly two-thirds of the people living with HIV worldwide (Joint United Nations Program on HIV/AIDS, 2014; World Health Organization, 2011). Furthermore, South Africa accounted for 40% of the region's new infections in 2015, with another 50% occurring in eight countries: Ethiopia, Kenya, Malawi, Mozambique, Uganda, the United Republic of Tanzania (Tanzania), Zambia and Zimbabwe (Joint United Nations Program on HIV/AIDS, 2016).

There are various interventions to prevent HIV/AIDS: condom distributions, behavioural change programmes, creating community awareness, and blood supply safety. To reduce deaths related with HIV/AIDS, the use of antiretroviral drugs (ARV) was introduced in the United States as a combination therapy in 1996; the drugs were used to achieve maximal and durable reduction in plasma viral load and restoration of immunological function (Palella et al., 1998; Ethiopian Ministry of Health, 2017). However, with the provision of antiretroviral therapy (ART), HIV/AIDS is becoming a chronic manageable disease (Sahay et al., 2011). As a result, adherence to HIV medication is extremely important, but a variety of other factors may complicate ART adherence; this needs devotion from patients, provisions of health services and health care professionals, and having social support from society (Wasti et al., 2012). In addition, gender difference affects the adherence states of HIV patients (Azmach, 2017); also nutrition and environment variations affect the effectiveness of ARVs (Hamza, 2017).

Ethiopia is one of the sub-Saharan Africa countries affected by the HIV pandemic. A large number (over 600,000 individuals) of infected people have been living with HIV (Management of HIV/AIDS, 2012). The country accounts for a huge number of cases at the regional level (Mehret and Khodakevich, 1990). The rate of infection of the epidemic is still increasing in many countries of the world. It is a major development concern in many countries, including Ethiopia, and is destroying lives and livelihoods (Ledergerber and PLATO collaboration, 2004). The number of people living with HIV/AIDS (PLWHA) is growing substantially from year to year in Ethiopia; for instance, from 2013 up to 2017 it increased by 9,367 individuals (Smyth et al., 2012).

The prevalence rate in Ethiopia varies across the country every year in each region. A trend analysis carried out for the country from 1982–2011 shows a continuous gradual rise of the HIV/AIDS prevalence rate until the late 1990s, and then a steady decline in the years after 2000. The national adult HIV prevalence rate was estimated at 0.2% in 1985, increasing to 3.2% in 1995 and reducing to 1.4% in 2005 (Central Statistical Authority and ORC Macro, 2005). However, according to the Ethiopian Demographic and Health Survey (EDHS) report, in 2011 the prevalence rate showed a slight increase as compared to the 2005 EDHS 2008 report. According to this report, the prevalence rate of women and men in the age group 15–49 was 1.5%. A very recent report revealed that, currently, the prevalence rate was estimated to be 1.9% for women and 1% for men (Central Statistical Authority and ORC Macro, 2012).

Despite the impact and consequence of HIV/AIDS, the number of PLWHA in Ethiopia is growing substantially due to lack of prevention and information. Studies were not conducted on the prevalence of HIV/AIDS at Kola Shell Health Centre. Therefore, the aim of this study was to assess the prevalence of HIV/AIDS for the past five consecutive years in Kolla Shell Health Centre, Gamo Gofa Zone, Southern Ethiopia. Additionally, the EDHS (2005, 2011) HIV prevalence data by age and sex were included.

## METHODS

### Description of the Study Area

The study was conducted in Kola Shell Health Centre, which is found in Kolla Shell kebele, Arba Minch Zuria woreda, Gamo Gofa zone, Southern Ethiopia. Arba Minch town is the capital city of Gamo Gofa zone and 505km away from Addis Ababa, the capital city of Ethiopia. Kolla Shell kebele is among the pastoral communities in Arba Minch Zuria woreda, a rural populated area 27km away from Arba Minch town. It is at an elevation of between 1,300 to 1,500 metres above mean sea level, and has a land area of about 1,537 hectares. The climate of the kebele is classified into 'Kola' hot weather type, with a total population of 9,608, out of which 51% are females and 49% are males.

## BIOGRAPHY CONT.

**Temam Abrar** has been a Senior Biotechnologist and Assistant Professor at the Department of Biotechnology at the College of Natural Sciences, Arba Minch University, Ethiopia since 2010. He received his MSc in Biotechnology from Arba Minch University in 2014. He has been a frequent participant in national and international workshops and symposia on the topic of agricultural biotechnology, particularly in the commercialisation of plant tissue culture in Ethiopia. He has also participated in medical and environmental related international workshops and certified with those international workshops. In addition, he has assisted senior researchers in the universities. Temam currently lives in Ethiopia.

