

Trichomonas Vaginalis Infection Among Pregnant Women In Calabar, Cross River State, Nigeria.

V Usanga, L Abia-Bassey, P Inyang-etoh, S Udoh, F Ani, E Archibong

Citation

V Usanga, L Abia-Bassey, P Inyang-etoh, S Udoh, F Ani, E Archibong. *Trichomonas Vaginalis Infection Among Pregnant Women In Calabar, Cross River State, Nigeria.* The Internet Journal of Gynecology and Obstetrics. 2009 Volume 14 Number 2.

Abstract

A total of 562 outpatient pregnant antenatal women made up of 220 from The General Hospital, Calabar (G.H) and 342 from The University of Calabar Teaching Hospital, Calabar (UCTH), were examined for *Trichomonas vaginalis* infection. Direct wet mount microscopy and Giemsa staining techniques were used on High Vaginal Swab (HVS) specimens collected on sterile swabs. A prevalence of 29(5.2%) was recorded using both methods; 12(5.5%) in G.H. and 17(5.0%) in UCTH, Calabar, respectively. Differences in hospitals used were statistically significant ($P < 0.05$). Women in the age group 20-24 years had the highest prevalence of infection 12(10.8%), closely followed by those of age group 15-19 years 8(10.3%). A higher prevalence rate of 9(8.3%) was recorded among women in their first trimester of pregnancy, in single (unmarried) women 7(5.3%) and in women with primary school education 12(6.4%). The need for improved personal hygiene and other effective intervention programmes among these vulnerable groups of women is advocated.

INTRODUCTION

Trichomonas vaginalis specie, a flagellated protozoan parasite is one of the most prevalent causes of non-viral sexually transmitted diseases in the world⁽¹⁾. *T. vaginalis* trophozoite is an oval, flagellated parasite with five flagella arising near a cytosome with a conspicuous barb-like axostyle project which may be used for attachment to surfaces and may also cause the tissue damage noted in trichomoniasis infections⁽¹⁾⁽²⁾.

T. vaginalis trophozoite is among the most durable protozoan organisms that can survive for up to 24 hours in urine, semen or even in water samples and has the ability to persist on fomites with a moist surface for up to one or two hours⁽³⁾.

Trichomoniasis occur in females (males rarely exhibit any symptoms) if the normal acidity of the vagina is shifted 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⁽³⁾. The disease is characterized in female patients by frothy-greenish foul smelling vaginal discharge accompanied with vulvo-vaginal irritation, dysuria and lower abdominal pains⁽⁴⁾. *T. vaginalis* is also associated with a condition known as strawberry cervix, an inflammatory reaction that mimic the cervical motion tenderness associated with pelvic inflammatory

disease (PID)⁽⁵⁾.

Complications of trichomonas vaginitis that have been reported in pregnant women include premature rupture of membranes, premature labour, low birth weight and post abortion infections⁽⁶⁾. *T. vaginalis* has also been reported in the urinary tract, fallopian tubes, pelvis and can cause pneumonia, bronchitis and oral lesions⁽⁶⁾.

Trichomoniasis is also linked to increased mortality as well as predisposing to HIV infection, AIDS and cervical cancers⁽⁶⁾⁽⁷⁾ and increases the susceptibility to other viruses infection, including herpes, human papillomavirus (HPV) and AIDS⁽⁸⁾. Cervicitis due to trichomoniasis is characterized by purulent discharges in the endocervical canal and easily induced endocervical bleeding⁽⁴⁾.

Persons with trichomoniasis are twice as likely to develop HIV infection as the general population⁽⁹⁾; this is explained by the fact that an association exists between acquisition of *T. vaginalis* and HIV: disruption of the epithelial monolayer cells leading to microulcerations of inhabited tissues and increased passage of the HIV virus⁽⁴⁾. Studies reveal that *T. vaginalis* induces immune activation, specifically lymphocyte activation, replication and cytokine production, leading to increased viral replication in HIV-infected cells

⁽¹⁰⁾.

