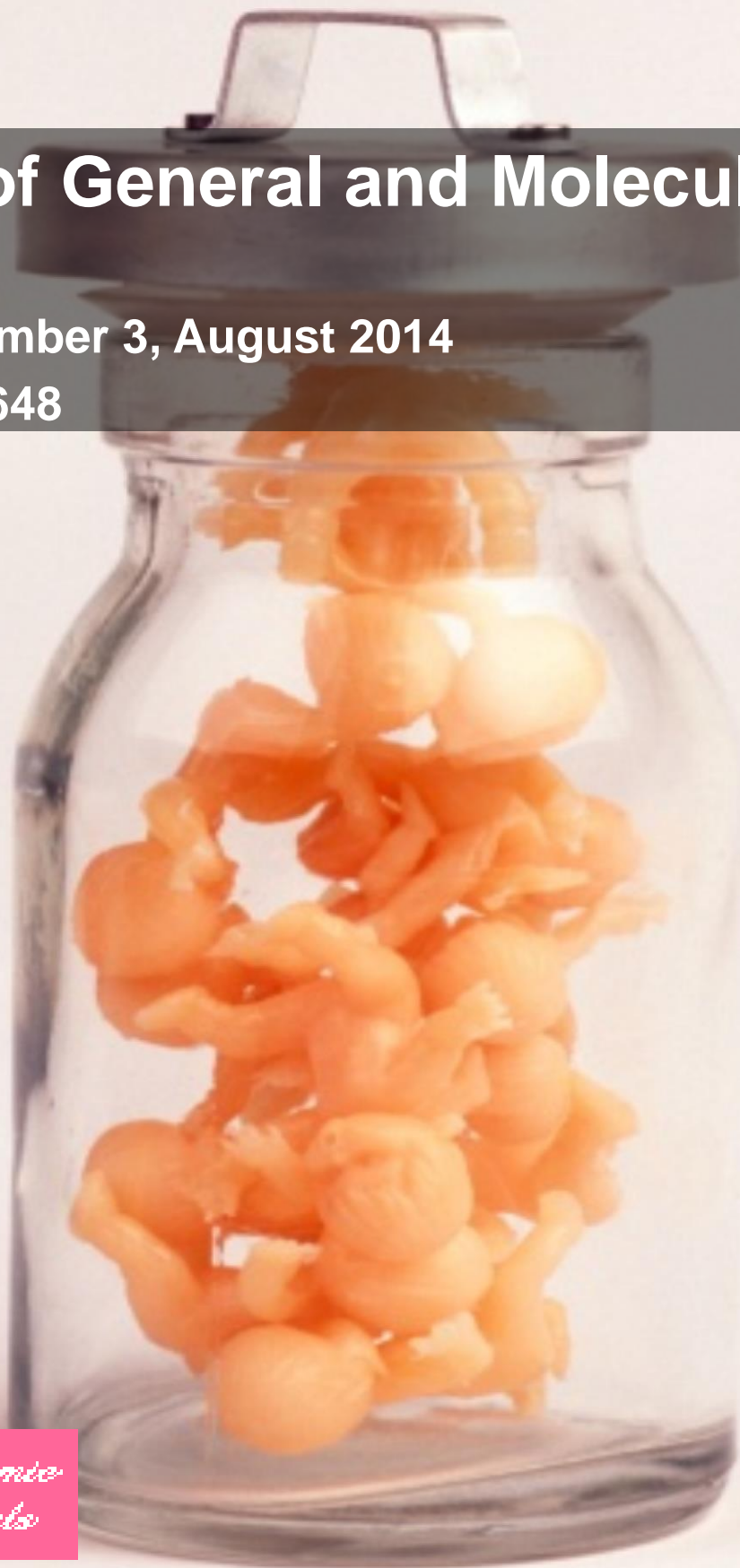


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Pitout JDD, Church DL, Gregson DB, Chow BL, McCracken M, Mulvey M, Laupland KB (2007). Molecular epidemiology of CTXM-producing *Escherichia coli* in the Calgary Health Region: emergence of CTX-M-15-producing isolates. *Antimicrob. Agents Chemother.* 51: 1281-1286.

