ORIGINAL ARTCLE

Prevalence of Selected Sexually Transmitted Infection (STI) and Associated Factors among Symptomatic Patients Attending Gondar Town Hospitals and Health Centers

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ABSTRACT

BACKGROUND: Sexually transmitted infection (STI) is a major global cause of acute illness, infertility, long-term disability and death, with serious medical and psychological consequences to millions of men, women and infants. Moreover, in Ethiopia, epidemiological studies on STI among STI clinic clients are limited. Therefore, the aim of this study was to determine the prevalence and associated risk factors of sexually transmitted infection (STI).

METHODS: A cross sectional study was conducted between April and August 2014 among STI clinic clients in Gondar Town hospitals and health centers. One hundred twenty study participants who fulfill the criteria were included. Different laboratory methods and techniques were applied to identify the possible microorganisms. Data were entered and analyzed using SPSS version 20. Logistic regression was used to determine risk factors for STI and P values < 0.05 was considered statistically significant.

RESULTS: The overall laboratory test confirmed that STIs prevalence was 74.1% with 32.5% being Candida spp., 30% T. palladium, 20.8% N. gonorrhoeae and 14.2% T. vaginalis. Two or more organisms were isolated in 20% of the study subjects. Risk factors for STI had knowledge about STI and alcohol consumption.

CONCLUSION: The prevalence of N. gonorrhoeae, T. pallidum, T. vaginalis, and Candida spp. in the study area was high. It needs health education programs, promotes condom utilization and more comprehensive community based STI studies. KEYWORDS: STI, Candida spp., N. gonorrhoeae, T. pallidum, T. vaginalis

INTRODUCTION

Sexually transmitted infections (STIs) are group of infections or communicable diseases in which the primary mode of transmission is through sexual contact. Some of the common STIs include bacteria vaginosis, herpes, Chlamydia, trichomoniasis, gonorrhea, Hepatitis B virus, Human Immunodeficiency Virus (HIV)/AIDS and syphilis (1).

STI is classified according to the type of organism causing the infection, which can be bacterial, fungal, viral or of parasitic origin. *Neisseria gonorrhoeae (N. gonorrhoeae)* and *Chlamydia trachomatis,* cause lymphogranuloma venereum, which is characterized by a transient genital lesion at the site of infection on the penis, urethra, scrotum, vagina, cervix, or external female genitalia (2). Addistionally, buboes may enlarge to the point that they rupture, producing draining sores. *Treponema palladium (T. pallidum*), *Trichomonas vaginalis (T. vaginalis)* are some of the most incriminated as etiological agents of STI (3). *Neisseria gonorrhoeae*, the causative agent of gonorrhea, is an intercellular human pathogen that primarily colonizes the urogenital tract. Gonorrhea remains a global public health problem. Nowadays, worryingly, *N. gonorrhoeae* has developed high-level resistance to all traditional antimicrobials used for the treatment of gonorrhea, like penicillin, tetracycline and fluoroquinolone (4). *Trichomonas vaginalis*, a small, motile, flagellated, protozoan parasite, causes trichomonal vaginitis (5). *Trichomonas vaginalis* is an opportunistic pathogen that could grow abnormally when the vagina ecosystem or the urethra in male has a distorted environmental balance (3). *Treponema pallidum*, a thin flagellated spirochete, is the etiologic agent of syphilis. Syphilis is typically acquired via sexual contact, but it an also be transmitted transplacentally and by exposure to blood or lesion exudates from infected persons in the primary and secondary stages of the disease (6).

Sexually transmitted infections are a major global cause of acute illness, infertility, long-term disability and death, with serious medical and psychological consequences to millions of men, women and infants (7). Sexually transmitted infections are a major public health problem worldwide. According to the 2005 the World Health Organization (WHO) report, more than 448 million new cases of curable STI (Chlamydia, gonorrhea, trichomoniasis and candidacies) and a total of 347 million new cases of gonorrhea, trichomoniasis and syphilis occurred every year worldwide in people aged between 15 and 49 years. Among this, the majority of the cases were in developing countries. For instance, over 22% of adults with *N. gonorrhoeae* were found in the WHO African Region, and in both sexes the prevalence of *N. gonorrhoeae*, *T. pallidum* and *T. vaginalis* were the highest (4). In the developing world, STI presents major health, social and economic problems, leading to a considerable morbidity, mortality and stigma. The prevalence rates apparently are far higher in developing countries where STI treatment is less accessible (8,9).