Symptomatic trichomoniasis is more common in women than in men: trichomoniasis in men is less clinically apparent but when infected, organism is found in the anterior urethra, external genitalia, prostate, epididymis and in semen ⁽¹⁰⁾, while symptoms range from none to urethritis complicated by prostatitis, epididymitis, urethral stricture disease and infertility ⁽¹⁰⁾.

The incidence of trichomoniasis depends on the population screened / examined. Certain factors such as poor personal hygiene, multiple sex partners, low socio-economic status and underdevelopment are documented to be associated with high incidence of infection ⁽¹¹⁾

Trichomoniasis is reported to be the most common pathogenic protozoan infection of humans in industrialized countries with an estimated 180 million infections acquired annually worldwide ⁽¹²⁾⁽¹³⁾ while in the United States of America, 5 million women and 1 million men are infected annually ⁽¹³⁾. In Africa, the prevalence of trichomoniasis is reported to be much higher ⁽¹³⁾.

This study is set to determine the prevalence of *T. vaginalis* infection among pregnant women in Calabar and to establish, if any, the relationship between the socio-demographic and behavioural risk factors that helps to perpetuate the infection among the women.

MATERIALS AND METHODS

STUDY LOCATION

The study location was Calabar, the capital city of Cross River State. Cross River State is in the south eastern region of Nigeria and shares boundaries with Benue State to the North, Ebonyi and Abia States to the West and to the East by Cameroon Republic. The city has a population of 2 millions inhabitants and is nicknamed “Canaan City” because of her rich cultural, social life and designated tourist destination.

COLLECTION OF SAMPLES

The Study was prospective in nature and conducted between December 2007 to November 2008 among pregnant women attending antenatal clinic for the first time during their pregnancy. Ethical approvals were given from the hospitals included in the study. Participation was voluntary and informed consent was obtained. Information on the demographic characteristics, education, and behavioral risk factors was obtained through a pre-designed structured questionnaire.

High vaginal swab samples were collected from each pregnant woman by inserting a sterile speculum into the posterior fornix of the vagina while the individual is in the lithotomic position. The nature of the collected samples were noted such as the color, consistency and odor. Samples collected were transported to the laboratory immediately for processing. Where delay was inevitable, HVS specimens were put in Stuart transport medium (STM) [Oxoid Ltd, UK] ⁽¹⁴⁾ and processed in the laboratory within 1 -2 hours of collection.

IDENTIFICATION OF T. VAGINALIS:

Wet mounts of all swab samples were made in sterile normal saline on clean slides, covered with a cover slide and examined under the low power (10x) and high power (40x) magnifications for presence of motile trichomonads. Pear-shaped, motile flagellates were seen moving with characteristic jerky, wobbling and rotating motions.

A smear of the secretion was also made on a slide, air-dried and fixed in absolute methanol for 1 minute. Diluted Giemsa stain was poured on the smear and allowed to stain for 10 minutes after which it was washed, air dried and examined under microscope with oil immersion (X100) magnification for presence of trichomonads.

DATA ANALYSIS

Statistical analysis of the results was conducted using Chi-square at 0.05% with an appropriate degree of freedom. A P-value of a level less than 0.05 ($P \leq 0.05$) was considered statistically significant.

RESULTS

Out of the 562 pregnant ante-natal women examined for *T. vaginalis*, a total of 29(5.2%) were infected. Of the 220 samples collected from General Hospital, Calabar (G.H), 12(5.5%) were positive for *T. vaginalis* while 17(5.0%) were infected out of the 342 sampled from University of Calabar Teaching Hospital, Calabar (UCTH), (table 1).

Table 2 shows the age specific distribution of *T. vaginalis* infection among the pregnant women in the study. Trichomoniasis was more prevalent in the 20 -24 years age group 12(10.8%), closely followed by the 15 – 19 years age group 8(10.3%) while those in the age group 40 and above tested negative to the infection. There was a high significant association between age groups and rate of infection ($P < 0.05$).

Peak prevalence was recorded in pregnant women in the first

trimester of pregnancy 9(8.3%) followed by those in the second 16(4.4%) and third 3(4.3%) trimesters respectively as shown in table 3. Statistical analysis of the relationship between these trimesters and infection prevalence was significant ($P < 0.05$).

