TRICHOMONIASIS AND ASSOCIATED SOCIO-DEMOGRAPHIC FACTORS AMONG WOMEN IN PORT HARCOURT,NIGERIA

Abstract

Human trichomoniasis is a sexually transmitted infection (STI) caused by an anaerobic flagellated protozoan parasite called *Trichomonas vaginalis* that infects the human urogenital tract. The study is aimed that assessing the association between trichomoniasis and demographic parameters in women attending Rivers State University Teaching Hospital (RSUTH). The cross-sectional study was made up of 650 randomly selected women, 450 of them were tested for trichomoniasis using urine sample while the other 200 were tested using high vagina swab (HVS). With the aid of a well-structured questionnaire, consenting participants provided their socio-demographic data. The results showed that there was an association between educational status and prevalence of trichomoniasis ($p<0.05$) in both cases of samples. Also, there was association between age and prevalence of trichomoniasis in HVS tested sample ($p<0.05$). There was no association between trichomoniasis and occupational and marital statuses ($p>0.05$). This study has revealed that education and age can impact on the dynamics of trichomonial infection among women.

Keywords: *high vagina swab, urine~~, trichomoniasis~~*

Comment [V31]: Please use different word. e.g., sexually transmitted disease, protozoa

Introduction

Human trichomoniasis is a sexually transmitted infection (STI) caused by an anaerobic flagellated protozoan parasite called *Trichomonas vaginalis* that infects the human urogenital tract. *Trichomonas vaginalis* was originally considered a commensal organism until the 1950s when the understanding of its role as a sexually transmitted infection (STI) began to evolve (Olusegun-Joseph and Killaney, 2016). This infection ranks third after bacterial vaginosis and candidiasis among the diseases that commonly cause vaginal symptom. An estimated 2.5 to 3 million Americans contract this infection annually, about 25% of Nigerian students and up to 20% of pregnant women test positive while about one billion people suffer Trichomoniasis worldwide (Omorodion, 2018). Transmission usually occurs via direct, skin-to-skin contact with an infected individual, most often through sexual intercourse. Trichomoniasis was first described by scientist, physician, microscopist and professor Alfred Francois Donnè (1801-1878) at the Faculty of Paris, in 1836. Donnè identified the protozoan in an unstained "wet mount" preparation of vaginal discharge mixed with saline. In 1883, another researcher named Kunstle described the behavior of the parasite within the female urinary tract. As an extracellular organism, *T. vaginalis* must adhere to the epithelial lining of the host's urogenital tract to

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survive. Inflammation of the urethra, vagina and cervix in women as well as the urethra, epididymis and prostate in men reveal the ability of the parasite to inhabit several host environments (Eke *et al*., 2021). The infection may lead to an important complication in pregnancy, as it has been related with prematurity and low birth weight. The disease is primarily transmitted through sexual contact and the incidence depends on the population screened and certain factors such as poor personal hygiene, multiple sex partners, low socio-economic status and under- development (Krieger, 2010).

Following the compelling need to understand the association between trichomoniasis and socio-demographic parameters among women of in Port Harcourt, this study is focused at assessing the association between trichomoniasis and selected social-demographic parameters among women in Port Harcourt.

Materials and Methods

Study Design

A descriptive cross sectional study was adopted and 650 participants (Adekunle, *et al.*, 2021) were randomly selected (Rhoda et al., 2022) from females within the age of 15 and 55 years attending Rivers State University Teaching Hospital (RSUTH), Port Harcourt, Nigeria. The participants were selected among pregnant women, HIV patients, out patients and healthy volunteers. Out of the 650 participants, 450 were tested for trichomoniasis using urine while 200 participants were tested using High vagina swab (HVS). Data pertaining their socio-demography were obtained via well-structured questionnaire supported by verbal interview (Onosakponome et al., 2022).

Comment [V33]: please mention about ethical clearance

Ethical Consideration

Ethical approval was sought and obtained from Rivers State University Teaching Hospital (RSUTH) and informed written consent was obtained from each participant before their enrolment in the study.

Eligibility Criteria

Inclusion Criteria

Only subjects who gave informed and written consent were included in the study. Females within the reproductive age of 15-55 years of age and those who were sexually active were enrolled.

Exclusion Criteria

Females who are not within the reproductive age of 15-55 years and females who do not give written consent were not recruited. Females who were not registered with RSUTH were also not selected.

Sample Collection and Analysis

A total of 200 High vaginal swab (HVS) specimen using sterile cotton swab sticks were aseptically collected from consented participants across the study area by qualified female medical laboratory scientists and 450 urine specimens were collected by the patients themselves using clean sterile sample bottles as directed. The HVS and urine samples were moved to the laboratory for microscopic smear examination for the trophozoites of *T. vaginalis*. Prior to smear preparation, the samples were cultured using *T. vaginalis* medium (Adekunle et al., 2021; Michael and Evelyn, 2021).