Studies indicate that some infections or co-infections of STI have the chance of increasing the risk of HIV transmission. STIs associated with *T. vaginalis*, *N. gonorrhoeae* and *T. pallidum*, *C. albicans* infections enhance the acquisition and transmission of HIV (10–12).

In many parts of the developing world, the absence of etiologic diagnostic capacity due to constraints imposed by cost, lack of equipment or trained personnel, and poor time management has forced health care providers to rely on a syndrome based approach to STI management. Yet, many STIs have common symptoms or are asymptomatic and therefore go undetected and untreated (7). Improvement in the management of STIs can reduce the incidence of HIV infection in the general population by about 40%. Prevention and treatment of STIs are therefore critical components of HIV prevention and treatment strategies (13).

Like other developing countries, in Ethiopia, the burden of STI is high but there is little information on the incidence and prevalence of STIs because of people with STIs who have minor or no symptoms, do not seek treatment at public health facilities. Identifying the etiology and prevalence of STI causing organisms is important to deliver appropriate treatment and decrease the risk for HIV transmission. Therefore, this study primarily aimed to determine the prevalence and associated factors of *N. gonorrhoeae*, *T. vaginalis*, *T. pallidum* and *Candida spp.* among STI attendants at Gondar Town hospitals and health centers.

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MATERIALS AND METHODS

Study design and study participants: Cross-sectional study was conducted from April 1 to August 30, 2014 in Gondar town, on two hospitals (1 governmental and 1 private) and 5 health centers, 725 km far from Addis Ababa, Northwest Ethiopia. Study participants were identified at institution level based on set inclusion and exclusion criteria. All STI suspected patients in the STI clinic were included, but patients under antibiotic treatment during the 7 days before the enrolment and females patients who were on menstruation at the time of examination were excluded from the study.

The prevalence of sexually transmitted infections (STIs) was the dependent variable. Numbers of sexual partners, knowledge about STI transmission, history of STI, experience of sexual activities, risk behaviors were some of the independent variables.

Sample size and sampling technique: We used purposive sampling technique and one hundred twenty (120) consenting patients, who attended Gondar Hown hospitals and health centers STI clinic, with one or more of the complaints as stated by WHO in its syndrome approach for the diagnosis of STIs (14) were included in the present study.

Data collection procedure: After taking written informed consent from each study participant, semi-structured questionnaire was used to collect socio-demographic and clinical data needed in this study. Data were collected by trained nurses.

Sample collection

Urethral and vaginal specimen: External inspections of the genital area were made, and the characteristics of any local changes such as erythema, abrasions, ulceration, urethral discharge and vaginal discharge were noted including color, amount, odor and consistency. In the absence of visible urethral discharge, the patient was asked to milk the urethra. Specimen of discharges were obtained at or just within the urethral meatus for males and both cervical and vaginal fluids were taken for females. Two cervical and one vaginal swabs were taken from females while three urethral swabs were taken from male. one for Gram staining, one for wet mount examination which was examined in the facilities and the other was put on Amies transport media for *N. gonorrhea* culture at Gondar University Hospital.

Venous blood collection: Five ml of venous blood was collected from the antecubital vein of each study subject into sterile tubes. The blood was allowed to retract and then centrifuged, and the serum was obtained. All serum samples were tested for *T. pallidum* and HIV (15).

Laboratory method

Isolation and identification of *N. gonorrhea*: Urethral swab and cervical swab specimens were inoculated onto Thayer Martin media (OXOID, UK). The containing vancomycin, colistin, nistatin and trimetoprin and incubated under a 5-10% CO_2 enriched wet atmosphere for 24-48 hours. Observing polymorphonuclear leucocytes (PMNLs) with Gram-negative intracellular diplococci was a presumptive diagnosis of gonococcal infection, and isolates were identified as *N. gonorrhoeae* on the basis of colony morphology, Gram staining, oxidase test, and carbohydrate utilization test (15).

Wet mount preparation and identification of *T. vaginalis*: All discharges collected from the study particiipnts were subjected for microscopic examination to detect *T. vaginalis.* A suspension of the discharge with 0.3ml normal saline was prepared. One drop of suspension was put on a clean slide, covered with a cover slip and immediately examined microscopically under the low power (10x) and high power (40x) magnifications. *Trichomonas vaginalis* was identified by its characteristics morphology and darting motility in a wet smear (15).