Occurrence of infection by marital status as depicted in table 4 shows that pregnant single women were more infected 7(5.3%) followed by married pregnant women. No *T.vaginalis* infection was recorded in the Divorced and Widowed group. Infection prevalence was significantly linked with marital status in this study ($P < 0.05$).

Infection was more in pregnant women with primary school education 12(6.4%), followed by those with secondary education qualification 11(4.8%) and in pregnant women with higher education 6(4.4%). However, no *T. vaginalis* infection was recorded among pregnant women with no education and women with Quranic education in this study. Educational qualification of married women in this study was not significantly linked with infection prevalence ($P > 0.05$).

Figure 1

Table 1: Prevalence of infection among pregnant women sampled from General Hospital and UCTH, Calabar.

Hospital	No Examined	No Infected	% Infected
Gen. Hospital	220	12	5.5
UCTH	342	17	5.0
TOTAL	562	29	5.2

Figure 2

Table 2: Age specific distribution of infection among pregnant women in Calabar

Age (Years)	No tested	No (%) Positive
15 – 19	78	8 (10.3)
20 – 24	111	12 (10.8)
25 – 29	160	4 (2.5)
30 – 34	135	4 (3.0)
35 – 39	58	1 (1.7)
40 – 49	20	-
Total	562	29 (5.2)

Figure 3

Table 3: Prevalence of infection by trimester among pregnant women

Trimester (Months)	No Tested	No (%) Positive
First (1 – 3)	108	9 (8.3)
Second (3 – 6)	362	16 (4.4)
Third (6 – 9)	92	3 (4.3)
Total	562	29 (5.2)

Figure 4

Table 4: Occurrence of infection by marital status of the pregnant women

Marital status	No Tested	No (%) Positive
Single	132	7 (5.3)
Married	421	22 (5.2)
Divorced/Separated	6	-
Widowed	3	-
Total	562	29 (5.2)

Figure 5

Table 5: Occurrence of infection according to the educational status of pregnant women

Educational Status	No Tested	No (%) Positive
None	3	-
Quranic only	6	-
Primary (FSLC holders)	187	12 (6.4)
Secondary (WASC/GCE/NECO)	230	11 (4.8)
Higher (HND/Degree etc)	136	6 (4.4)
Total	562	29 (5.2)

DISCUSSION

The result of this study has demonstrated the prevalence and occurrence of *T.vaginalis* infection in pregnant women in Calabar, Cross River State. *T.vaginalis* was found in 29(5.5%) of the pregnant women examined in this study.

This result partly agrees with findings from previous studies, for example 4.7% reported in Illorin, Nigeria⁽¹⁵⁾; 2.7% prevalence in Jos, Nigeria⁽¹⁶⁾, 2.8% in Abakaliki, Nigeria⁽¹⁷⁾ and 3.3% in Lagos, Nigeria⁽¹⁸⁾.

However, this observation is at variance with a higher prevalence rate reported in a number of other studies; for example, 12.5% in Enugu, Nigeria⁽¹⁹⁾, 15.0% in Benin City, Nigeria⁽²⁰⁾, 17.7% in Uyo, Nigeria⁽²¹⁾, 18.7% in Zaria, Nigeria⁽²²⁾ 24.7% in Tanzania⁽²³⁾, 34.0% in Nairobi, Kenya⁽²⁴⁾ and 49.2% in South Africa⁽²⁵⁾.

There is a general consensus that the prevalence of *T.vaginalis* vary markedly according to settings⁽¹²⁾, therefore, these disparities in prevalence could be attributed to the different environmental backgrounds of the subjects studied.

Amongst the different age groups investigated, *T.vaginalis* infection distribution was highest in women aged 20 – 24 years (10.8%), followed by women aged 15 – 19 years (10.3%) and non in women aged 40 years and above. The result of this study is in agreement with generally observed fact that the incidence of sexually transmitted diseases (STDs) including trichomoniasis, by the number of cases treated each year, is highest among the 15 - 30 years age group⁽²⁶⁾. These age groups reported by other researchers⁽¹⁵⁾⁽¹⁶⁾⁽¹⁷⁾⁽¹⁸⁾⁽²¹⁾ are documented to be persons with the greatest sexual activity and that incidences decreases with age.