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Journal of General and Molecular Virology

Table of Contents: Volume 6 Number 3, August 2014

ARTICLES

**Assessment Of The Current Status Of HIV Virus And Predisposing Factors
Among Students At Dilla University And Dilla Referral Hospital, Ethiopia**
Fekadu Alemu

Full Length Research Paper

Assessment of the current status of HIV virus and predisposing factors among students at Dilla University and Dilla Referral Hospital, Ethiopia

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Acquired immunodeficiency syndrome (AIDS) cannot be transmitted by causal contact, air, food and water. People with acquired immunodeficiency syndrome have human immunodeficiency virus in their blood and body fluids that can enter the blood stream of an uninfected person upon contact with infected body fluids or sexual contact with an infected person. Primary data was collected by using structured questionnaire, interviewing and reviewing secondary data from Dilla Referral Hospital. Majority of students 137 (67.15%) had an idea on HIV virus that it is not curable and a deadly killer disease while 36 (17.64%) had an idea on HIV that it is curable. Majority of students (158, 77.46%) had discussed about HIV/AIDS with other people. Accordingly to the information in the questionnaire by the Dilla University students, most of the students (96.00%) had heard about HIV/AIDS. Majority of students heard and got information about HIV from mass media followed by health center, books, and combination of all lists, parents and friends: 46.00, 18.00, 12.00, 10.00, 6.00 and 2.00%, respectively. According to the secondary data obtained from Dilla Referral Hospital, the majority of the people that live with HIV virus were of the productive age (15-49 age) group in both male and female. Among these the number of female infected with HIV were higher than for male: 42.63, 44.35, 37.76, 44.37, 42.70, 37.62 and 40.40%, and 49.38, 52.17, 46.90, 44.70, 44.32, 52.47 and 39.40%, respectively for each year from 2008-2014. Therefore, HIV virus prevalence among Dilla Referral Hospital patients was on the decrease, and the students of Dilla University were very aware of HIV from well gathered information from different sources and also discussed with their partners.

Key words: Dilla University, human immunodeficiency virus (HIV), prevalence, sexual, students.

INTRODUCTION

Immunodeficiency syndrome (AIDS) caused by the human immunodeficiency virus (HIV) is one of the greatest public health and social problems threatening the human race. Globally, AIDS is now the fourth leading

cause of mortality; 3.1 million deaths have been attributable to AIDS in 2002 alone, of which 1.2 million occurred in women (Nancy et al., 2005). According to the Joint UN Committee on HIV/AIDS (UNAIDS, 2004), an

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estimated 38 million people worldwide were living with HIV in 2003, of which 5 million were newly infected. More than 95% of HIV-infected people live in the developing world, most in Sub-Saharan Africa (Nancy et al., 2005). Worldwide, women now represent 50% of all adults living with HIV and AIDS and this proportion had increased over time (UNAIDS, 2002). Improved data have revealed that the prevalence rates in southern Africa are staggering: 20-26% of adults (aged 15-49 years) are infected; in some regions 20-50% of pregnant women were infected and are likely to transmit infection to one third of their offspring (Nancy et al., 2005).

Epidemiologic studies have demonstrated that HIV is transmitted by three primary routes: sexual, parenteral (blood-borne), and perinatal (Nancy et al., 2005). Factors that increase the risk of exposure to blood, such as genital ulcer disease (Cameron et al., 1989; Plummer et al., 1991), trauma during sexual contact (Marmor et al., 1986), and menstruation of an HIV-infected woman during sexual contact (European Study Group, 1992; Nair et al., 1993; St Louis et al., 1993) may all increase the risk of transmission. Sexual transmission of HIV from an infected partner to a non-infected partner can occur through male-to-female, female-to-male, male-to-male, and female-to-female sexual contact. Worldwide, sexual transmission of HIV is the predominant mode of transmission (Quinn, 1996).

The first step in infection is HIV binding to target cells, followed by its transportation to regional lymph nodes, where it replicates and establishes a productive and permanent infection. In the last few years it has been demonstrated that in the early phases of infection, HIV preferentially targets $CCR5^+ CD4^+$ memory T lymphocytes in the gastrointestinal tract (Brenchley et al., 2004). This results in a rapid, massive and possibly permanent destruction of CD4 cells, rupture of the intestinal mucosa and penetration of microbial translocation products in the systemic circulation.