## BIOGRAPHY CONT.

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## Study Design and Period

A descriptive analysis of the prevalence study was conducted on the recorded data of the Kolla Shell Health Office from February to March, 2017.

## Source and Study Population

All HIV infected patients attending at Kolla Shell Health Centre and HIV infected individuals registered between January 2012 and December 2016 were the source and study population respectively.

## Sample Size Determination

The five year data (2012 to 2016) were used, based on the availability of well-organised data.

## Methods of Data Collection

Secondary data were collected at Kolla Shell Health Centre from HIV patients' medical records. The intended data were collected from different technical and statistical documents since 2012. The study evaluated the prevalence of the disease and the significantly affected age and sex groups. Additionally, the EDHS (2005, 2011) prevalence report among HIV patients by age and sex were used.

## Data Analysis

Data were entered into Excel-Windows version 2013 for analysis. All the collected data for each of the five consecutive years were analysed with average, percentage, tables, and graphs.

## Ethical Clearance

The study protocol was reviewed and approved by Arba Minch University Ethical Clearance Committee. A supportive letter was obtained from the Kolla Shell Health Office before data collection began.

## RESULTS

### Type-1 and Type-2 HIV Infection

According to the Kolla Shell Health Office recorded data, the highest number of infections was recorded with Type-1 HIV with the range of 90.4–100%, whereas Type-2 HIV was less prevalent than Type-1 HIV in the study area. Although in this trend the number of deaths decreased each year, the number of infections or PLWHA increased. The highest number of deaths was observed due to Type-1 HIV; this accounted for 58–78% of deaths whereas Type-2 HIV caused 22–42% percent of deaths.

### HIV Prevalence Based on Sex Groups

Table 1 show the results of HIV/AIDS trends and prevalence of the five consecutive years (2012 to 2016) based on sex distribution. The percentage comparison shows that the female to male ratio of infection was 70:30 from 2012 to 2016. The average number of HIV infections was 5 for males and 13 for females. The total number of PLWHA in Kolla Shell increased from year to year; for instance, only 6 individuals in 2012, but 25 in 2015.

# 1

HIV Prevalence from 2012–2016 among Women and Men, Kola Shell, Southern Ethiopia

# TABLE

Year	Male		Female		Total
	Frequency	%	Frequency	%	
2012	2	33.3	4	66.7	6
2013	6	40.0	9	60.0	15
2014	6	28.8	15	71.4	21
2015	7	28.0	18	72.0	25
2016	3	13.6	19	68.4	22

Source: Kolla Shell Health Center.

## HIV Prevalence Based on Age Groups

Table 2 shows HIV prevalence based on age distribution. The most HIV infected age group was the adult population (15–44 years of age), representing more than 57% in each year. This group was followed by childhood and the early child age groups, being the second and third highest infected age groups respectively. This could be due to tens of thousands of new adolescents joining Kolla Shell High School and other primary schools.

## HIV Prevalence by Age and Sex

Table 3 shows HIV prevalence by age distribution based on EDHS (2005). The total of HIV prevalence levels rise with age in the early 40s. The age patterns suggest that young women are particularly vulnerable to HIV infection compared with young men. Among women aged 15–19, 0.7% percent are HIV infected, compared with 0.1% percent of men age 15–19. High level prevalence was observed in the female age group 35–39 and male age

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HIV Prevalence from 2012–2016 among Age Category, Kolla Shell, Southern Ethiopia

TABLE

Year	Age Category (percentage)						Total
	< 15 Age		15–49 Age		> 49 Age		
	Frequency	%	Frequency	%	Frequency	%	
2012	3	50.0	3	50.0	0	0	6
2013	5	33.3	8	53.3	2	13.4	15
2014	7	33.3	12	57.2	2	9.5	21
2015	7	28.0	15	60.0	3	12.0	25
2016	8	36.4	13	59.1	1	4.5	22

Source: Kolla Shell Health Center.