Rapid immunochromatographic syphilis tests: Rapid immunochromatographic syphilis test, which has *T. pallidum* recombinant antigens and provide results similar to those of specific treponemal tests, was used. This was performed by adding 3 drop of serum sample to the sample well. Test results were read after 15 minutes. A positive test was shown by a pink-mauve line in both the control and test areas. A negative test was shown by a pink line in the control area only.

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Sensitivity ranged from 85–98% and specificity from 93–98% (15).

Identification of *Candida spp*: *Candidiasis* was identified on the bases of detecting yeast cells and pseudohyphae in wet vaginal/urethral preparations and Large Gram positive yeast cells and pseudohyphae in Gram stained smears.

HIV-test: To detect HIV, anti-HIV was used for screening according to the manufacturer's instructions (rapid test currently used in national algorithm for Ethiopia; KHB, STAT PAK, UNI-GOLD).

Data quality control: The questionnaire was pre-tested on 15 outpatient department patients for comprehensiveness, effectiveness, reliability and validity. Training was given for data collectors on data collection procedures by support of investigator, venereologist and gynecologist. Culture media sterility was ensured by incubating 5% of each batch of the prepared media at 37^{o}c for 24 hours. Performance of prepared media was also checked by inoculating with control strains N. gonorrhea ATCCTM 49226 (16,17).

Data analysis: Data were entered and analyzed using SPSS version 20 statistical software. Descriptive statistics was applied to determine the distribution of the socio-demographic and clinical characteristics. Bivariate analysis was performed to examine possible risk factors for N. gonorrhoeae, T. vaginalis, T. pallidum and Candida spp. infections. To obtain adjusted estimates of the odds ratio while accounting for all confounding variables, multiple logistic regressions were used. P-values < 0.05 were considered statistically significant.

Ethical consideration: The study was approved by the Research and Ethics Committee of the School of Biomedical and Laboratory Sciences of the University of Gondar. Official permission was obtained from each health facility. The aim and details of the study were explained to each study participant before obtaining their written consent for specimen collection. Confidentiality was maintained at all levels of the study by using codes rather than names of the study participants. Participants' involvement in the study was on voluntary basis. Participants who were unwilling to participate in the study and those who wished to quit their participation at any stage were informed to do so without any restriction. The results of all positive individuals were reported to the respective health facilities for better management of the patients.

RESULTS

Socio-demographic characteristics: A total of 120 patients, 21(17.5%) males and 99 (82.5%) females, were enrolled in the study. The mean ±SD age of the study participants was 27.8 ±7.2 years. The majority (66.6%) of the study participants were in the age group of below 30 years. Fifty-eight (48.3%) of the participants were married. The majority of them, 74(61.7%) were literate. Regarding their occupations, house wives accounted for 21.7%, and in terms of economic status, 37(30.8%) of the participants reported that they did not have ncomes of their own (Table 1).

Prevalence of STI agents: The overall prevalence of laboratory confirmed STIs pathogens among suspected attendees of Gondar Town hospitals and health centers was 89(74.1%) excluding HIV. *Candida spp*. had the highest percentage of infection occurrence which accounts 39(32.5%). The other organisms were *T. pallidum*, 36(30%), N. gonorrhoeae 25(20.8%), T. vaginalis 17(14.2%) and HIV 17(14.2%). Among 39 TPHA positive cases, 8 had RPR confirmed active syphilis. The majority of *N. gonorrhoeae, T. pallidum, T. vaginalis*, HIV and *Candida spp.* infections were higher on females and the age group 15-29 years. The majority of the respondents, 82(68.3%), had multiple sexual partners. Among the male subjects, 19(90.4%) had multiple sexual partners. Similarly, from around 3/4th of the female subjects, 64(64.6%) had multiple sexual partners. Moreover, 69(57.5%) had never used condom (Table 2).

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Table 1: Socio-demographic characteristics of study participants suffering from symptoms of STI in Gondar Town hospitals and health centers from STI clinics, April - August 2014.

