Epidemiology of *Trichomonas Vaginalis* Infection among Women in Jos Metropolis, Nigeria

Okojokwu, O.J.[1*], Akpakpan E.E.[2], Kolawole O.T.[3], Ndubuisi J.C.[3], Okopi, J.A.[1]

[1]Department of Microbiology, Faculty of Natural Sciences, University of Jos, Jos, Nigeria
[2]Department of Biological Science, Faculty of Science, Federal University Otuoke, Bayelsa State, Nigeria
[3]Department of Faculty of Science, Ahmadu Bello University, Zaria, Kaduna State, Nigeria
*Corresponding Author's Email address: okojokwuoj@gmail.com

Abstract: Trichomoniasis has become famous a common sexually transmitted protozoal infection which is associated with adverse birth outcome. This study was aimed at determining the prevalence and associated risk factors of *Trichomonas vaginalis* infection among women n Jos metropolis, Nigeria. One hundred and fifty (150) high vaginal swab samples were collected and analysed by wet mount. Overall, 6 women (4.0%) were positive for *T. vaginalis*. The women between age bracket 34 – 44 years had the highest prevalence of 18.2% followed by age group 15 – 24 years (3.4%) but the different was not significant. Other risk factors such as marital status, number of sexual partners, frequency of sexual intercourse per week and pregnancy status examined and showed no significant association with trichomoniasis. The infection was significantly associated with HIV/AIDS (p = 0.030) hence showing increased likelihood of *T. vaginalis* infection. *Trichomonas vaginalis* infection is present in Jos metropolis with low prevalence of 4.0%. The majority of infected individuals were aged 34 – 44 years and sexually active.
[Okojokwu, O.J., Akpakpan E.E., Kolawole O.T., Ndubuisi J.C., Okopi, J.A. **Epidemiology of *Trichomonas vaginalis* Infection among Women in Jos Metropolis, Nigeria.** *Biomedicine and Nursing* 2015;1(3): 7-11]. ISSN 2379-8211.. http://www.nbmedicine.org. 2. doi:10.7537/marsbnj010315.02

Keywords: *Trichomonas vaginalis*, Trichomoniasis, Prevalence, Women, Jos, Nigeria

Introduction

Trichomonas vaginalis is a flagellated protozoan parasite that causes trichomoniasis. This is one of the most prevalent causes of non-viral sexually transmitted diseases in the world (Schwebe, 2002). Globally, trichomoniasis affects approximately 57 – 180 million people, with the majority living in developing countries (Bowden and Garnett, 2000; Garland, 2001; Ada-Sarkodie, 2004). Garland (2001) reported that *T. vagginalis* infection is ppredominantly spread through unprotected sexual intercourse with an infected partner, but could also be spread via the fingers after masturbation.

It has been reported that *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 1 or 2 hours (Swygard *et al.*, 2004). The disease is characterized in female patients by green, frothy, foul-smelling vaginal discharge which is accompanied by vulvo-vaginal irritation, dysuria and lower abdominal pains (Thomason and Gilbert, 1989).

Prevention of *Trichomonas vaginalis* infection has not been a priority due to lack of understanding of its public health implications and lack of resources (Schwebke and Burgess, 2004). It has been observed that women who are infected during pregnancy are predisposed to premature rupture of membranes, premature labour and low birth-weight (Hardy *et al.*, 1984; Cotch, 1990; Sood and Kapil, 2008). Trichomoniasis may also predispose and potentiate HIV transmission (Laga *et al.*, 1991). Laga and colleague (1993) reported that persons with trichomoniasis are twice as likely to contract HIV infection as the general population.

The prevalence of trichomoniasis depends on the population screened. Certain factors like poor personal hygiene, low socio-economic status, multiple sexual partners and underdevelopment are reported to be associated with high incidence of infection (Crosby *et al.*, 2002).

This study was undertaken to determine the prevalence of trichomoniasis among the population screened and to examine the associated risk factors that promote transmission of *Trichomonas vaginalis* infection among women in Jos metropolis, Nigeria.

Materials and Methods

Study area

Plateau State is an area within the Middle Belt of Nigeria with 17 Local Government and Jos City as the Capital. The study area (Jos Metroplis) is bounded by longitude 08°51.5'E to 8°55.2'E of the Greenwich Meridian and Latitude 9° 51.5'N to 9°56.1' N of the Equator which has the following adjacent States, Bauchi State to the North East, Kaduna State to the North West, and the following Local Government form the core part of the metropolis; Jos North and Jos South and part of Jos East. Samples were collected from three tertiary health facilities within the metropolis.