Women in the first trimester of pregnancy were observed to be more infected with *T.vaginalis* (8.3%), followed by those in the second (4.4%) and third trimesters (4.3%) respectively. Information retrieved from pregnant women revealed that the frequency of sexual intercourse decreases as pregnancy advances and this may likely be the reason for the low incidence of infection at second and third trimesters. Our finding is consistent with previous report in Imo state, Nigeria⁽²⁷⁾ who reported that pregnant women in the first trimester of pregnancy had the highest prevalence of STDs.

However, this observation was in contrast with findings in Abakaliki, Nigeria⁽¹⁷⁾ who reported that women in the third trimester of pregnancy were more infected with *T.vaginalis* in their study. Trimester was significantly associated with infection occurrence in this study.

Marital status of pregnant women examined for *T.vaginalis* in this study was also found to be significantly associated with infection acquisition ($P < 0.05$). Single (unmarried) pregnant women were found to be more infected (5.3%) than the married (5.2%). This pre-supposes that unmarried women are unattached thus free to indulge in more sexual activities probably involving multiple sexual partners. This corroborates findings by Okpara et al⁽²¹⁾ who reported that single women were more infected in their study. In a related

study a statistically significant association was found between trichomoniasis, prostitution, no condom use and other STDs⁽²⁸⁾.

Occurrence of *T.vaginalis* infection by level of education revealed that pregnant women with the primary school leaving certificate categories had the highest prevalence of infection in this study (6.4%) followed by secondary school certificate holders (4.8%). Illiterate pregnant women and women with Quranic education had no infection with *T.vaginalis* recorded in this study. This was clearly due to the extremely small number of pregnant women in those groups examined as shown in table 5. Thus, there was no significant association between educational status and infection occurrence ($P > 0.05$), an observation that is at variance with several studies⁽¹⁵⁾⁽¹⁶⁾⁽¹⁷⁾⁽²¹⁾ that have significantly linked educational status with infection occurrence.

The use of wet mount and Giemsa staining methods greatly enhanced the detection of *T.vaginalis* trophozoites that would have been missed by direct wet mount technique alone. Despite the limited sensitivity of these methods, direct wet microscopic examination of vaginal swab specimens alone remain the most widely utilized diagnostic test for the infection in most hospitals⁽²⁹⁾ and this is reported to have a sensitivity of only about 60 – 80%⁽³⁰⁾⁽³¹⁾⁽³²⁾. According to some researchers⁽²²⁾⁽³¹⁾⁽³³⁾, culture method is considered to be far superior to wet mount examination for the detection of the organisms and is currently the gold standard which should be considered for widespread clinical use.

The high incidence of *T.vaginalis* infection worldwide, co-infection with other sexually transmitted infections and attendant high risk of pelvic inflammatory diseases and tubal infertility make trichomoniasis a compelling public health concern⁽⁵⁾⁽³⁴⁾.

Certain factors such as poor personal hygiene, multiple sex partners, low socio-economic status and under development are also associated with high incidence of infection⁽²¹⁾⁽²²⁾. Neonatal trichomoniasis can be acquired during passage through an infected birth canal⁽³⁵⁾ and it is estimated that 2-17% of female babies acquire trichomoniasis through direct vulvo-vaginal contamination⁽⁹⁾. Trichomoniasis is an infection of multiple sites (eg. Vaginal epithelium, skene glands, bartholin glands, urethra), thus prompt diagnosis is important for eliminating infection in the patient and sexual partners and treatment of sexual partners is thought to increase cure rates⁽⁴⁾.

CONCLUSION

Our study has confirmed the endemicity of trichomonas vaginalis infection among pregnant women in Calabar, Cross River State and suggests that the control of trichomoniasis can best be accomplished by public health programmes through persistent efforts to educate people on the need to improve on their personal hygiene, screen, diagnose, treat patients and sexual partners and follow up on the high risk individuals within communities.

