

# Distribution of the pattern, incidence, and determinants of sexually transmitted infections among patients attending Adari Hospital, Hawassa City, Sidama Region, Ethiopia

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## Abstract

Sexually Transmitted Infections (STIs) cause serious medical and psychological health problems in Ethiopia and vary in different localities. Thus, this study aimed to investigate patterns, status,

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Informed consent: all patients participating in this study signed a written informed consent form for participating in this study. Confidentiality of the data was kept as secured.

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and the association of sexually transmitted infections and local risk factors in the patients attending Adari Hospital. An institutional-based cross-sectional study was carried out from September 2021 to June 2022. Systematic simple random sampling was used to select a total of 385 patients. In addition, five years of retrospective data were collected. Data were collected through blood tests, urethral and vaginal discharge swabs, structured questionnaires, interviews, and observations. Variables with p-values less than 5% are considered as significant. The overall prevalence of sexually transmitted infections was 74.4%. The odds of STIs in patients who were urban, single, presence of two and above sexual partners, illiterate, sexual intercourse without using a condom, and sex after drinking alcohol and chewing khat were more likely to be infected with STIs as compared with their counterparts. STIs were highly prevalent and one of the health challenges of Hawassa city.

## Introduction

Sexually Transmitted Infections (STIs) are a variety of clinical syndromes caused by pathogens that can be acquired and transmitted through sexual contact. The burden of sexually transmitted infections is globally large and ever-increasing because many of them are asymptomatic infections; some of the most affected countries have no diagnostic techniques; and use very poor surveillance systems in different parts of the world.<sup>1</sup> STIs cause a large burden of disease worldwide and have 333 million cases of annual incidence with harmful effects on sexual health. Although prevention and treatment of most STIs are easy and curable, Sub-Saharan Africa has a high prevalence of STIs, contributing to more than 70% of the entire burden of infection, particularly in young people due to high rates of sexual practice.<sup>2</sup>

In low-income countries, the burden of STI is very high. On average, more than 1 million STIs are acquired every day. It is estimated that 80 to 90% of the global burden of STIs occurs in low-income countries, where there is limited or no access to diagnostic facilities and poor awareness.<sup>3</sup> About 35% of the Ethiopian population comprises young people between 15 and 24 years of age, and this largest category is highly vulnerable to STIs.<sup>4</sup> The socio-cultural and economic contexts of low-income nations impact the epidemiology of STIs, increase the transmission of HIV infection, and help make them an important public health priority.<sup>5</sup>

In developing countries like Ethiopia, high levels of STIs and high rates of complications are caused mainly due to inadequacies in health service provision and health care seeking,<sup>6</sup> poorly trained STI case management care providers,<sup>1</sup> and the asymptomatic nature of many STIs. The incidence of STIs and their complications are usually higher among people living in urban areas, those who are single and young age, and the presence of a higher num-

ber of sexual partners.<sup>7</sup> Globally, STIs are a significant cause of acute illness, infertility, long-term disability, and death, with serious medical and psychological effects on millions of men, women, and infants. Females are at a greater risk of STIs and developing complications if infections go untreated, and the absence of symptoms in infected individuals leads to increased transmission and greater susceptibility to other types of infections.<sup>8</sup> Most microbial pathogens that are responsible for STIs are curable with treatment except STIs of viral origin.<sup>9</sup>

STIs rank among the top ten conditions for which adults seek health care in many developing countries. These diseases are important for three reasons, their magnitude, their potential for causing serious complications, and their linkage with Human Immunodeficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS). Prevalence figures for specific STIs are often lacking or unreliable.<sup>10</sup> Besides, globally, young populations make up only one-fourth of the sexually active population, but they acquire 50% of all STIs.<sup>11</sup> Moreover, young incarcerated persons were more at risk because of high rates of sexual activity, more sex with at-risk partners, earlier initiation of sexual behavior, and less condom use.