HIV disrupts the proper functioning of the immune system. A weakened immune system allows the development of a number of different infections and cancers which cause illness and death in people with AIDS. HIV also infects and causes direct damage to other types of cells: for example, damage to the lining of the intestine can contribute to wasting (severe weight loss) and, damage to nerve cells can cause neurological problems (Nelson, 1988; Pomerantz, 1987; Elder and Sever, 1988).

The first documented report of HIV/AIDS case in Ethiopia was recorded in 1986 (Hladik, 2005). The HIV/AIDS epidemics have since evolved into a generalized epidemic with AIDS as the leading cause of morbidity and mortality among adults. Ethiopia has just over 1% of the world's population but contributes to 7% of the world's HIV/AIDS cases (World Bank, 2004). In terms of the number of people infected with HIV, Ethiopia is the fifth rank after South Africa, Nigeria, Kenya and Zimba-

bwe, and it is the second (after Nigeria) in terms of the number of children orphaned by the AIDS epidemic. More than 90% of the infections in Ethiopia takes place among aged ranges between 15 to 49; the most economically productive segment of the population. The prevalence rate of HIV for 2004 was estimated 13.2% for urban areas and 2.3% for rural Ethiopia to give a national average of 3.7%. Therefore, the aim of the current study was necessary to know the current status of HIV infected individual in the study area and exploring knowledge attitude and practice among the study participants towards HIVAIDs.

MATERIALS AND METHODS

Study design, area, time and population

This study was conducted in Dilla University and Dilla Referral Hospital found in Gedeo zone in the south west of the country. Dilla is located on the main road from Addis Ababa to Nairobi. The Dilla town is 361 and 90 Km away from Addis Ababa and Hawassa town, respectively. The study was conducted with the purpose of exploring knowledge, attitude and practice of HIV among the main campus students of Dilla University and its prevalence at Dilla referral Hospital from November to July 2014.

The study employed mixed methods of quantitative and qualitative approaches for gathering information from randomly selected students from different colleges and departments at Dilla University. Around 204 students were randomly and systematically selected for interview and 50 questionnaires were distributed as well as filled by these students at Dilla University.

Method of data collection

The study utilized both published and unpublished materials. Primary data were collected through structured questionnaire and interviewing the volunteer students. Around 204 volunteer students were interviewed and 50 questionnaires were distributed and recollected after being filled by volunteer students at Dilla University. Secondary data were collected from Dilla Referral Hospital from registration documents for voluntary counseling test (VCT) of HIV Virus. The date ranged from year 2008-2014 and about 14,668 individuals were registered for voluntary counseling test of HIV Virus at Dilla Referral Hospital.

Ethical clearance

The study protocol was reviewed and ethically approved by Dilla University ethical and clearance committee. Before data collection, an informed consent was obtained from respondents. The confidentiality of the respondents was maintained.

Data analysis

Data entry and analysis was performed using the statistical package for Social Sciences for Windows SPSS (version 16.0). For analysis of the percentage and total HIV infected individuals tested at Dilla Referral Hospital, the results were expressed graphically and as tables.

Table 1. Students' response to the following interviews at Dilla University, Ethiopia at 2014.

Type of question to the student (interview question)	Way of answering the interview question	Sex	
		Male (n,%)	Female (n,%)
What do you know about HIV/AIDS?	Not curable	73 (35.78)	64 (31.37)
	Curable	16 (7.84)	20 (9.80)
	From super natural power	18 (8.82)	13 (6.37)
Do you think that using condom can prevent the transmission of HIV/AIDS?	Yes	92 (55.09)	73 (35.78)
	No	15 (7.35)	24 (11.76)
Do you agree that a student member, who has HIV virus in his/her blood should be isolated from others?	Agree	7 (3.43)	6 (2.94)
	Disagree	100 (49.02)	91(44.61)
Do you agree that a student member, who has HIV in his/her blood should keep his/her status secret to other student?	Agree	15 (7.35)	9 (4.41)
	Disagree	92 (45.10)	88 (43.14)
Did you discuss about HIV/AIDS with other people?	Yes	83 (40.69)	75 (36.77)
	No	24 (11.76)	22 (10.78)
If your answer to above question is yes, with whom did you discuss?	Friends	50 (31.65)	35 (22.15)
	Anti-HIV/AIDS	12 (7.59)	16 (10.13)
	Parents	11 (6.97)	10 (6.33)
	Health profession	5 (3.16)	7 (4.43)
	Teachers	5 (3.16)	7 (4.43)
Have you ever tested for HIV?	Yes	82 (40.20)	70 (34.31)
	No	25 (12.25)	27 (13.24)

N, number of respondents;% percentage.