Variable		Frequency	Percentage
Sex	Male	21	17.5
	Female	99	82.5
Age	15-29	80	66.7
	30-45	40	33.3
Marital status	Single	49	40.8
	Married	58	48.3
	Widowed	2	1.7
	Divorced	11	9.2
Educational status	Illiterate	46	38.3
	Literate	74	61.7
Occupation	No	23	19.2
	House wife	26	21.7
	Sex worker	11	9.2
	Student	9	7.5
	Gov. employees	22	18.3
	Farmer	7	5.8
	Other	22	18.3
Income	No	37	30.8
	<800	25	20.8
	801-1600	31	25.8
	1600-2400	27	22.5

Risk factors for laboratory confirmed STIs: Although high gonococcal infections were observed among females, 19(76%), clients who had multiple sexual partner, 18(72%), history of STI. 16(64%) and alcohol use, 20(80%), logistic regression analysis showed no statistically significant association. In this study, the overall prevalence of *T. pallidum* infection, 36(30%), was significantly associated with HIV status (OR 5.72, 95%CI 1.919-17.046, p=0.002). Non-condom use had a significant association with *T. pallidum* infection (OR 0.23, 95%CI 0.06-0.81, p=0.04). Regular alcohol intake also had a significant association with *T. pallidum* infection (OR 6.6, 95%CI 1.2-36.6, p=0.026) (Table 3). Candidiasis and *T. vaginalis* infection had a significant association with knowledge about STI (OR 4.2, 95%CI 1.2-14, p=0.02) and marital status (OR 649, 95%CI 1.4-27789, p=0.036) in the multivariate analysis respectively (Table 4).

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Table 2: Frequency of genital pathogens with different characteristics among Gondar town hospitals and health centers STI clients (n=120), April - August 2014.

Characteristics		Total N(%)	*N. gonorrhea* N(%)	*T. vaginalis* N(%)	*T. pallidum* (TPHA) N(%)	*Candida spp.* N(%)
Sex	Male	21(17.5)	6 (24)	0(0)	10(27.7)	0(0)
	Female	99(82.5)	19(76)	17(100)	26(72.3)	39(100)
Age	15-29	80(66.7)	17(68)	13(76.5)	25(69.4)	28(71.8)
	30-45	40(33,3)	8(32)	4(23.5)	11(30.6)	11(28.2)
Marital status	Single	49(51.7)	14(66)	12(70.6)	16(44.5)	20(51.3)
	Married	58(48.3)	11(44)	5(29.4)	20(55.5)	19(48.7)
Educational status	Illiterate	46(38.3)	9(36)	4(23.5)	17(47.2)	13(33.3)
	Literate	74(61.7)	16(64)	13(76.5)	19(52.8)	26(66.7)
Occupation	Gvt	31(25.8)	7(28)	5(29.4)	8(22.2)	11(28.2)
	House wife	26(21.7)	3(12)	5(29.4)	7(19.4)	9(23)
	CSW	11(9.2)	2(8)	1(5.8)	6(16.6)	6(15.3)
	No	23(19.2)	5(20)	3(17.6)	4(11.1)	9(23)
	Self-employed	29(24.1)	8(32)	3(17.6)	11(30.5)	11(28.2)
Income	No	37(30.8)	7(28)	7(41.1)	7(19.4)	11(28)
	<800	25(20.8)	7(28)	6(35.2)	4(11.1)	6(15.3)
	801-1600	31(25.8)	5(20)	2(11.7)	14(38.8)	12(30.7)
	>1600	27(22.8)	6(24)	2(11.7)	11(30.5)	10(25.6)
Knowledge about STI	No	54(45)	10(40)	8(47.1)	15(41.6)	11(28.3)
	Yes	66(55)	15(60)	9(52.9)	21(58.3)	28(71.7)
Alcohol use	No	39(32.5)	5(20)	5(29.5)	8(22.3)	18(46.2)
	Yes	81(67.5)	20(80)	12(71.5)	28(77.7)	21(53.8)
Chat chewing	No	102(85)	21(84)	14(82.3)	28(77.7)	35(89.7)
	Yes	17(15)	4(16)	3(16.7)	9(22.3)	4(10.3)
Smoking	No	111(93)	22(88)	17(100)	31(86.1)	38(97.4)
	Yes	9(7.5)	3(12)	0(0)	5(13.9)	1(2.6)
History of abortion*	No	55(55.5)	12(48)	8(47)	11(30.5)	20(51.2)
	Yes	44(44.5)	7(32)	9(52.9)	16(44.4)	19(48.7)
Sexual partner	1	38(31.6)	7(28)	7(41.1)	9(25)	16(41)
	>1	82(68.3)	18(72)	10(58.9)	27(75)	23(59)
Condom use	Never	69(57.5)	13(52)	11(64.7)	19(52.7)	22(56.4)
	S/Rarely	38(32)	9(36)	5(29.4)	9(25)	11(28.2)
	Always	13(10.5)	3(12)	1(5.8)	8(22.2)	6(15.3)
Prostitute contact*+	No	16(76.1)	1(4)	0(0)	1(2.7)	0(0)
	Yes	5(23.9)	3(12)	0(0)	2(5.5)	0(0)
History of STI	No	53(44.2)	9(36)	6(35.2)	16(44.4)	17(43.5)
	Yes	67(55.8)	16(64)	11(74.8)	20(53.6)	22(56.5)
Material sharing	No	81(67.5)	19(76)	9(52.9)	4(11.1)	25(64.1)
	Yes	39(32.5)	6(34)	8(47.1)	12(88.9)	14(35.9)
Contact with new person the last 3 months	No	78(65)	16(64)	13(76.4)	21(58.3)	24(61.5)
	Yes	42(35)	9(36)	4(23.6)	15(41.7)	15(38.5)
HIV status	Positive	17(14.2)	1(4)	2(11.8)	11(30.5)	6(15.3)
	Negative	103(86)	24(96)	15(88.2)	25(69.5)	33(84.7)