Study population

A total of one hundred and fifty (150) women of different ages and socio-ecomonic status attending Bingham University Teaching Hospital, Plateau Specialist Hospital and Jos University Teaching Hospital, Jos, were enrolled for this study. The study was conducted over a period of six months spanning between July and December, 2014. Structured questionnaire was employed to obtain relevant information from the patients. The study was approved by the ethical review committees of the respective hospitals.

Sample collection and processing

One hundred and fifty (150) high vaginal swab (HVS) samples were collected under aseptic condition with the assistance of a gynaecologist. This was done after informed consent had been sought from the patients.

Wet preparations (wet mount) was made of each HVS, immediately after collection, in a drop of physiological saline on a clean, grease-free glass slide covered with a cover-slip and examined microscopically under the low power (10x) and high power (40x) magnification for the presence of *Trichomonas vaginalis*. *Trichomonas vaginalis* was identified with its characteristic pear-shaped morphology and quick jerky or darting motility.

Statistical analysis

Data generated from the study were analysed using Statistical Package for the Social Sciences (SPSS) version 21 (IBM SPSS Inc, USA). Proportions were compared using Chi-square with p-value of < 0.05 considered significant.

Results

Out of the 150 high vaginal swab samples examined, 6(4.0%) swabs showed positivity for *Trichomonas vaginalis* infection (Table 1). The prevalence of *T. vaginalis* infection in relation to marital status of the subjects showed that single women had the highest infection rate or 4(5.2%) followed by married women, 2(3.4%). There was no statistically significant association (χ^2 = 0.454; p = 0.929) between marital status and trichomoniasis.

The prevalence of trichomoniasis inn relation to number of sexual partners is shown in Table 2. All the positive cases occurred in women with single sexual partners, with a prevalence of 5.3%. The difference was however not statistically significant (χ^2 = 0.967; p = 0.915). Prevalence of *T. vagnialis* infection according to frequency of sexual intercourse per week shows that women that had 3 sexual intercourse per week had the highest rate of infection of 10.3% followed by women who had more than three sexual intercourse per week (6.1%) (Table 3). The difference between these specific prevalences was however not statistically significant (χ^2 = 0.9524; p = 0.7459).

Table 4 shows that all the positive cases of trichomoniasis occurred among non-pregnant women with a prevalence of 6(4.2%). No positive case was recorded among the pregnant women and pregnancy status of the women was not significantly associated with the infection (p = 0.678). Occurrence of trichomoniasis was more in HIV positive women (40.0%) than HIV h=negative women (2.8%). The infection was significantly associated (χ^2 = 0.550; p = 0.030) with HIV/AIDS in this study (Table 5).

When association between age and trichomoniasis was examined, peak prevalence was recorded in women aged 35 – 44 years 4(18.2%) followed by women in age group 15 – 24 years 2(3.4%). Statistical analysis of the relationship between age group and infection prevalence was not significant (p = 0.129) (Table 6).

Table 1: Prevalence of trichomoniasis in relation to marital status

Marital Status	No. tested	No. positive for *T. vaginalis* (%)	χ^2	P Value
Single	77	4(5.2)	0.454	0.929
Married	59	2(3.4)		
Widowed	8	0 (0.0)		
Separated	6	0(0.0)		
Total	**150**	**6(4.0)**		

Table 2: Prevalence of trichomoniasis in relation to number of sexual partners

No of sexual partner	No. tested	No. positive for *T. vaginalis* (%)	χ^2	p-value
None	16	0(0.0)	0.967	**0.915**
One	114	6(5.3)		
Two	15	0 (0.0)		
Three	2	0(0.0)		
More Than 3	3	0(0.0)		

Table 3: Prevalence of trichomoniasis in relation to frequency of sex per week

Frequency of sex per week	No. tested	No. positive for *T. vaginalis* (%)	χ^2	P Value
None	18	0(0.0)	0.952	0.745
One	28	0(0.0)		
Two	19	0 (0.0)		
Three	29	3(10.3)		
More Than 3	49	3(6.1)		

Table 4: Prevalence of trichomoniasis in relation to pregnancy status

Pregnancy status	No. tested	No. positive for *T. vaginalis* (%)	χ^2	p-value
Pregnant	8	0(0.0)	0.172	0.678
Not Pregnant	142	6(6.2)		

Table 5: Prevalence of trichomoniasis in relation to HIV/AIDS

HIV/AIDS	No. tested	No. positive for *T. vaginalis* (%)	χ^2	P Value
Positive	5	2(40.0)	0.550	0.030*
Negative	145	4(2.8)		

* = significant association exists at $p < 0.05$

Table 6: Prevalence of trichomoniasis in relation to Age

Age (years)	No. tested	No. positive for *T. vaginalis* (%)	χ^2	P Value
15-24	56	2(3.4)	7.126	0.129
25-34	38	0(0.0)		
35-44	22	4(18.2)		
45-44	32	0(0.0)		
55-64	2	0(0.0)		
Total	**150**	**6(4.0)**		