RESULT

Socio-demographic data

This study was conducted between January and June 2014. Two hundred and four respondents participated. All of them responded to the structured questionnaire on the knowledge, attitude and behavior related variables of the assessment. The number of voluntary counselling and test (VCT) individuals for HIV Virus in Dilla Referral Hospital in 2008, 2009, 2010, 2011, 2012, 2013, 2014 was 2698, 2602, 2594, 2045, 1761, 1638, 1330, respectively. The number of HIV positive individual in 2008, 2009, 2010, 2011, 2012, 2013 and 2014 were 401, 345, 339, 302, 185, 202 and, 99 accordingly.

Interview and questionnaires results

Table 1 shows that the majority of students (137, 67.15%) were of the idea that HIV virus was not curable or is deadly disease while (36, 17.64%) had an idea that, HIV is curable. Similarly some students were of the idea that, HIV patients were cured by faith (the power of God)

(31, 15.19%) if they believed in a super natural power as indicated in Table 1. As indicated in Table 1 the majority of students (100, 49.02%) male and (91, 44.61%) female did not believe in isolating HIV positive individuals while a small minority (7, 3.43%) male and (6, 2.94%) female believed in isolating those HIV positive individuals.

As shown in the Table 1, the majority of students (158, 77.46%) responded that, they discussed about HIV/AIDS with other people. They discussed it with their friends, parents, at anti HIV/AIDS club, health professionals and teachers with 53.80, 17.72, 13.30, 7.59 and 7.59%, respectively. As shown in the Table 1, 40.20% male and 34.31% female students had been tested for HIV virus counseling while 12.25% male and 13.24% female students did not attempt the test.

Distributed questionnaires to the students of Dilla University in Main Campus during 2014

The questionnaire that was distributed to students was correctly filled out and returned by 54% male and 46%

Table 2. Students' response to the following questionnaires at Dilla University, Ethiopia at 2014.

Types of questions to the Dilla University students, Main campus	Target answered questionnaires	Sex	
		Male (n,%)	Female (n,%)
Have you heard about HIV/AIDS?	Yes	25 (50.00)	23 (46.00)
	No	2 (4.00%)	-
From where you heard about IV/AIDS?	From parents	2 (4.00)	1 (2.00)
	From friends	1 (2.00)	1 (2.00)
	From health center	5 (10.00)	4 (8.00)
	From mass media	10 (20.00)	13 (26.00)
	From books	4 (8.00)	2 (4.00)
	From all the above	3 (6.00)	2 (4.00)
Knowledge about routs of HIV transmission	Unprotected sexual intercourse	19 (38.00)	20 (40.00)
	From infected mother to child	5 (10.00)	1 (2.00)
	Using sharp materials with others	2 (4.00)	2 (4.00)
	Through the bite of insect	1 (2.00)	-
Knowledge about HIV prevention method	Abstinence	11 (22.00)	13 (26.00)
	Condom	6 (12.00)	4 (8.00)
	Faithfulness	9 (18.00)	1 (2.00)
	I do not use any methods	1 (2.00)	5 (10.00)
Have you ever had sexual intercourse	Yes	16 (32.00)	8 (16.00)
	No	11 (22.00)	15 (30.00)
If your answer to question above is yes, with whom did you have sexual intercourse?	With my partner (husband or wife)	3 (12.50)	-
	With my beloved friend	13 (54.17)	8 (33.33)
	With prostitute	-	-
If your answer to questions above is yes, with how many people did you have casual sex?	Single person	12 (50.00)	5 (20.83)
	Two person	3 (12.50)	1 (4.17)
	Three and more	1 (4.17)	2 (8.33)
If your answer to question above is yes, did you use a condom during sexual intercourse?	Yes	9 (37.50)	5 (20.53)
	No	7 (29.17)	3 (12.50)
Have you ever used sharp materials with others?	Yes	1 (2.00)	2 (4.00)
	No	18 (36.00)	16 (32.00)
	Some times	5 (10.00)	2 (4.00)
	I don't remember	3 (6.00)	3 (6.00)