History of abortion*= for females, Prostitute contact*+ = for males, Gvt= government, TPHA = Treponema pallidum hemogglutinin

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Table 3: Bivariate and multivariate analysis for *N. gonorrhea* and *T. Pallidum among* symptomatic STI patients in Gondar Town hospitals and health centers, April-August 2014

Characteristics	Total No (%)	*N. gonorrhea*				*T. Pallidum (*TPHA)			
		Positive No (%)	OR (95% CI)	AOR (95% CI)	P	Positive No (%)	OR(95% CI)	AOR(95% CI)	P
Sex									
Male	21(17)	6(29)	1.00	1.00		10(47)	1.00	1.00	
Female	99(83)	19(19)	0.59(0.2-1.7)	1.2(0.1-7)	0.974	26(26)	0.39(0.1-1)	0.5(0.1-3)	0.740
Age (yrs)									
15-29	80(67)	17(21)	1.0(0.4-2.7)	1.4(0.3-6)	0.649	25(31)	1(0.5-2.7)	1.5(0.3-6)	0.555
30-45	40(33)	8(20)	1.00	1.00		11(28)	1.00	1.00	
ES									
Illiterate	46(38)	9(20)	1.00	1.00	0.165	17(47)	1.00	1.00	0.722
Literate	74(62)	16(22)	0.88(0.3-2)	3.1(0.6-15)		19(26)	1.6(0.7-3)	0.5(0.1-4)	
MS									
Single	62(52)	14(23)	1.2(0.5-3)	1.0(0.1-6)	0.976	14(26)	0.6(0.3-1)	0.2(0.1-1)	0.201
Married	58(48)	11(19	1.00	1.00		20(35)	1.00	1.00	
Income									
No	37(31)	7(19)	1.2(0.2-7)	0.88(0.1-9)	0.756	7(19)	0.5(0.1-2)	0.7(0.09-6)	0.658
<800	25(21)	7(28)	2.1(0.3-12)	3.4(0.3-33)	0.231	4(16)	0.4(0.1-2)	0.2(0.02-2)	0.464
800-1600	31(26)	9(20)	1.3(0.2-7)	1.0(1.3-7.5)	0.968	14(45)	1.9(0.5-7)	1.8(0.3-10)	0.212
>1600	27(22)	2(15)	1.00	1.00	0.374	11(41)	1.00	1.00	0.626
Occup.									
Gvt	38(26)	10(26)	2.2(0.5-9.7)	10(0.7-13)	0.115	11(38)	0.9(0.2-3)	0.5(0.1-4)	0.534
Self	22(24)	5(23)	2.9(0.6-12)	5(0.5-6.1)	0.509	8(26)	1.6(0.5-5)	1(0.1-5.9)	0.412
No	23(19)	5(22)	2.1(0.4-10)	3.5(0.2-44)	0.648	4(17)	0.5(0.1-2)	1(0.2-10)	0.166
CSW	11(9)	2(18)	1.7(0.2-11)	1(0.01-196)	0.417	6(55)	3(0.7-14)	0.5(0.1-28)	0.051
HW	26(22)	3(11)		1.00	0.393	7(27)	1.00	1.00	0.371

Gvt; government, CSW; commercial sex worker, HW; house wives, ES; educational status, MS; marital status, Occup. ; Occupation

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Table 4: Bivariate and multivariate analysis for *T. vaginalis* and *Candida spp.* among STI patients in Gondar Town hospitals and health centers, April-August 2014.