Discussions

Trichomonas vaginalis was detected in 4.0% of the high vaginal swab s collected from women with abnormal vaginal discharge in this study. This observed prevalence is higher than previously reported prevalence of 0.9% in Iran (Chalechale and Karimi, 2010). In Nigeria, an overall trichomoniasis prevalence of 2.6% in women aged 15 – 64 years was reported between January 2006 and October 2007 (Abdulazeez *et al.,* 2007), while in Asia the prevalences were reported to be 2.9% in Chinese women (Xueqiang *et al.,* 2007), 18.2% in Palestinian women (Al-Hindi and Lubbad, 2006), 25% and 28.1% in Turkey andSaudi Arabia respectively (Tanyuksel *et al.,* 1996; Madani, 2006). Some other researchers in Nigeria reported higher prevalences. Uneke *et al.* (2007) reported 24.4%, Jatau *et al.* (2006)) published 35.7% in literature. The variation in prevalence reported by various investigators could be attributed to the sample size, the test method used, degree of infection and level of hygiene of the infected women.

The result of this study of prevalence inn relation to marital status was in agreement with findings of previous studies by Usanga *et al.* (2009) who reported 5.3% and 5.2% prevalence among single and married women respectively in Calabar. This presupposes that unmarried women being unattached are free to indulge in more sexual activities probably involving multiple sexual partners (Usanga *et al.,* 2009).

The observation of peak *Trichhomonas vaginalis* infection among women with one sexual partners in this study could be due to the possibility that the women had one sexual partner each but their male sexual cohorts had more than one sexual partners thereby increasing the odds of the women contracting trichomoniasis. Occurrence of *T. vaginalis* infection by frequency of sexual intercourse per week revealed that women that had at least sexual intercourse per week had higher prevalence. This is probably because each act of sex with an infected male exposes and increases the chance of contraction of the infection.

Contrary to our expectation, pregnancy did not affect the prevalence of trichomoniasis as the difference between pregnant and non-pregnant women were insignificant. This is in consonance with the report of Adeoye and Akande (2007). According to Lemos and Garcia-Zapata (2010), early (< 18 years at first sexual intercourse) sexual initiation was associated with the presence of the infection. Sexual contacts seems to be the principal means of

transmitting *T. vaginalis* and Donbraye *et al.* (2010) reported in their study that women in their 2nd and 3rd trimesters were more often colonized than those in their 1st trimester. On the other hand, report by Usanga *et al.* (2009) revealed that pregnant women admitted that frequency of sexual intercourse decreases as pregnancy advances which could be the reason for the low incidence of infection at second and third trimesters. Therefore there is no consensus as to pregnancy predisposing the subjects to infection by *Trichomonas vaginalis*.

The test of association between trichomoniasis and HIV/AIDS among the women showed a significant association (p = 0.030). This implies that there is a relationship between trichomoniasis and HIV/AIDS infection. This could mean that either HIV/AIDS predisposes to trichomoniasis or vice-versa. The high incidence of *T. vaginalis* co-infection with other sexually transmitted infections with the attendant high risk of pelvic inflammatory disease and tubal infertility makes trichomoniasis a compelling public health threat (Moodley *et al.*, 2002).

The different age group investigated revealed that prevalence of trichomoniasis was highest in age bracket 35 – 44 years [4(182%)] followed by 15 – 24 years (3.4%). This may be due to the fact that women in these age groups are sexually active. This finding is in consonance with the documentation of previous researchers and supports the fact that age is a risk factor for sexually transmitted diseases in sexually active women around this age group (Sobel, 1997; Jombe *et al.*, 2006).

Conclusion

In conclusion, *Trichomonas vaginalis* infection is present in Jos metropolis with a prevalence of 4.0% among women. This poses public health implications for HIV prevention as it confirms the practice of unprotected sex, educational efforts must be aimed at sexually active persons and high risk individuals (Donbraye *et al.*, 2010). There is therefore the need for people to be educated on the need for good personal hygiene and safe sexual practices in addition to the need for governments to improve the socio-economic status of the populace.

Conflict Of Interest

No conflict of interest was declared.