3

Percentage of HIV Positive among Women Age 15–49 and Men Age 15–49 that were Tested, by Age, Ethiopia

TABLE

Age Category	Female [15–49]		Male [15–49]		Total 15–49	
	Percentage HIV Positive	Frequency	Percentage HIV Positive	Frequency	Percentage HIV Positive	Frequency
15–19	0.7	1397	0.1	1175	0.4	2572
20–29	1.7	1025	0.4	929	1.1	1954
25–29	2.1	1004	0.7	640	1.6	1645
30–34	1.5	734	1.9	664	1.7	1398
35–39	4.4	650	1.8	518	3.2	1232
40–49	3.1	487	2.8	438	3.0	925
45–49	0.8	439	0.0	376	0.5	815

Source: EDHS 2005

group 40–49, with the prevalence of 4.4% and 2.8%, respectively. HIV prevalence among women 20–24 is over three times that of men in the same age group (1.7% and 0.4%, respectively).

Table 4 shows the percentage of adults age 15–49 in Ethiopia who are infected with HIV. Among women aged 15–49, HIV prevalence is 1.9%, and among men aged 15–49 and 15–59, HIV prevalence is 1.0%. For women, HIV prevalence increases with age to a peak of 3.7% at age 30–34. High

level prevalence was observed in the female age group 30–34 and male age group 35–39, with a prevalence of 3.7% and 2.0%, respectively. For men, HIV prevalence increases from 0.0% at age 15–19 to 3.0% at age 35–39, and drops thereafter. Overall, HIV prevalence is higher for women than men in most age groups.

In addition, Figure 1 illustrates the age pattern of HIV prevalence for females and males according to the EDHS 2005 and 2011 respectively.

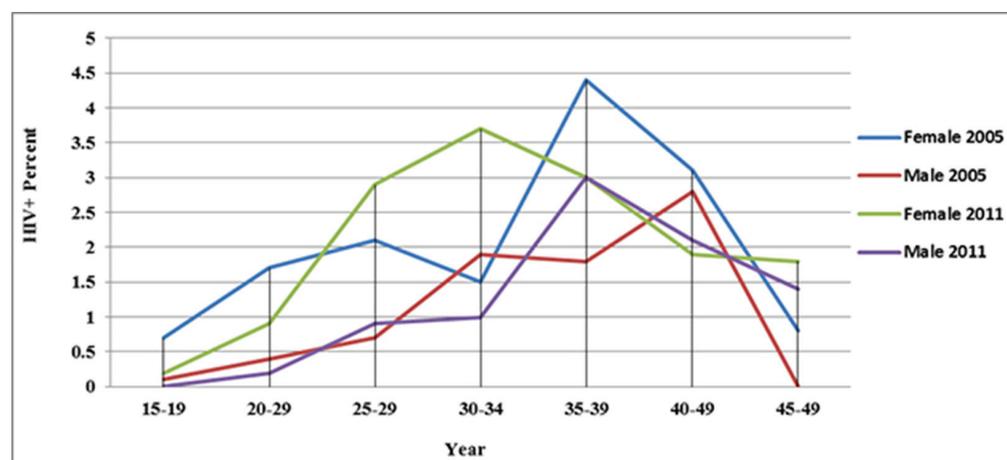
**4**

HIV Prevalence by Age: among Women Aged 15–49 and Men Aged 15–59 who were Interviewed and Tested, the Percentage HIV Positive, by Age, Ethiopia

**TABLE**

Age Category	Female [15–49]		Male [15–49]		Total 15–49	
	Percentage HIV Positive	Weighted Frequency	Percentage HIV Positive	Weighted Frequency	Percentage HIV Positive	Weighted Frequency
15–19	0.2	3584	0.0	2931	0.1	6516
20–29	0.9	2619	0.2	2280	0.6	4899
25–29	2.9	2788	0.9	2261	2.0	5049
30–34	3.7	1809	1.0	1478	2.5	3287
35–39	3.0	1714	3.0	1630	3.0	3344
40–49	1.9	1110	2.1	1093	2.0	2203

Source: EDHS 2011

**FIGURE****1**

HIV Prevalence for Women and Men Age 15–49 by Age Groups, 2005 and 2011

Source: EDHS 2005 and 2011.