The biology of STIs in Ethiopia has become more complex and reveals many characteristics of risk behavior, where increasing poverty results in delay of marriage, urbanization, socio-cultural change, which results in sexual behavior, and increasing unemployment of youth have contributed to earlier and often unprotected sex.<sup>12</sup>

Finding the relevant data on the incidence and burden of STIs is important for planning appropriate interventions. They are also crucial in helping to improve the design and implementation of STI interventions. Although there are some studies conducted in Ethiopia, little is known about the prevalence and associated factors of STIs in the study area. Assessing the prevalence and factors associated with common STIs among the study population provided better information for health planners to adopt strategies to manage the impacts of STIs on the local people.

## Materials and Methods

### Description of the study area and study population

Hawassa city is in the Sidama regional state, located 273km south of Addis Ababa, the capital city of Ethiopia, and has a latitude and longitude of 7°3'N 38°28'E and an elevation of 1,708 meters (5,604 ft) above sea level. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia, this zone had a total population of 258,808, of whom 133,123 were males and 125,685 females. While 157,879 or 61% were living in the city of Hawassa, the rest of the population of this zone was living in surrounding rural kebeles. A total of 61,279 households were counted in this zone, which results in an average of 4.22 persons per household, and 57,469 housing units.<sup>13</sup> Hawassa city has two governmental hospitals in addition to health centers and private clinics. Adare General Hospital is the best healthcare provider located in Hawassa, Ethiopia. Adare General Hospital has a total capacity of 110 beds with major medical specialties and services. It receives referral patients from Hawassa town and nearby zones. In 2008 E.C., the hospital was upgraded to Adare General Hospital from its primary level. The hospital provides services such as outpatient, emergency, inpatient (internal medicine, pediatrics, neonatal inten-

sive care, delivery, and surgery), laboratory, radiology, pharmacy, and food. In addition to providing basic health services, the hospital is serving as the training center for medical and health students who come from governmental and private teaching centers.

### Inclusion/exclusion criteria and study variables

All patients attending Adare Hospital and examined for STIs during the study period and those who were not treated for anti-parasitic treatment for the previous two weeks were included in the study. Those patients who were on anti-parasitic treatment for the previous two weeks were excluded. The prevalence of STIs among patients was used as the dependent variable, whereas age, sex, educational status, hand washing habit, source of drinking water, presence of toilet, and others were used as independent variables.

### Study design

Research design is the outline for fulfilling the research objective and answering research questions. It is a master plan stating the methods and procedures for collecting and analyzing the required information. A health institution-based study was conducted to collect data from September 2021 to June 2022 in Adare Hospital. The present study was descriptive (concerned with determining the frequency with which an event occurs) and cross-sectional since all relevant data was collected at a single point in time. This is a retrospective study where data from the past six years (2016-2021) was utilized. The study included all records of individuals registered in the log book from 2016-2021 and diagnosed with STIs.

### Sample size determination and sampling techniques

#### Sample size determination

The sample size was estimated using a statistical formula developed by Yamane,<sup>14</sup> considering the level of acceptable margin of error 5%. The target population size was in 2021 (N=10904 households) a total number of samples (n) was required to be drawn assuming a 95% confidence level and 5% margin of error. Based on this the researcher decided to take the upper population size limit to get a more valid sample size. If the population size (N) of a given study is known and its sampling error (e) is fixed by the researcher, then the total sample size (n) can be calculated by using the following formula.

$$n = \frac{N}{1 + N(e)^2} \\ = \frac{10904}{1 + 10904(0.05)^2} = 385 \text{ minimum sample size}$$

#### Sampling technique

A systematic random sampling technique was applied to select samples from patients

#### Data collection

Data were collected by attending nurses who have prior experience in data collection. All data collectors and supervisors were trained for one day and performed practical exercises to become familiar with the questionnaire. Socio-demographic and sexual behavior data and, knowledge attitude and practice for STIs were collected through a self-administered structured and pre-tested questionnaire. Laboratory data were collected using a blood test, and urethral and vaginal discharge swabs whereas retrospective data were obtained from document analysis.