References

1. Abdulazeez, A, Alo E, Livingstone R (2007). Epidemiology of urinogenital trichomoniasis in a north-eastern State, Nigeria. The Internet J Parasitic Dis, 2 (2).
2. Adu-Sarkodie Y (2004). *Trichomonas vaginalis* screening goes global. Sex Transm Infect, 80: 201-203.
3. Al-Hindi AI, Lubbad AMH (2006). *Trichonamas vaginalis* infection among Palestinian women: prevalence and trends during 2000-2006. Turk J Med Sci, 36: 371-375.
4. Bowden FJ, Garnett GP (2000). *Trichomonas vaginalis* Epidemiology: Parameterising and analysing a model of treatment interventions. Sexual Transmitted infection, 76:248-256.
5. Chalechale A, Karimi I (2010). The prevalence of *Trichomonas vaginalis* infection among patients that presented to hospitals in the Kermanshah district of Iran in 2006 and 2007. Turk J Med Sci, 40(6): 971 – 975.
6. Cotch MF (1990). Carriage of *Trichomonas vaginalis* (Tv) is associated with adverse pregnancy outcome. In Program and abstracts of the 30th Interscience Conference on Antimicrobial Agents and Chemotherapy. Washington, DC: American Society for Microbiol., pp: 199.
7. Crosby R, DiClemente, RJ, Wingwood GM (2002). Predictions of infection with *Trichomonas vaginalis*: a prospective study of low-income African-American adolescent females. Sexually Transmitted Infections, 78: 360-364.
8. De Lemos PAP, Garcia-Zapata MTA (2010). Prevalence of Trichomonas vaginalis in HIV-positive and –negative patients in referral hospitals in Goiania, GO, Brazil. International J. Tropical Med., 5(2): 24-27.
9. Donbraye E, Donbraye-Emmanuel OOB, Okonko IO, Odeji IO, Alli JA, Nwanze JC (2010). Detection and prevalence of *Trichomona vaginalis* among pregnant women in Ibadan, Southwestern Nigeria. World Applied Sciences Journal, 11(12):1512-1517.
10. Garland SM (2001). *Trichomonas vaginalis*: why we should be screening. Venereology, 14: 116-120.
11. Hardy PH, Hardy JB, Nell EE, Graham DA, Spence MR, Rosenbaum RC (1984). Prevalence of six sexually transmitted disease agents among pregnant inner-city adolescents and pregnancy outcome. Lancet, pp: 333-337.
12. Jatau ED, Olanitola OS, Olayinka AT, (2006). Prevalence of *Trichomonas* Infection among Women attending Antenatal Clinics in Zaria, Nigeria. Annals of African medicine, 5(4):178.
13. Jombo GTA, Egah DZ, Banwate EB, Opajobi SO (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.
14. Laga M, Manoka A, Kivuvu M, Alvary M, Malele B, Goeman J, Behets F, Batter V, Tuliza M, Nzila N (1993). Non Ulcerative Sexually Transmitted Diseases as Risk Factors for HIV-1. Transmission in women: Results from a cohort study. AIDS, 7: 95-102.
15. Laga M, Nzila N, Goeman J (1991). The interrelationship of sexually transmitted diseases and HIV infection: Implications for the control of both epidemics in Africa. AIDS, 5(Suppl. 1): S55-63.
16. Madani AT (2006). Sexually transmitted infections in Saudi Arabia. BMC Infect Dis, 6: 3.
17. 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):519-522.
18. Schwebke JR (2002). Update of trichomoniasis. Sexually Transmitted Infection, 3:234-238.
19. Schwebke JR, Burgess D (2004). Trichomoniasis. Clin. Microbiol. Rev., 17(4): 794-803.
20. Sobel JD (1997). Vaginitis. *N Engl J Med*. 337:1896-1903.
21. Sood S, Kapil A (2008). An update on *Trichomonas vaginalis*. Indian Journal of Sexually Transmitted Diseases, 29: 7-14.
22. Swygard H, Sena AC, Hobbs MM (2004). Trichomoniasis: Clinical Manifestations, diagnosis and Management. Sexually Transmitted Infections, (80) 71 – 95.
23. Tanyüksel M, Gün H, Doganci L (1996). Prevalence of *Trichomonas vaginalis* in prostitutes in Turkey. Cent Eur J Public Health, 4: 96-97.
24. Uneke CJ, Alo MN, Ogbu O, Ugwuoru DC (2007). Trichomonas vaginalis infection in human immunodeficiency virus-seropositive Nigerian women: The public TM health significance. Online J. Health and Allied Sciences [Journal (On- line/Unpaginated)] ID Code: 5846.
25. Usang O, Abia-Basse L, Inyang-etoh P, Udoh S, Ani F, Archibong, E (2009). *Trichomonas vaginalis* Infection among Pregnant women in Calabar Cross River state, Nigeria. The Internet Journal of Gynaecology and Obstetrics, 14 (2): 1-4.
26. Xueqiang F, Yingzhi Z, Yandfang Y, Yutao D, Huiqing L (2007). Prevalence and risk factors of *trichomoniasis*, bacterial *vaginosis*, and *candidiasis* of married women of child-bearing age in rural Shandong. Jpn J Infect Dis, 60: 257-261.

12/23/2015