## DISCUSSION

According to the results of the present study, the prevalence of HIV infection was slightly higher among females than males in the years 2011–2016, as shown in Table 1. The severity of the HIV/AIDS epidemic in sub-Saharan countries, including Ethiopia, is widely acknowledged. After the discovery of the first HIV case in 1986, the prevalence rates rose rapidly worldwide, especially in the 1990s. For instance, by the end of 2003, it was estimated that 1.7 million people in the country had already died from HIV/AIDS, and a further 1–2.3 million were living with the disease. In addition, there are around 700,000 children under the age of 17 who have lost either one or both parents as result of HIV/AIDS (UNAIDS, UNICEF, WHO, 2004). Ethiopia is classified as one of the “next wave countries” with large populations at risk from HIV infection, together with Nigeria, China, India, and Russia. This will divert the current focal point of the HIV epidemic in central and southern Africa (National Intelligence Council, 2002).

The prevalence of HIV based on age group and study period were shown in Table 2; 50%, 53.3%, 57.14%, 60%, and 59.09%, respectively, for 15–44 age group in the consecutive years 2012–2016. HIV/AIDS is a global challenge: there is remarkable regional variation. Accordingly, over 95% of HIV-infected people live in the developing world, most in Sub-Saharan Africa (Nancy et al., 2005). Many reports revealed that the adolescent age group has the highest prevalence rate of HIV compared to other age groups. In Ethiopia in recent years, children and adolescents have become increasingly exposed to HIV with an estimated 14,000 new infections in the 0–14 age group in 2003 (Ethiopia Ministry of Health, 2004). In the same year, the highest HIV infection rates were reported in Ethiopia, which occurred in the adolescent age.

In 2000, the median age for first sexual intercourse in females was 16.4 years and for men 20.3 years, indicating the relatively greater vulnerability of teenage girls to HIV infection (Central Statistical Authority and ORC Macro, 2000). In line with this,

students who live away from their family to attain primary and secondary school were more affected compared to students living with their family. This might be due to peer pressure, practicing unsafe sex, and having many sexual partners, or students may not be encouraged by their sexual partner to use a condom during sexual intercourse (Central Statistical Authority and ORC Macro, 2012). As the number of sexual partners increases, so does the likelihood of contracting HIV (Msuya et al., 2006).

The highest number of HIV infections was recorded with Type-1 HIV with a range of 90.4–100%. Type-2 HIV was less prevalent than Type-1 HIV in the study area. A relatively high number of deaths due to HIV/AIDS was observed in members of the adolescent age group, followed by childhood and the infancy age groups during the specified years. The result of this study is consistent with previous reports as Type-1 HIV is the most common case of HIV/AIDS infection and is responsible for about 90% of all HIV/AIDS cases (Braitstein et al., 2006).

The main reason why the number of female HIV patients exceeds that of male patients was believed to be due to the fact that the number of females in the population of the town is more than the number of males, and females have more exposure to HIV/AIDS than males. The increasing number of PLWHA might be mainly due to poor prevention efforts; a number of patients told us that less attention and effort was given to prevent the disease based on verbal communication.

The findings of the study indicate that the female-to-male infection ratio was 2.7, which is higher than the results from EDHS 2005. The 2005 EDHS results indicate that 1.4% of Ethiopian adults age 15–49 are infected with HIV (Figure 3). HIV prevalence in women is nearly 2%, while for men 15–49, it is just under 1%. Gender differences in infection levels reflect the fact that biological factors make women more susceptible to the risk of infection. They also relate to the fact that women both initiate sexual activity and marry at a much younger age

than men (Central Statistical Authority and ORC Macro, 2005). The EDHS 2011 results indicate that the overall adult HIV prevalence in Ethiopia has remained low. The HIV prevalence among adults age 15–49 is 1.5% (confidence interval 1.2–1.7%), and it was 1.4% (confidence interval 1.1–1.8%) in the 2005 EDHS (Central Statistical Authority and ORC Macro, 2012).

### Public Health Significance

The assessment of HIV/AIDS prevalence will enable the identification of the level of its distribution regarding to age and sex. The study will also be supportive for programme managers, researchers, and policy and decision makers working in the HIV/AIDS area for proper designing and planning. The present study revealed that all health stakeholders should have to feel responsible about the increasing number of HIV/AIDS infections and the number of deaths due to AIDS in the study area. In addition, necessary orientation and education about the impact of HIV/AIDS should be promoted among the new incoming students to strengthen their awareness and knowledge about HIV preventive methods.

### CONCLUSIONS

The number of HIV/AIDS infections significantly increased from 2012 up to 2016. This may be due to a lack of awareness about prevention in the community where the study was conducted. This study has shown that the prevalence of HIV/AIDS was more among females than males. Adolescents were the most infected age group. Type HIV-1 was the most infectious virus responsible for the largest number of HIV/AIDS infections.

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