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Clinical Study

Trichomonas vaginalis Infection among Pregnant Women in Jimma University Specialized Hospital, Southwest Ethiopia

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Background. *Trichomonas vaginalis* is a sexually transmitted parasitic protozoan known to be responsible for an estimated 180 million new infections per year, making it the most prevalent nonviral sexually transmitted pathogen worldwide. *Method*. A cross-sectional study design was conducted on vaginal swabs by wet mount and Modified Columbia Agar culture technique in Jimma University Specialized Hospital (JUSH), ANC clinic, Jimma, Ethiopia. The study was done to assess the magnitude and associated risk factors of *T. vaginalis* infection from December to May, 2011/2012. *Result*. A total of 361 pregnant women were involved in this study. From these, 18 (4.98%) of the pregnant women were positive for *T. vaginalis* infection by Modified Columbian Agar culture technique. Education status (AOR = 0.186, 95% CI: 0.059–0.585, $P < 0.05$), patients with dysuria (AOR = 0.180; 95% CI: 0.046–0.704, $P < 0.05$) and dyspareunia (AOR = 0.152; 95% CI: 0.035–0.667, $P < 0.05$) were significantly associated with *T. vaginalis* infection. *Conclusion*. The prevalence of *T. vaginalis* infection at 4.89% is relatively high among young reproductive aged women. Because this infection increases the risk of HIV transmission and is associated with adverse pregnancy outcomes, there is a need for increased provision of health information concerning *T. vaginalis* to the community, educating women, screening, and treatment of *T. vaginalis* infection in Ethiopia.

1. Introduction

Trichomonas vaginalis is a flagellated protozoan possessing five flagella, four of which are located at its anterior portion. The fifth flagellum is incorporated within the undulating membrane of the parasite, which is supported by a slender noncontractile costa. This parasite varies in size and shape, with the average length and width being 13 and 10 μm. The life cycle of *T. vaginalis* is simple and involves only the direct transmission of viable trophozoite. Unlike many protozoan parasites, it possesses trophozoite form and lacks cyst stage. It has a cosmopolitan distribution and has been identified in all racial group and socioeconomic strata; however, it has been encountered in every continent and climate, with no seasonal variability. *T. vaginalis* infections are commonly associated with other sexually transmitted diseases (STDs) [1, 2].

Trichomonas vaginalis, an anaerobic, parasitic, is the causative agent of trichomoniasis and is the most common pathogenic protozoan infection of humans in the industrialized countries. The flagellate was originally considered a commensal organism until the 1950s when the understanding of its role as a sexually transmitted infection (STI) began to evolve. Humans are the only known host with the trophozoite transmitted via fomites. Both males and females are infected but the majority of cases were reported among females who also present with symptomatic infection than males. In females, vaginitis is the most common manifestation of the infection. Complications include the infection of the adnexa, skin, endometrium, and Bartholin glands. The pregnant women infected with this parasite may be at risk of an adverse birth out comes like postabortion or posthysterectomy infection, as well as infertility and enhanced predisposition to neoplastic transformation in cervical tissues [3].

Trichomonas vaginalis is a sexually transmitted parasitic protozoan known to be responsible for an estimated 180 million new infections per year, making it the most prevalent

nonviral sexually transmitted pathogen worldwide. It can also be transmitted to neonates during passage through an infected birth canal, but the infection is usually asymptomatic. *Trichomonas vaginalis* infection is frequently asymptomatic in adults; it can cause urethritis in men. Symptomatic women with trichomoniasis usually complain of vaginal discharge, vulvovaginal soreness, and/or irritation. Complications of trichomonal vaginitis that have been reported include premature rupture of membranes, premature labour, low birth weight [4, 5].

Trichomoniasis has neither been the focus of intensive study nor of active control programs in the sub Saharan Africa and this neglect likely a function of the relatively mild nature of the disease. However available evidence suggests that *T. vaginalis* may play a critical and under recognized role in amplifying human immunodeficiency virus (HIV) transmission and, in some circumstances, may have a major impact on the epidemic dynamics of HIV infection and the acquired immunodeficiency syndrome (AIDS) in the sub-Saharan Africa [6].