No, Number.

female. Most of the students (96.00%) has heard about HIV/AIDS whereas (4.00%) student respondents had never heard about HIV virus. As indicated in Table 2 the majority of students believed that the major route of HIV transmission was unprotected sex, from infected mothers to child, sharing sharp materials with other and through bite of insect: 78.00, 12.00, 8.00 and 2.00% respectively. On the other hand, our data further revealed that while,

abstinence/ faithfulness and using a condom (48.00 and 20.00%) were thought of as majority ways of HIV prevention mechanisms and approaches, a few did not use any method.

Majority of students (about 70.83%) had sexual intercourse with a single person while some (16.67%) had sexual intercourse with two persons and three or more (12.50%) respectively.

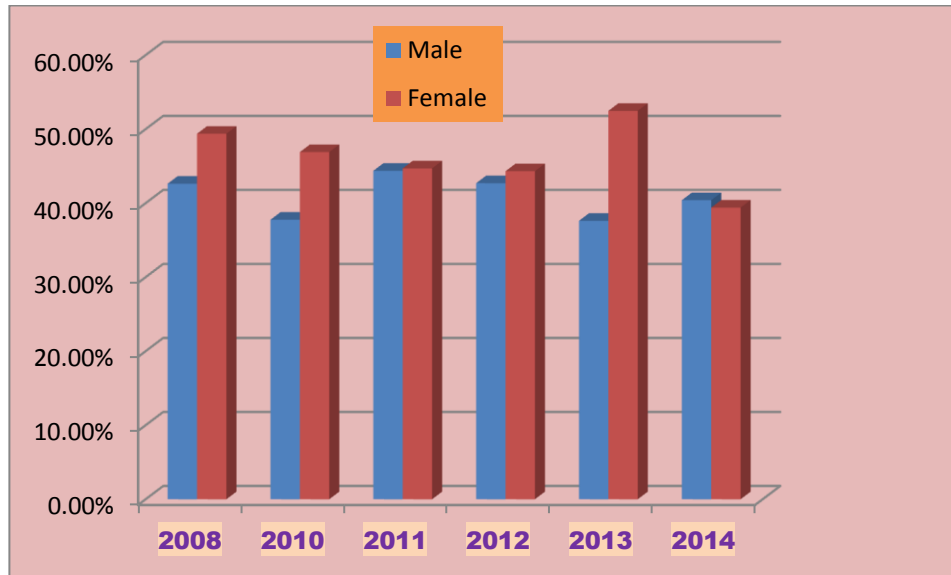


Figure 1. Prevalence of HIV infected individuals between the age of 15-49 at Dilla Referral Hospital.