Statistical Analysis

Data obtained was entered into Microsoft Excel and analyzed using SPSS version 25. Descriptive statistics including frequencies and percentages were used to describe the population and also to estimate the prevalence of trichomoniasis in the studied population. Chi-square test was used to investigate associations among categorical variables. Confidence level was set at 95%.

Results

Table 1 shows the comparison of prevalence of trichomoniasis among studied groups (OP, HIV, PTW and HV) in women attending RSUTH. The results presents that there is a significant difference ($p<0.05$) in the prevalence of trichomoniasis among the groups.

Table 2 shows the association between age and trichomoniasis among women attending RSUTH. The results presents that there is a significant association ($p<0.05$) between age and trichomonial infection in HVS analyzed samples but no association in urine analyzed samples.

Table 3 shows the association between marital status and trichomoniasis among women attending RSUTH. The results presents that there is no significant association ($p>0.05$) between marital status and trichomonial infection.

Table 4 shows the association between occupation and trichomoniasis among women attending RSUTH. The results presents that there is no significant association ($p>0.05$) between occupation and trichomonial infection.

Table 5 shows the association between educational status and trichomoniasis among women attending RSUTH. The results presents that there is a significant association ($p<0.05$) between occupational status and trichomoniasis

Table 1: Comparing Prevalence of Trichomoniasis among the Study Groups

SG	NE		NP (%)		Kruskal Wallis (x^2)		P-value	
	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS
OP	150	50	6(4)	8(5.3)				
HIV	100	50	13(13)	8(16)	20.191	11.450	0.000	0.010
PTW	100	50	3(3)	2(4)				
HV	100	50	0(0)	0(0)				
Overall	450	200	22(4.9)	18(9)			SS	SS

SG = Subgroups; NE = Number Examined; NP = Number Positive; HVS = High Vaginal Swab; OP = Out Patients; HIV = HIV Positive Persons; PTW = Pregnant Women; HV = Healthy Volunteers. SS = Significant (P=0.000) (P=0.010).

Table 2.0: Relationship between Age and *T. vaginalis* infection.

Age (years)	NE		NP (%)											
			OP		HIV		PTW		HV		P-value			
	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS
15-25	146	75	2(1.4)	4(5.3)	0(0)	0(0)	1(0.6)	0(0)	0(0)	0(0)				
26-35	145	72	3(2.1)	2(2.8)	4(2.6)	2(2.8)	2(1.4)	2(2.8)	0(0)	0(0)	3.935	8.841	0.269	0.031
36-45	102	40	0(0)	2(5)	7(6.9)	2(5)	0(0)	0(0)	0(0)	0(0)				
46-55	57	13	1(1.8)	0(0)	2(3.5)	4(30.7)	0(0)	0(0)	0(0)	0(0)				
Overall	450	200	6(1.3)	8(4)	13(2.9)	8(4)	3(0.7)	2(1)	0(0)	0(0)				

NE = Number Examined; NP = Number Positive; HVS = High Vaginal Swab; OP = Out Patients; HIV = HIV Positive Persons; PTW = Pregnant Women; HV = Healthy Volunteers. (P<0.05).

Table 3.0: Relationship between Marital Status and *T. vaginalis* infection.

Marital Status	NE		NP (%)								x2		P-value	
			OP		HIV		PTW		HV					
	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS
Single	186	101	3(1.6)	5(5)	2(1.1)	2(2)	0(0)	0(0)	0(0)	0(0)	3.302	1.067	0.069	0.302
Married	264	99	3(1.1)	3(1.1)	11(4.2)	6(6)	3(1.1)	2(2)	0(0)	0(0)				
Overall	450	200	6(1.3)	8(4)	13(2.9)	8(4)	3(0.7)	2(1)	0(0)	0(0)				

NE = Number Examined; NP = Number Positive; HVS = High Vaginal Swab; OP = Out Patients; HIV = HIV Positive Persons; PTW = Pregnant Women; HV = Healthy Volunteers. (P>0.05).

Table 4.0: Relationship between Occupation and *T. vaginalis* infection.

Occupation	NE		NP (%)								x2		P-value	
			OP		HIV		PTW		HV					
	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS
Unemployed	49	28	1(2)	0(0)	3(6.1)	2(7.1)	0(0)	0(0)	0(0)	0(0)				
Employed	130	48	3(2.3)	3(6.3)	4(3)	6(12.5)	1(0.8)	0(0)	0(0)	0(0)				
Self-employed	132	53	1(0.8)	1(1.9)	6(4.6)	0(0)	1(0.8)	2(3.8)	0(0)	0(0)	5.176	7.558	0.270	0.109
Retired	14	4	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)				
Student	125	67	1(0.8)	4(6)	0(0)	0(0)	1(0.8)	0(0)	0(0)	0(0)				
Overall	450	200	6(1.3)	8(4)	13(2.9)	8(4)	3(0.7)	2(1)	0(0)	0(0)				

NE = Number Examined; NP = Number Positive; HVS = High Vaginal Swab; OP = Out Patients; HIV = HIV Positive Persons; PTW = Pregnant Women; HV = Healthy Volunteers. (P>0.05).