Trichomoniasis is often asymptomatic in men, however in more than half of the infected women manifests vaginitis, cervicitis, urethritis, and irritation with frothy malodorous discharge. Negative outcomes of this infection are especially significant during pregnancy. *T. vaginalis* can lead to urogenital tract infection. The incidence of vaginal trichomoniasis has noticeably risen especially in developing countries and in populations with high-risk behaviors such as poor sexual activity hygiene and multiple sexual partners. Poverty, socioeconomic status, low educational level, high risk sexual behaviors, prisoners, and HIV+ or HBV+ infected people are risk factors for acquiring STDs such as vaginal trichomoniasis [7].

The parasite also causes nongonococcal urethritis, prostatitis, and perhaps other lower genitourinary tract syndromes in infected men. Concomitant infection with other urethral pathogens such as Neisseria gonorrhoeae and/or Chlamydia trachomatis has also been found to be common in men and women with trichomoniasis. *Trichomonas vaginalis* infection is one of the most common curable sexually transmitted infections. Untreated infection can persist up to 5 years [8, 9]. So, the objective of this study was to assess the magnitude and associated risk factors of *T. vaginalis* infection in the study area.

2. Materials and Methods

2.1. Study Area. The study was conducted in Jimma University Specialized Hospital (JUSH), ANC clinic. Jimma University specialized hospital is found in Jimma town. The town is located 335 kms southwest of the capital Addis Ababa. The town has a characteristic of tropical highland climate condition, heavy rain fall, warm temperature, and long wet period [10]. The hospital serves a total of five million populations in southwest Ethiopia.

2.2. Study Design and Subjects. A facility-based cross-sectional study was conducted from December, 2011 to May, 2012. A total of 361 pregnant women in any of the three trimesters were participated in this study. Pregnant women who had vaginal medication and sexual intercourse in the previous 3 days prior to data collection were excluded from the study.

2.3. Data Collection Procedures. Sociodemographic and data on predisposing factors were collected using predesigned questionnaire by trained nurses. Moreover, two vaginal swabs were collected by trained clinical nurses for laboratory investigation. Wet smear was prepared from the first swab and immediately examined by experienced medical laboratory technologist. The second vaginal swab was placed in phosphate buffer saline solution and inoculated in Modified Columbia Agar (Columbia agar and Malt extract Oxoid ltd Basingstoke HANTS England, Dextrose Oxoid ltd Basingstoke Hampshire England, Streptomycin and Penicillin CSPC Zhongnuo Pharmaceutical (Shijiazhuang) co. ltd China, Chloramphenicol KARNATAKA antibiotics and pharmaceuticals limited India, Nystatin (Mycostatin) Amman pharmaceutical industries co. Jordan) in petri dishes. Culture and identification of *T. vaginalis* were done following the procedures as described by [11].

2.4. Data Analysis. The result was noted on data collection format. Finally the data was edited and entered into computer and analyzed using SPSS version 16.00 windows software. Descriptive statistics, Chi-square test, bivariate and multivariate logistic regressions were used for the analysis, taking P values less than 0.05 considered as significant. All the sociodemographic and clinical characteristics were tested by bivariate binary logistic regression and whose values less than 0.025 included in the multivariate binary logistic regression analysis.

2.5. Ethical Considerations. Ethical clearance was obtained from Jimma University ethical review committee. The purpose of the study was clearly explained for the study subjects, and written consent was obtained from each study participants. Confidentiality of the result was kept by coding patient information and specimen.

3. Results

3.1. Sociodemographic Characteristics. A total of 361 pregnant women of age ranging 15 to 36 years with mean age 24.4 ± 4.56 (mean ± SD) had participated in this study. Greater than half (54.8%) of the study participants were in the age range of 15–24 years. Majority of the study participants (38.8%) were unemployed. One hundred ninety three (53.5%) of the study participants were from urban areas. Majority of the study participants were married (93.1%) and literate (can read and write) (76%) (Table 1).