References

- Schwabke, J. R. (2002). Update of trichomoniasis. *Sexually Transmitted Infection* (3):234-238.
- Hook, E. W. (1999) Trichomoniasis III. *Sexually Transmitted Diseases*, 26: 288 – 389.
- Swygard, H., Sena, A. C. & Hobbs, M. M. (2004). Trichomoniasis: Clinical Manifestations, diagnosis and Management. *Sexually Transmitted Infections*, (80) 71 – 95.
- [Guideline] Centers for Disease Control and Prevention (CDC) (2006): Workowski, K. A. & Berman, S.M. Sexually transmitted diseases treatment guidelines. Morbidity Mortality Weekly Recommendation Report; 5: 1-94. [Medline]
- Moodley, P., Wilkinson, D. & Connolly, C. (2002): Trichomonas vaginalis is associated with pelvic inflammatory disease in women infected with human immunodeficiency virus. *Clinical Infectious Disease*; 34 (4):519-22. [Medline]
- Soper D. Trichomoniasis: under control or undercontrolled? (2004): *American Journal of Obstetrics & Gynecology*; 190(1):281-90. [Medline]
- Sobel, J. D. (2005): What's new in bacterial vaginosis and trichomoniasis? *Infectious Disease Clinics of North America*; 19(2):387-406. [Medline]
- Huppert JS. Trichomoniasis in teens: an update (2009): *Current Opinion in Obstetrics & Gynecology*; 21 (5):371-8. [Medline]
- Laga, M., Manoka, A. & Kivuvu, M. (1993) : Non-ulcerative sexually transmitted diseases as risk factors for HIV-1 transmission in women: results from a cohort study. *AIDS*;(1):95-102. [Medline]
- Smith, D. A. and Ramos, N. (2010): Trichomoniasis. *eMedicine Specialties*. Website: emedicine.Medscape.com (Updated Jan 5, 2010).
- Crosby, R., DiClemente, R. J. & Wingwood, G.M. (2002): Predictions of infection with Trichomonas vaginalis: a prospective study of low-income African-American adolescent females. *Sexually Transmitted Infections*; 78: 360-364
- Bowden, F. J & Garnett, G. P. (2000): Trichomonas vaginalis epidemiology: parameterising and analyzing a model of treatment interventions. *Sexually Transmitted Infections*; 76: 248-256
- World Health Organization (WHO) (2004). Integrating care for reproductive health, sexually transmitted and other reproductive tract infections; A guide to essential practice, Morbidity Mortality Weekly Recommendation Report, 51 (RR-2): 1-118.
- Stuart, R. D., Toshae, R.S. & Postula, T.M. (1954). Transport Medium for Neisseria gonorrhoeae. *Canadian Journal of Public Health*, 45 (2) 13 – 53.
- Aboyeji, A. P. & Nwabuisi, C. (2003). Prevalence of sexually transmitted diseases among pregnant women in Ilorin, Nigeria. *Journal of Obstetrics & Gynaecology*, 23, (6): 637-639.
- Jombo, G.T.A., Egah, D.Z., Banwate, E.B. & Opajobi, S. O. (2006). High vaginal and endocervical swabs: A bacteriological study of 8,433 samples in Jos , Nigeria. *Journal of Medical Laboratory Science* 15, (2): 41-46.
- Uneke, C. J., Cletus, D.C., Ugwuoru, E.A. & Mirian , A. (2006). Trichomonas vaginalis infection among pregnant women in South-Eastern Nigeria: Public health significance. *The Internet Journal of Gynaecology and Obstetrics*. 6 (1): 1528-1540.
- Adeoye, G. O. and Akande, A. H. (2007): Epidemiology of Trichomonas vaginalis among women in Lagos Metropolis, Nigeria. *Pakistan Journal of Biological Sciences* 10 (13): 2198-2201.
- Nwosu, M. N., Mba, I. E. K., Opara, C. & Nwajuaku, C. (2001). Genital ulcers and sexual transmitted disease in rural Nigeria. *Journal of Medical Investigation and Practice*. 2: 28-33.
- Akerele, J., Abhalimen, P., Okonofua, F. (2002). Prevalence of asymptomatic genital infection among pregnant women in Benin-City, Nigeria. *African Journal of Reproductive Health*, 6 (3): 93-97.
- Okpara, K., Udoidung, N., Ating, I., Basse, E., Okon, O and Nwabueze, A. (2009): Risk Factors for Vaginal Trichomoniasis Among Women in Uyo, Nigeria. *The Internet Journal of Health*. Vol 9, no 2, 1528-8315
- Jatau, E. D., Olonitola, S. A and Olayinka, A. T. (2006): Prevalence of Trichomonas Infection Among Women Attending Antenatal Clinics in Zaria, Nigeria. *Annals of African Medicine*, vol 5, no 4; 178-181.
- Klouman, E., Masenga, E. J. & Klepp, A. B. (1997): HIV and reproductive tract infections in a total village population in rural Kilimanjaro, Tanzania: women at increased risk. *Journal of Acquired Immune Deficiency Syndrome and Human Retrovirology*; 14: 163-168.
- Mirza, N. B., Nzanze, H., Li, D. C & Piot, P. (1983) : Microbiology of vaginal discharge in Nairobi, Kenya. *British Journal of Venereal Diseases*; 59: 186-188.
- O'Farrell, N., Hoosen, A.A & Kharsary, A. H. (1989): Sexually transmitted pathogens in pregnant women in a rural South African community. *Genitourinary Medicine*; 65: 276-280.
- World Health Organization (WHO) (2007): Sexually transmitted infection. *WHOMediaCenter*. (Website:<http://www.Mediainquiries@who.information>).
- Obiajuru I.O.C. & Ogbulie J.N. (2005). Comparative study of the prevalence of sexually transmitted diseases between pregnant women and non-pregnant women in Imo state, Nigeria. *Global Journal of pure and Applied sciences*, 3 (11): 339-342.
- Garcia, F., Exposto, F., Prieto, E., Lopes, M., Duarte, A. and Correia da Silva, R. (2004): Association of Trichomonas vaginalis with sociodemographic factors and other STDs among female inmates in Lisbon. *International Journal of STD/ AIDS*, 15: 615-618.
- Petr, D., Delgates, K., Bhatt, R. & Garber, G. (1998) Clinical and microbiological aspects of Trichomonas vaginalis. *Clinical Microbiology Review*; 4: 300 – 317.
- Fouts, A. C. & Kraus, S.J. (1980) Trichomonas vaginalis: re-evaluation of its clinical presentation and laboratory diagnosis. *Journal of Infectious Diseases*; 141:137.
- Beverly, A. L., Vengtarik, L.M., Cotton, B. & Schwabke, J. R. (1999): Viability of Trichomonas vaginalis in transport medium. *Journal of Clinical Microbiology*; 37: 3749-3750.
- Shafir, S. C., Sorvillo, F. J. & Smith, L. (2009): Current