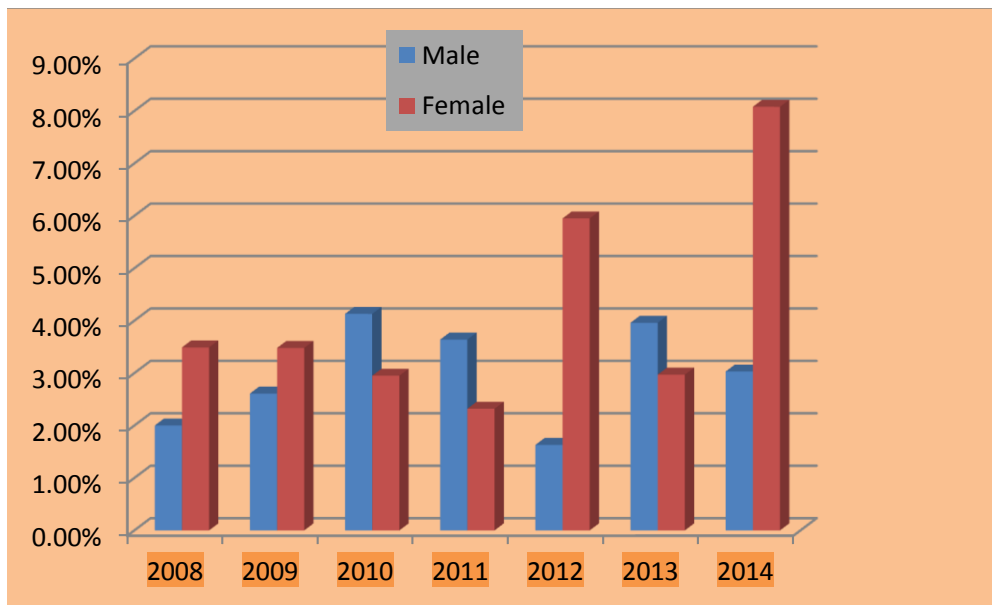


Figure 2. Prevalence of HIV infected individuals in the age group <15 at Dilla Referral Hospital.

Majority of the people that live with HIV virus belonged to the productive age (15-49 years) among both males and females. Among these, the number of females living with HIV virus were larger than male: 42.63, 44.35, 37.76, 44.37, 42.70, 37.62, and 40.40; and 49.38, 52.17, 46.90, 44.70, 44.32, 52.47 and 39.40% respectively for years 2008 to 2014. Next to the productive age were children (<15 age) infected (carrier) by HIV virus followed by old age (>49 age) (Figure 3).

Distribution of HIV infection between the age of 15-49 across the sex was more prevalent in females than males while, across the years 2008-2014, the prevalence was decreased as indicated in Figure 1.

Distribution of HIV infection in patients less than 15 years of age was across the gender; more prevalent in females than males while, across the year 2008-2014, the prevalence was increased in female as indicated in Figure 2.

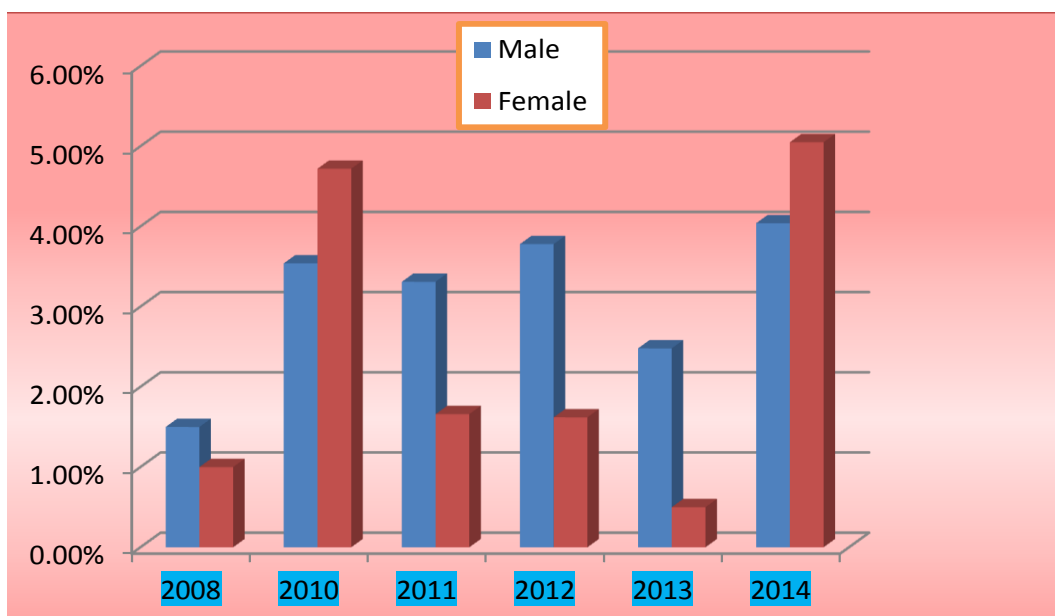


Figure 3. Prevalence of HIV infected individuals in the age group >49 at Dilla Referral Hospital. Distribution of HIV infection in patients greater than 49 years old was across the gender more prevalent on female than male while, across the year 2008-2014, the prevalence was increased in both males and females as indicated Figure 3.