#### Data analysis

After the data was checked for completeness, and then ana-

lyzed by using the Statistical Package for Social Sciences (SPSS) version 24. To determine the association of some potential risk factors with STI, logistic regression analyses were used. Odds ratios with their 95% confidence intervals were computed to identify the presence and strength of association, and statistical significance was declared if  $p < 0.05$ .

### Ethical considerations

The study was reviewed and approved, and ethical clearance was obtained from the Institutional Ethical Committee Review Board of the College of Natural Sciences, through the Department of, Biology, Hawassa University (Ref.no. IRB/264/11). The objective of the study was informed to the study participants and gave their consent to participate in the study. Confidentiality was also maintained.

## Results

### Socio-demographic and clinical characteristics of respondents

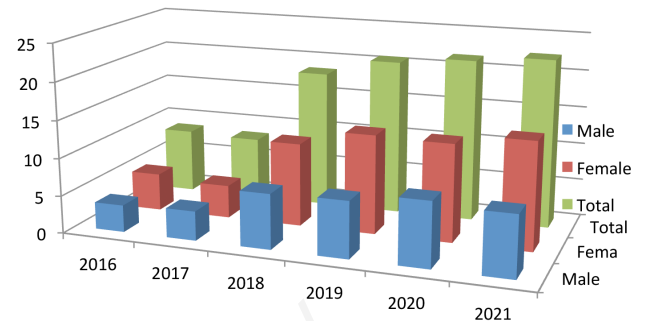
The socio-demographic characteristics of respondents are summarized in Table 1. A total of 385 respondents participated in this study, of which 147(38.2%) were males and 238(61.8%) were females. Thirty (9%) participants were at age  $\leq 15$  years, 206(53.5%) were between the age of 16-31 years. Eighty (20.8%) participants were between the age of 32-47 years. Two hundred forty-four (60.5%) participants of this study were unmarried, and 201 (52.2%) were married. Most of the respondents lived in rural areas, 201(52.2%). Two hundred twenty-two (57.7%) respondents were uneducated, and 283 (73.5%) respondents did not use condoms during sexual intercourse. Most of the respondents, 267(69.4%) were having sexual intercourse after drinking alcohol. Almost half, 201(52.2%) participants were having sex after chewing khat (Table 1). About 298/385(77.4%) of STIs suspected patients were STIs infected. Analyses of the potential risk factors explored for the STIs showed that 116 (78.9%) males, and 182 (76.4%) females had at least one STI and were statistically significant ( $p < 0.05$ ) (Table 2). The odds of STIs in patients who were rural dwellers were 1.5 times higher than those who lived in urban areas. Similarly, single patients were 1.5 times more likely to be infected with STIs. Moreover, illiterate patients were two times more likely to be infected with STIs. Likewise, sex after drinking alcohol, and sex after chewing khat, sex without condom use, having good knowledge about STI transmission were significantly associated with STI transmission. Sexual intercourse without condom use was 1.8 times more likely to be infected with STIs. Furthermore, having good knowledge about STI transmission and the presence of only one sexual partner were protective from STI transmission whereas the presence of only one sexual partner was protective from STI transmission and it showed a reduction by 13% from STIs (Table 2).

### Trends of Sexually Transmitted Infections incidence (2016-2021) of the study participants

A total of 1074 STI patients were recorded from the year 2016 to 2021. Among these, 490 (45.6%) were males and 584 (54.4%) were females. As shown in Figure 1, the retrospective studies carried out on STI-positive patients from 2016-2021 years showed the incidence of 92(8.6%) in 2016, 89(8.3%) in 2017, 198(18.4%) in 2018, 222(20.7%) in 2019, 232(21.6%) in 2020 and 241(22.4%) in 2021. The incidence of STIs increased from 2017 to 2021 (Figure 1).