3.2. Risk Factors Associated with T. vaginalis Infection. With regard to association of *T. vaginalis* infection with marital status, 336 (93.1%) of the study participants were married. From these, 15 (4.5%) were positive for *T. vaginalis*. There is

Table 1: Demographic characteristics versus Modified Columbia Agar culture result in pregnant women at Jimma University specialized hospital, 2012.

Variables	Culture result		P value
	Positive (%)	Negative (%)	
Age			
15–24 years	9 (4.5)	189 (95.5)	
25–34 years	9 (5.8)	146 (94.2)	0.697
35–44 years	0	8 (100)	
Residence			
Urban	5 (2.6)	188 (97.4)	0.025
Rural	13 (7.7)	155 (92.3)	
Occupation			
Farmer	2 (5.4)	35 (94.6)	
Merchant	1 (5.9)	16 (94.1)	
Employed	0	74 (100)	0.291
Unemployed	9 (6.4)	131 (93.6)	
Others	6 (6.5)	87 (93.5)	
Marital status			
Single	0	6 (100)	
Divorced	3 (15.8)	16 (84.2)	0.075
Married	15 (4.5)	321 (95.5)	
Educational status			
Illiterate	12 (13.8)	75 (86.2)	
1–4 grade	1 (1.9)	52 (98.1)	
5–8 grade	5 (6.6)	71 (93.4)	0.001
9–12 grade	0	118 (100)	
>2 grade	0	27 (100)	

Table 2: Clinical characteristics versus Modified Columbia Agar culture result in pregnant women ($n = 361$) at Jimma university specialized hospital, 2012.

Variables	Culture result		P value
	Positive (%)	Negative (%)	
Trimester			
1st	1 (2.8)	35 (97.2)	
2nd	6 (5)	115 (95)	0.802
3rd	11 (5.4)	193 (94.6)	
Personal hygiene (shower) with soap			
≥3x/week	1 (5.6)	17 (94.4)	
2x/week	5 (5.6)	84 (94.4)	0.94
Once/week	12 (4.7)	242 (95.3)	
Vaginal discharge			
Yes	15 (8.2)	168 (91.8)	0.004
No	3 (1.7)	175 (98.3)	
Vaginal itching			
Yes	11 (16.7)	55 (83.3)	0.001
No	7 (2.4)	288 (97.6)	
Dysuria			
Yes	13 (21)	49 (79)	0.001
No	5 (1.7)	294 (83.3)	
Dyspareunia			
Yes	15 (15.8)	80 (84.2)	0.001
No	3 (1.1)	263 (98.9)	
Sex partner			
One	15 (5.1)	278 (94.9)	0.809
≥2	3 (4.4)	65 (95.6)	
Contraceptives used before pregnancy			
Pills	8 (11.9)	59 (88.1)	
Depo-Provera	2 (1.3)	149 (98.7)	
Norplant	0	5 (100)	0.002
Loop	1 (33.3)	2 (66.7)	
No	7 (5.2)	128 (94.8)	
Sharing of internal clothes			
Yes	4 (11.4)	31 (88.6)	0.065
No	14 (4.3)	312 (95.7)	
Use of common bath			
Yes	0	35 (100)	0.154
No	18 (5.5)	308 (94.5)	
Sharing of toilet			
Yes	0	44 (100)	0.105
No	18 (5.7)	299 (94.3)	

no significant association between *T. vaginalis* infection and marital status ($P = 0.075$). Whereas in relation to residence, 168 (465%) of the study participants were from rural areas. From these, 13 (7.7%) were infected by *T. vaginalis* infection. In association with occupation with *T. vaginalis* infection, 140 (38.8%) of the study participants were unemployed, from these, 9 (6.4%) were positive for *T. vaginalis*. There is no significant association between *T. vaginalis* infection, residence and occupation (Table 1).