Table 3. Prevalence of HIV/AIDS among voluntary counseling test for HIV virus from 2008-2014 at Dilla Referral Hospital, Dilla, Ethiopia at 2014.

Sex	Age category	Years						
		2008	2009	2010	2011	2012	2013	2014
Male	<15 age	8 (2.00)	9 (2.61)	14 (4.13%)	11 (3.64%)	3 (1.63%)	8 (3.96%)	3 (3.03%)
	15-49 age	171 (42.63%)	144 (41.74%)	128 (37.76%)	134 (44.37%)	79 (42.70%)	76 (37.62%)	40 (40.40%)
	>49 age	6 (1.50%)	12 (3.54%)	10 (3.31%)	7 (3.78%)	5 (2.48%)	4 (4.04%)	
	Total	185 (46.13%)	153 (44.35%)	154 (45.43%)	155 (51.32%)	89 (48.11%)	89 (44.06%)	47 (47.47%)
Female	<15 age	14 (3.49%)	12 (3.48%)	10 (2.95%)	7 (2.32%)	11 (5.95%)	6 (2.97%)	8 (8.08%)
	15-49 age	198 (49.38%)	180 (52.17%)	159 (46.90%)	135 (44.70%)	82 (44.32%)	106 (52.47%)	39 (39.40%)
	>49 age	4 (1.00%)	16 (4.72%)	5 (1.66%)	3 (1.62%)	1 (0.50%)	5 (5.05%)	
	Total	216 (53.87%)	192 (55.65%)	185 (54.57%)	147 (48.68%)	96 (51.89%)	113 (55.94%)	52 (52.53%)

DISCUSSION

As this study showed, among HIV positive individuals, the number of males and females were, 185, 153,154,155, 89, 89, 47 and 216, 192, 185, 147, 96, 52 respectively in the respective years as indicated in Table 3. In Ethiopia, in 2000, the median age of first sexual intercourse of women aged 20-49 was 16.4 years and for men it was 20.3 years, indicating the relatively greater vulnerability of teenage girls to HIV infection (CSA and ORCMacro, 2001). Ethiopia is classified along with Nigeria, China, India, and Russia as belonging to the “next wave countries” with large populations at risk from HIV infection, which will eclipse the current focal point of the epidemic in central and southern Africa (NIC, 2002).

As Table 1 shows 55.09% male and 35.78% female students believed using a condom can prevent HIV/ AIDS while 7.35% male and 11.76% female students believed that using a condom will not prevent HIV transmission from patient (carrier) to healthy individual. In 2003, the highest HIV infection rates in Ethiopia reportedly occurred in the 15-34 age groups. The highest rates in female Antenatal care (ANC) attendees were in the 15-24 age groups (8.6%). Children and adolescents have become increasingly exposed to HIV in recent years, with an estimated 14,000 new infections in the 0-14 age group in 2003 (MOH, 2004). Rates are higher in young females than males, apparently due to a combination of the earlier commencement of sexual activity of females, the older age of their partners, gender-based biological factors

(Quinn and Overbaugh, 2005), and prenatal and obstetric care/delivery exposures. In Ethiopia, in 2000, the median age of first sexual intercourse of women aged 20-49 was 16.4 years and for men 20.3 years, indicating the relatively greater vulnerability of teenage girls to HIV infection (CSA and ORCMacro, 2001).

However, a significant number of students 24 (11.8%) still favored keeping their HIV status as a secret although majority of respondents 180 (88.2%) disagreed with keeping HIV status a secret. Ethiopia is classified (along with Nigeria, China, India, and Russia) as belonging to the "next wave countries" with large populations at risk from HIV infection, which will eclipse the current focal point of the epidemic in central and southern Africa (NIC, 2002).

Majority of students came to know and got information about HIV from mass media followed by health center, books, and combination of all lists, parents and friends: 46.00, 18.00, 12.00, 10.00, 6.00 and 2.00% respectively. Worldwide, women now represent 50% of all adults living with HIV and AIDS and this proportion had been steadily increasing over time (UNAIDS, 2002). Perinatal transmission can occur in utero, during labor and delivery, or post-partum through breast-feeding (Gwinn and Wortley, 1996). Perinatal transmission rates average 25–30% (Blanche et al., 1989).