### Types and frequency of Sexually Transmitted Infections

Gonorrhoea had the highest percentage of infection occurrence, which accounts for 431(40.1%). Two hundred nineteen-five (27.5%), 197(18.3%), 144(13.4%), and 7 (0.65%) of the patients were infected by hepatitis, HIV/AIDS, syphilis, and chancroid



**Figure 1.** Trends of Sexually Transmitted Infections (STI) incidence in (2016-2021) among patients in Adari Hospital.

**Table 1.** Socio-demographic characteristics of study participants, in Adari Hospital 2022.

Variables	Number	Percentage (%)
<b>Sex</b>		
Female	238	61.8
Male	147	38.2
<b>Age</b>		
1-15	35	9
16-31	206	53.5
32-47	80	20.8
>48	64	16.6
<b>Residence</b>		
Urban	184	47.8
Rural	201	52.2
<b>Marriage</b>		
Single	184	47.8
Married	201	52.2
<b>Education</b>		
Illiterate	222	57.7
Literate	164	42.3
<b>Condom use</b>		
Yes	102	26.5
No	283	73.5
<b>Knowledge of STIs</b>		
Good	199	51.7
Poor	186	48.3
<b>Sexual partner</b>		
One	183	47.5
Two and above	202	52.5
<b>Sex after drinking alcohol</b>		
Yes	267	69.4
No	118	30.6
<b>Sex after chewing khat</b>		
Yes	184	47.8
No	201	52.2

\*The percentage calculated for the respective characteristic is from the total examined. STI, Sexually Transmitted Infections

respectively. HIV/AIDS, gonorrhea, hepatitis, and syphilis infections were higher in females and the age group <30 years. The majority of the study participants (HIV, gonorrhea, hepatitis, syphilis, and chancroid) patients were urban, unmarried, and illiterate (Table 3).

## Discussion

Studies on STIs and their effects on health are low compared to the ever-increasing rate of STIs in the population. Due to the absence of longitudinal studies, the pattern increment of sexually transmitted diseases may not be well justified.<sup>15</sup>

Although more efforts are needed to study STIs and their effect on health, some previous studies indicated many significant psychological, medical/physiological, and sociological negative impacts on the health of the population.<sup>16</sup> STIs are believed to affect a large segment of the Ethiopian population, particularly the productive age group.

Compared to what has been reported earlier from different regions of Ethiopia, the prevalence of STIs on health for the present study population varies in different localities. This could be

explained by the differences in awareness about STI transmission, sex after alcohol use, having multiple sexual partners and STI non-testing contribute high prevalence of STIs in different regions or localities. Other investigators have also reported that the prevalence of STIs varies in different regions of Ethiopia.<sup>17</sup>

STIs were higher in the age range of 16-31 years. Hawassa is an emerging town and due to its attraction to tourists and investments, there are a lot of investments mainly hotels and industries. Due to such expansion of investments, high numbers of labor migrants dominantly young age groups who are the most sexually active age group were moving from the surrounding districts to the town in search of job opportunities might contribute to the higher prevalence. This finding was comparable with a study done by Teshome and Olaniran *et al.*<sup>17,18</sup>

The overall proportion of HIV/AIDS within five years was (16.8%), which was higher than the prevalence rate reported in the study conducted at Hawassa University (10.6%),<sup>19</sup> Gondar, Ethiopia (14.5%).<sup>12</sup> However, the overall HIV/AIDS prevalence rate observed in this study was lower than the prevalence rate observed in the study done in Malawi,<sup>20</sup> which was 44.2%. The differences might be due to the time in which the research was conducted and differences in locality.

**Table 2.** Univariate and multivariate analysis of some associated factors for Sexually Transmitted Infections (STIs) prevalence among STI-suspected patients in Adari Hospital, Hawassa City, Ethiopia, (Sep, 2021 - Jun, 2022).