Most of the study participants (56.5%) were in the third trimester of pregnancy. From these, 11 (5.4%) were positive for *T. vaginalis*. There was no significance difference ($P = 0.802$) in *T. vaginalis* infection rate among the trimesters. The same as, two hundred fifty four (70.3%) of the study participants were taken shower once/week. From these, 12 (4.7%) were positive for *T. vaginalis*. There is no significant association ($P = 0.94$) between *T. vaginalis* infection and personal hygiene. Also, about half (50.7%) of the study participants who reported presence of vaginal discharge, 15 (8.2%) were positive for *T. vaginalis*. Participants who reported to have vaginal discharge showed significant association with *T. vaginalis* infection by the bivariate analysis ($P < 0.05$). With the same manner vaginal itching was reported by 66 (18.3%) of the study participants. From these, 11 (16.7%) were positive for *T. vaginalis* infection. Participants reported to have vaginal itching showed significant association by the bivariate analysis ($P < 0.05$). Most of the study participants 293 (81.2%)

Table 3: Bivariate and multivariate binary logistic analyses of demographic and clinical characteristics of *T. vaginalis* at Jimma University Specialized Hospital, 2012.

	Culture result		COR	95% CI	AOR	95% CI	*P* value
	Positive (%)	Negative (%)					
Educational status							
Literate	6 (2.2)	268 (97.8)	1		1		
Illiterate	12 (13.8)	75 (86.2)	7.147	2.595–19.678	0.186	0.059–0.585	0.004
Dysuria							
Yes	13 (21)	49 (79)	0.064	0.022–0.188	0.180	0.046–0.704	0.014
No	5 (1.7)	294 (98.3)	1		1		
Dyspareunia							
Yes	15 (15.8)	80 (84.2)	0.061	0.017–0.215	0.152	0.035–0.667	0.013
No	3 (1.1)	263 (98.9)	1		1		

Statistically significant at $P < 0.05$, COR: crude odds ratio, AOR: adjusted odds ratio, CI: confidence interval.

who reported to have one sexual partner, 15 (15.8%) were positive for *T. vaginalis*. There is no significant association ($P = 0.809$) between *T. vaginalis* infection and number of sex partner. One hundred fifty one (41.8%) and 67 (18.6%) of the study participants were reported the usage of Depo-Provera and pills (oral contraceptives) before pregnancy, respectively. There is no significant association between *T. vaginalis* infection and contraceptives usage before pregnancy. Finally study subjects who reported sharing of internal clothes 4 (11.4%), no usage of common bath 14 (4.5%), and no sharing of toilet 18 (5.7%) were positive for *T. vaginalis* (Table 2).

After adjusting for the other variables, education status (AOR = 0.186, 95% CI: 0.059–0.585, $P < 0.05$), patients with dysuria (AOR = 0.180; 95% CI: 0.046–0.704, $P < 0.05$) and dyspareunia (AOR = 0.152; 95% CI: 0.035–0.667, $P < 0.05$) were significantly associated with *T. vaginalis* infection by the multivariate analysis (Table 3).

4. Discussion

The prevalence of *T. vaginalis* in this study area was 4.98%. The finding of this study was lower than reports from Nigeria 18.66% [12], Tehran 10.2% [13], India 8.5% [14], Zambia 27.1% [15], Sri Lanka 6.9% and 7.2% [16, 17], Maharashtra India 12.06% [18], Sudan 7.3% [19], and Maryland 12.6% [20].

On the other hand, the prevalence of this study was higher than the studies conducted in US 2.8% [21] and Iran 2.1% [22]. Also, the prevalence of this study was comparable with the study conducted in Iraq 5.4% [23] and Argentina 4% [24]. The observed difference in the rate of infection could be due to variation in age distribution, personal hygiene practice, climatic conditions, socioeconomic and literacy status of the pregnant women.

In this study risk factors like vaginal discharge, vaginal itching, dysuria, dyspareunia, and contraceptives used before pregnancy had significant association with *T. vaginalis* infection which is consistent with other studies conducted in Iran [13], Sri Lanka [16, 17], and India [14].

In this study most of the *T. vaginalis* infected women were married and reported their spouse were their main sex partner which was consistent with the studies done in India [14], but inconsistent with the study done in Tehran [13]. Most of the *T. vaginalis* infected pregnant women in this study were illiterate (cannot read and write) which is different from the study conducted in Sri Lanka [17] and Hamadan city, western Iran [22].

Majority of the pregnant women who used pills (oral contraceptives) before pregnancy were more infected by *T. vaginalis* infection which is consistent with the study conducted in Tehran [13].

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