About 52.00% of both male and female students had not made intercourse while others (48.00%) had sexual intercourse. Among those who had sexual intercourse, some of them had casual sex with their partner (husband or wife) and with their beloved friends (87.50 and 12.50% respectively). The dominant mode of transmission is through heterosexual contact (estimated to account for 87% of infections) and mother-to-child transmission (MTCT) (10% of infections) (GoE, 2004). Blood transfusion, harmful traditional practices, and unsafe injections are all recognized to be a small risk at present but require attention (GoE, 1998).

Majority of students (58.33%) used a condom correctly during their casual intercourse while few students (41.67%) did not use condom. Large number of student (68.00%) did not sharp materials with other, while 14.00% of students sometimes shared sharp materials with others and few of students (6.00%) always shared sharp materials with others but the remaining students (12.00%), did not remember whether they used it or not. Epidemiologic studies have demonstrated that HIV is transmitted by three primary routes: sexual, parenteral (blood-borne), and perinatal (Nancy et al., 2005). Soldiers, high-risk and mobile groups exposed to and spreading HIV through multi-partner sex contacts, were stationed in the 1980s and early 1990s in many Ethiopian towns in the war zone. Troops were also at risk of being infected during emergency blood transfusions (Eshete et al., 1993; Kloos, 1993).

HIV infection rates in soldiers were increased from 2.1% in 1985/1986 to 12.0% in 1989 (Gebretensae, 2003).

Factors that increase the risk of exposure to blood, such as genital ulcer disease (Cameron et al., 1989; Plummer et al., 1991), trauma during sexual contact (Marmor et al., 1986), and menstruation of an HIV-infected woman during sexual contact (European Study Group, 1992; Nair et al., 1993; St Louis et al., 1993) may all increase the risk of transmission.

The number of HIV infected individuals and the number of individuals of voluntary counseling test for HIV decreased from 2008 to 2014. Sexual transmission of HIV from an infected partner to an uninfected partner can occur through male-to-female, female-to-male, male-to-male, and female-to-female sexual contact. Worldwide, sexual transmission of HIV is the predominant mode of transmission (Quinn, 1996).

Parenteral transmission of HIV has occurred in recipients of blood and blood products, through transfusion of blood (estimated 95% risk of infection from transfusion of a single unit of HIV-infected whole blood) (CDC, 1998) or clotting factors, in intravenous or injection drug users through the sharing of needles (approximately 0.67% risk per exposure) (Kaplan and Heimer, 1992), in health care workers through needle sticks (approximately 0.3-0.4% risk per exposure, depending on the size and location of the inoculum) (Tokars et al., 1993; Updated PHS guidelines, 2001), and, less commonly, mucous membrane exposure (0.09% risk per exposure) (Updated PHS guidelines, 2001; Hessol et al., 1989). Among cumulatively reported AIDS cases in U.S. women through December 2001, 39% had injection drug use as their exposure risk and 3% reported receipt of infected blood, blood products, or tissue (CDC, 2002).

Routes of HIV spread are unprotected vaginal, anal, or oral sex with an infected person, needles or drug equipment shared with injection drug users who have HIV, prenatal (before birth) and perinatal (during and right after birth) exposure of infants whose mothers are infected with HIV, breast-feeding by mothers with HIV, transfusion of blood products containing the virus, organ transplants from HIV-infected donors, penetrating injuries or accidents of health care workers (usually needle sticks) while caring for HIV-infected patients or handling their blood.

Conclusion

This study was focused on the students background on HIV virus, their attitude, knowledge and information. Large numbers of students heard about HIV from media. Most of the students had positive attitude towards someone who had HIV in his or her blood. In addition most of the students used condoms during sexual intercourse while other students had unsafe sex as well as multiple sexual partners among students. On the contrary, some students still had negative attitude towards

use of condoms and lack adequate and correct information and hence are unable to practically utilize HIV/AIDS management services such as awareness raising, training, and peer conservations, and condom use. On the other hand, the result obtained from Dilla Referral Hospital from 2008 to 2014 indicated more females were infected with HIV virus than males. However, the prevalence of HIV virus across the year 2008 to 2014 decreased along with the number of infected individual with HIV virus.

Conflict of Interests

The author(s) have not declared any conflict of interests.

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