Variables	STI positive No (%)	COR (95% CI)	p-value	AOR (95% CI)	p-value
Sex					
Female	182 (76.4)	1.871 (1.4-2.64)	0.005	2.97 (1.3-2.84)	0.005
Male	116 (78.9)	1		1	
Age					
1-15	27 (77)	1.64 (2.13-3.16)	0.13	2.84 (1.13-2.16)	0.24
16-31	156 (75.7)	1.56 (1.13-2.16)	<0.001	7.6 (1.3-1.6)	<0.001
32-47	60 (75)	1.75 (1.01-2.8)	0.029	1.65 (0.01-0.14)	0.015
>48	55 (85.9)	1		1	
Residence					
Urban	142 (77.1)	1		1	
Rural	156 (77.6)	1.63 (1.15-2.3)	<0.001	1.47 (1.5-1.7)	<0.001
Marriage					
Single	142 (77.1)	1.63 (1.15-2.3)	<0.001	1.47 (1.5-1.7)	<0.001
Married	156 (77.6)	1		1	
Education					
Illiterate	176 (79.3)	1.43 (1.03-2.10)	<0.001	2.13 (1.02-2.6)	0.01
Literate	122 (74.4)	1			
Condom use					
Yes	75 (73.5)	1		1	
No	223 (78.8)	1.89 (1.23-2.96)	<0.001	1.80 (1.43-2.76)	<0.001
Knowledge of STIs					
Good	155 (77.8)	1		1	
Poor	143 (76.88)	1.54 (2.03-5.16)	<0.001	2.54 (2.53-4.13)	<0.001
Sexual partner					
One	145 (79.2)	1		1	
Two and above	153 (75.7)	1.52 (1.32-2.20)	<0.001	0.87 (1.33-2.40)	<0.001
Sex after drinking alcohol					
Yes	205 (76.8)	1.63 (1.0-2.20)	0.02	1.43 (1.0-2.31)	0.001
No	93 (78.8)	1		1	
Sex after chewing khat					
Yes	142 (77.2)	1.63 (1.15-2.3)	<0.001	1.47 (1.5-1.7)	<0.001
No	156 (77.6)	1		1	

\*The percentage calculated for the respective characteristic is from the total examined. COR, Crude Odds Ratio; AOR, Adjusted Odds Ratio.

This study revealed that the prevalence of gonorrhea relative to other STIs within five years was 40.1%. This was higher than those reported from Gondar (20.8%),<sup>12</sup> Mozambique (22.5%),<sup>21</sup> Egypt (26%),<sup>22</sup> Southwestern Nigeria (25%),<sup>23</sup> and Mongolia (11%).<sup>15</sup> The reason behind the prevalence difference might be due to the time of the study, environmental differences, the cultural context in which the people live, and knowledge about the transmission of the disease.

In this study, the prevalence of hepatitis A, (26.8%) was higher than the prevalence rate observed in Jigjiga, Ethiopia (19%),<sup>24</sup> and Addis Ababa, Ethiopia (7.3%).<sup>25</sup> The study also revealed that syphilis had a 13.96% mean prevalence rate within a five-year retrospective study. This was lower than the study conducted in Gondar, Ethiopia (30%).<sup>12</sup> Yirgalem Hospital Southern Ethiopia (39%).<sup>26</sup> This might be due to differences in the study period, differences in locality, in socio-economic cultural differences.

The findings of the study showed that the overall prevalence of sexually transmitted diseases in 385 study subjects was 77.40%. This was comparatively similar to the prevalence in Gondar town, Ethiopia (74.1%),<sup>12</sup> and lower than Nigeria (85%).<sup>23</sup> On the contrary, it was higher than the study done in Addis Ababa, Ethiopia,<sup>25</sup> which reported an STI prevalence rate of 47.9%, and studies reported in Malawi (4.2%),<sup>20</sup> and Mozambique (41%).<sup>21</sup> The probable reason for this prevalence discrepancy might be due to differences in the duration of the study, the interventions used for the target group, and the difference in sample size, as the current study was conducted only in a single town or hospital whereas the other studies were done at national level on a large scale, due to the socio-cultural and economic context in which the person lives, a knowledge difference between the person about how to protect themselves, environment, different attitudes of the community for having sexual attraction for the same gender and national laws towards homosexuality.