issues and considerations regarding trichomoniasis and human immunodeficiency virus in African-Americans. *Clinical Microbiology Review*; 22(1):37-45, Table of Contents. [Medline]

33. Borchardt, K. & Smith, R. (1991): An evaluation of an in-pouch TV culture method for diagnosing *Trichomonas vaginalis* infection. *Genitourinary Medicine*; 67: 149-152

34. Grodstein, F., Goldman, M. B & Ryan, L. (1993): Relation of female infertility to consumption of caffeinated beverages. *American Journal of Epidemiology*; 137(12):1353-60. [Medline]

35. Danesh, I. S., Stephen, J. M. & Gorbach, J. (1995): Neonatal *Trichomonas vaginalis* infection. *Journal of Emergency Medicine*; 13: 51-54.

Author Information

V. U. Usanga

Department of Medical Laboratory Science, Faculty of Allied Medical Sciences, University of Calabar

L. Abia-Bassey

Department of Medical Laboratory Science, Faculty of Allied Medical Sciences, University of Calabar

P. C. Inyang-etoh

Department of Medical Laboratory Science, Faculty of Allied Medical Sciences, University of Calabar

S, M. Udoh

Department of Medical Microbiology, Faculty of Clinical sciences, University of Uyo

F. Ani

Department of Obstetrics/ Gynaecology, General Hospital

E. Archibong

Department of Obstetrics/ Gynaecology, University of Calabar Teaching Hospital