Table 5.0: Relationship between Educational status and *T. vaginalis* infection.

	NE		NP (%)											
Educational			**OP**		**HIV**		**PTW**		**HV**		**x2**		**P-value**	
Status	**Urine**	**HVS**	**Urine**	**HVS**	**Urine**	**HVS**	**Urine**	**HVS**	**Urine**	**HVS**	**Urine**	**HVS**	**Urine**	**HVS**
No formal education	0	0	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)				
Primary	1	2	0(0)	0(0)	1(100)	2(100)	0(0)	0(0)	0(0)	0(0)	19.815	20.447	0.000	0.000
Secondary	105	40	1(1)	1(2.5)	4(3.8)	0(0)	1(1)	2(5)	0(0)	0(0)				
Tertiary	344	158	5(1.5)	7(4.4)	8(2.3)	6(3.8)	2(0.6)	0(0)	0(0)	0(0)				
Overall	450	200	6(1.3)	8(4)	13(2.9)	8(4)	3(0.7)	2(1)	0(0)	0(0)				

NE = Number Examined; NP = Number Positive; HVS = High Vaginal Swab; OP = Out Patients; HIV = HIV Positive Persons; PTW = Pregnant Women; HV = Healthy Volunteers. ($P<0.05$).

Discussion

The study showed that the overall prevalence of trichomoniasis in Port Harcourt is high with urine presenting 4.9% prevalence while HVS with 9%. Amadi and Nwagbo (2013) reported that either urine sample or vaginal swab is insufficient for proper diagnosis of *T. vaginalis* infection and have suggested that for better results, both urine and vaginal swab should be used. Kruskal-Wallis was used to evaluate the differences among the four subgroups. HIV patients recorded the highest prevalence in urine (13%) and HVS (16%) followed closely by "out patients" presenting prevalence in urine as (4%) and HVS (5.3%). Pregnant women and healthy volunteers recorded slightly lower prevalence of urine 3(3%), HVS 2(4%) and urine (0), HVS (0) respectively. Davis *et al*., (2017) documented the association between sexually transmitted viral infections like HIV and trichomoniasis. Immunocompromised individuals (HIV patients) are more susceptible to infections and out patients who experience symptoms like itching, small punctate haemorrhagic spots – strawberry (mucosa) cervix and smelly vaginal discharges or asymptomatic. This study is similar with recent findings of Wand *et al.,* (2021) reporting that the infection was also more common in women with concomitant cervicitis or bacterial vaginosis. Trichomoniasis is known to occur in females when the normal acidity of the vagina shifts from a semi-acidic pH (3.8-4.2) to a much more basic one (5.0-6.0) that is conducive to *T. vaginalis* growth. Host factors that increase vaginal pH such as pregnancy, menstruation, and coincident anaerobic infections in the vaginal wall appear to encourage the growth of *T. vaginalis*. Pregnancy did not affect significantly the prevalence of trichomoniasis in this study which may be due to the health education given at every antenatal clinic day where good personal hygiene is encouraged. The findings of Akinbo, *et al*., (2017) was in consonance with this study findings as the frequency of sexual intercourse decreases as pregnancy advances, therefore pregnant women were less predisposed to trichomoniasis.

The study revealed that women between the age of 46-55 years and 36-45 years recorded the highest prevalence of trichomoniasis 30.7% and 6.9% respectively. Age is significantly associated with trichomoniasis infection. This could be as a result of unsafe sex practices and hormonal deficiency which leads to thinning of the vaginal epithelium and a reduction in epithelial glycogen content, this alters the vaginal pH and lactobacilli microflora, creating a conducive environment for *T. vaginalis* to thrive. Married women recorded the highest prevalence of trichomoniasis (5%), although there was no association between marital status and the infection. The findings of Momeni (2016) were similar to these findings. The prevalence of trichomoniasis based on occupation of subjects differs relatively among all groups but there was no association with the prevalence of the infection. The level of education has a significant impact on the prevalence of *T. vaginalis*. The study showed that the highest rate of infection among women with primary education reached 100% in HIV patients. Obviously, this result was close to most related studies in which low educational level was associated with increased rate of *T. vaginalis* including the study of Sumadhya (2012) in Sri Lanka and another study in the United States by Annang (2010). Perhaps the reason for the high prevalence of infection among

women with low education could be due to lack of health knowledge which is usually related to general education because health education is taught till secondary level. Again, the more people are educated the more they make better decisions and take care of themselves. So education has a multiplying effect on people.

Conclusion

This study has demonstrated that certain demographic characteristics are associated with trichomoniasis. That is to say, certain demographic characteristics can predispose one to trichomonial infection. In this study, it was revealed that educational status, and age are associated trichomoniasis in women at RSUTH.

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