In this study, literates were more likely to protect against STIs as compared to illiterates (Adjusted Odds Ratio, AOR=2.13, 95% Confidence Interval, CI; 1.02, 2.6). This finding was almost similar to the study conducted in Brazil and showed that illiterates had

developed a high prevalence rate as compared to their counterparts (AOR=1.09, 95% CI; 1.31,4.73).<sup>27,28</sup>

In this study, residence and STI prevalence were highly associated. This means those patients who came from urban areas were more likely to develop STIs as compared to patients who reside in rural areas. This is consistent with a previous study; patients from urban areas attending the health facility had significantly higher STI prevalence compared to patients from rural areas.<sup>29,30</sup> It has been suggested that patients from urban areas may be due to the possibility of having two or more sexual partners and urbanization could contribute to a higher prevalence rate.

In this study, STI prevalence was also less frequent among married than single. The reason for the high occurrence of STIs in single patients may be due to STIs non-testing, condom non-use, and the presence of multiple sexual partners. This finding is contrary to other studies done in Gondar, Northern Ethiopia.<sup>24</sup>

The trend of STIs gradually increased from 2017 to 2021, which is similar to the study done by Geremew and Teshome.<sup>12,17</sup> This might be due to the increment of unprotected sex through time, the presence of more than one sexual partner, and sex after alcohol use contribute to the high prevalence of STIs.

## Conclusions

This study revealed that the prevalence of sexually transmitted infections in the study area was relatively high as compared to findings documented in some parts of the country, and its prevalence was 77.4%. An increasing trend was observed in the STIs prevalence rate in the past five years from (8.6%- 22.4%) in 2016-2021. The most prevalent STIs were gonorrhea and the most affected age group was below 16-31 years in both sexes. Moreover, the prevalence rate had a significant association with marital status; residence, condom use, educational status, number of sexual partners, sex after drinking alcohol, and sex after chewing khat of the study participants. In general, it was observed that those individuals who were not married, in urban residences, had sexual

**Table 3.** Frequency of Sexually Transmitted Infections (STIs) by demographic (n=1074) with different characteristics at Adari Hospital, Southern Ethiopia (September 2016 - June 2021).

Variables N (%)	Total N (%)	HIV + ve N (%)	Gonorrhea N (%)	Hepatitis N (%)	Syphilis N (%)	Chancroid
<b>Sex</b>						
Male	490 (45.6)	93 (47)	194 (45)	127 (43)	69 (48)	7 (1.2)
Female	584 (54.4)	104 (53)	237 (55)	168 (57)	75 (52)	0 (0)
<b>Age</b>						
<30	560 (52.1)	114 (57.9)	208 (48.3)	167 (56.6)	167 (56.6)	6 (85.7)
30-45	374 (34.8)	60 (30.5)	158 (36.7)	98 (33.2)	55 (39.3)	1 (14.3)
Above 45	140 (13.1)	23 (11.7)	65 (15)	30 (10)	20 (13)	0 (0)
<b>Residence</b>						
Urban	921 (85.8)	162 (82.2)	390 (90.5)	240 (81.4)	124 (88.6)	5 (71.4)
Rural	153 (14.2)	35 (17.8)	41 (9.5)	55 (18.6)	16 (11.4)	2 (28.6)
<b>Marital status</b>						
Single	686 (63.9)	143 (72.5)	254 (58.9)	184 (62.4)	98 (70)	7 (100)
Married	388 (36.1)	54 (27.5)	177 (41.1)	111 (37.6)	42 (30)	0 (0)
<b>Educational status</b>						
Illiterate	636 (59.2)	119 (60)	242 (56)	171 (58)	98 (70)	6 (86)
Literate	438 (40.8)	78 (40)	189 (44)	124 (42)	42 (30)	1 (24)

\*The percentage calculated for the respective characteristic is from the total examined. HIV, Human Immunodeficiency Virus.

intercourse without using a condom, had sexual intercourse after drinking alcohol, after chewing khat, and were illiterate were more likely to develop a risk of STIs as compared to their counterparts.

### Limitations of the study

Since only a few studies were conducted in Ethiopia, little is known about the prevalence and associated factors of STIs in the study area. As a result, this study faced social desirability bias because of highly sensitive questions related to sexuality, and recall bias, which may lead to an underestimate of the actual prevalence. Furthermore, this study was cross-sectional, it may not allow for the establishment of a causal link to the syndrome of STI.

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