Characteristics	Total No (%)	*Candida spp.*				*T. vaginalis*			
		positive No (%)	OR (95% CI)	AOR (95% CI)	P	Positive No (%)	OR(95% CI)	AOR(95% CI)	P
Age (yrs)									
15-29	80(67)	28(35)	1.4(0.6-3)	0.8(0.1-4)	0.848	13(16)	1.7(0.5-5)		0.241
30-45	40(33)	11(28)	1.00	1.00		4(10)	1.00	1.00	
ES									
Illiterate	46(38)	13(28)	1.00	1.00	0.553	4(9)	1.00	1.00	0.253
Literate	74(62)	26(35)	0.7(0.3-1.6)	0.6(0.1-2)		13(18)	0.4(0.1-1.4)	0.28(0.03-2)	
MS									
Single	62(52)	20(32)	0.9(0.4-2)	0.8(0.1-4)	0.824	12(19)	2.5(0.83-7)	649(1.4-277)	0.036
Married	58(48)	19(33)	1.00	1.00		5(9)	1.00	1.00	
Income									
No	37(31)	11(30)	0.5(0.1-1.8)	0.2(0.03-1)	0.215	7(19)	1.2(0.23-7)	0.003(0-1.4)	0.083
<800	25(21)	6(24)	0.3(0.08-1)	0.2(0.03-1)	0.182	6(24)	1.7(0.29-10)	0.5(0.003-56)	0.581
800-1600	45(38)	16(36)	0.6(0.2-2.2)	0.6(0.1-3)	0.718	2(5)	0.2(0.032-2)	0.005(0-12)	0.111
>1600	13(10)	6(46)	1.00	1.00	0.444	2(16)	1.00	1.00	0.112
Occup.									
Gvt	38(26)	7(18)	2.3(0.7-7)	0.8(0.2-4)	0.84	8(21)	0.8(.2-3.1)	0.005(0-1.5)	0.574
Self	22(24)	8(35)	2.8(0.8-9)	1.1(0.2-6)	0.54	0(0.0)	0.4(0.1-2.2)	0.01(0-1.9)	0.282
No	23(19)	9(39)	2.5(0.7-8)	1.6(0.3-8.2)	0.75	3(13)	0.6(0.1-2.9)	0.005(0-1.5)	0.995
CSW	11(9)	6(55)	5.3(1-22)	0.00	0.77	1(9.1)	0.4(0.04-4))	0.00	0.093
HW	26(22)	9(35)	1.00	1.00	0.90	5(19)	1.00	1.00	0.486

Gvt; government, CSW; commercial sex worker, HW; house wives, ES; educational status, MS; marital status

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DISCUSSION

Data are scarced regarding the epidemiology of STIs in most countries due to various reasons such as stigma and scarcity of diagnostic facilities associated with money.

The situation induces many developing countries, including Ethiopia, to corporate syndromic approach for STI diagnosis and treatment (18).

This study showed the endemicity and occurrence of sexually transmitted infections among symptomatic patients' genital specimens in Gondar Town hospitals and health centers. The overall prevalence of laboratory confirmed that the prevalence of STI was 89(74.1%) excluding HIV. The etiologies recovered from the patients include: *N. gonorrhea* 25(20.8%), *T. pallidum* 36(30%) and *T. vaginalis* 17(14.5%). On the other hand, *Candida spp.*, 39(32.5%), and HIV 17(14.5%) was also recovered alongside.

The overall prevalence of STI was 89(74.1%). A consistent prevalence of laboratory confirmed STI was recorded in Egypt (71.6%) (19). A relatively higher prevalence (85%) was found in reports from Ibadan in Nigeria (20). However, a comparatively lower prevalence (39%) was also reported in Ibadan in Nigeria (21). This is due to the fact that the prevalence of STI agents change with time, and the distribution of STI agents varies from place to place.

In this study, the prevalence of *N. gonorrhoeae,* 25(20.8%), was comparable with studies from Mozambique (22.5%) (22), Egypt (26%) (19) and Southwestern Nigeria (25%) (23). However, it was higher than the value reported in other studies like 0.8% in Vientiane (24), 11% in Mongolia (25). The result is also higher than other studies like, 6% in US (26), 1.4% in Colombia (1), 6% in India (27). Moreover, our findings of the prevalence of *N. gonorrhoeae* is higher than aprevious report from Hawassa, Ethiopia (5.1%) (28). These discrepancies in the prevalence of *N. gonorrhoeae* might be due to socioeconomic, cultural and geographical difference. High resistance development might be also due to lack of differential diagnosis, increase number of untreated patient and poor partner tracing system especially in our settings.

The prevalence of *T. pallidum* in our study was 36(32.5%) by TPHA. Among this, 6.6% were both RPR and TPHA positive active syphilis cases. This was comparable to a study from India, 6% active syphilis (27). However, it was higher than the report in Nigeria (1.5%) (21) and 0% prevalence among ANC clients in Southern Ethiopia (29). However, our finding was relatively lower as compared to 8% in ruler South Africa (30) and 15% in ruler Mozambique (31).

In our study, the prevalence of *T. vaginalis* was 17(14.5%). This finding was comparable with the report from South Africa, in which the prevalence of *T. vaginalis* among family planning service users was 14% (30). However, this figure was higher than the prevalence of *T. vaginalis* (2%) reported from Maputo and Ibadan (21,22), 12% and 2% among HIV sero-positive and negatives Nigerian women attending HIV and STI clinic respectively (3). These differences may be due to variation among study population.

The prevalence of *Candida spp*. had the highest percentage of infection occurrence, 39(32.5%). this is lower than the 39% prevalence in Nigeria (3) and higher tthan the 11%, 27%, 25.5% and 16% reports from Colombia, Nigeria, Tanzania and Ethiopia, respectively (1,21,32,33).

In the study, there was no significant difference in gonococcal infection and previously reported risk factors except HIV status (21,32,34). Keeping the finding reported from India (27), clients infected with gonorrhea got association with HIV status after all confounders were removed (OR 0.03, 95% CI 0.002-0.59, p=0.024). In this study, bivariate analysis, association was observed in condom use. Non-condom use had a protective effect for acquisition of *T. pallidum* (OR 0.23, 95% CI 0.06-.81, p=0.04). Although this had contrast with reports of Mehta *et al*, condom use had protective effect for acquisition of STI (35). This may be due to the fact that *T. pallidum* have other routes of transmition. The overall prevalence of *T. pallidum* infection 36(30%) was significantly associated with positive HIV status (OR 5.72, 95% CI 1.919-17.046, p=0.002). This was consistent with the report of Cohen-Genital ulcer diseases are associated with the highest relative risk for increased HIV

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transmission (36). Regular alcohol intake also had a significant association with *T. pallidum* infection (OR 3.32, 95% CI 1.1-9.2, p=0.032). This is comparable to a study from Colombia (1) and Ethiopia: to access the association of unprotected sex, sexually transmitted infections and problem drinking among female CSW (37).

Risk factors associated with *T. vaginalis* infection in this study was marital status (649, 1.4-277, 0.036), which is in line with a study in Nigeria-being married decreases infection acquisition (21). Females had the highest prevalence of *T. vaginalis* compared to males. This is comparable to a study from Nigeria (24). In contrast to other reports (21,37), *T. vaginalis* was common (54.4%) among subjects in the age group of 15 - 19 years, and the prevalence decreases when age increases. This may be due to poor sanitation and knowledge about STI among the vulnerable group.

In conclusion, high prevalence of *N. gonorrhoeae, T. pallidum, T. vaginalis* and *Candida spp.* among symptomatic clients who attended the STI clinics in the study area was observed. The risk factors for individual STIs were HIV positive status. Whereas regular alcohol intake for *T. pallidum*, HIV status for *N. gonorrhea*, marital status for *T. vaginalis* and lak of knowledge for *Candida spp were also* identified risk factors. Therefore, based on this finding, health education programs and promoting condom utilization and more comprehensive STI studies are recommended.

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