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## *Trichomonas vaginalis* infection in Benin City, Nigeria

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**ABSTRACT:** Of the total 1,100 people screened in Benin City, Nigeria between March 1998 and November, 1999, 120 (10.9%) and 136 (12.36%) prevalence of *Trichomonas vaginalis* were recorded with the wet mount (direct) microscopy and Oxoid culture medium method respectively, but using t-distribution, the difference in prevalence was not statistically significant ( $P>0.05$ ). Infection rates were significantly higher ( $P<0.05$ ) in females than in males and in the age group of 21-30 years. Prevalence was also significantly higher among female students, non-pregnant females and females on contraceptives. The clinical symptom of vaginal discharge (VD) recorded the highest prevalence (44.1%) closely followed by vulvo vaginitis/pruritis (vv/p) and urethritis/discharge (U/D) each with 11.8% prevalence.

**Index Key words:** *Trichomonas vaginalis*, Prevalence, benin City, Nigeria, Age, Sex, Occupational effects on infection.

### Introduction

Trichomoniasis (*Trichomonal vaginitis*), caused by *Trichomonas vaginalis*, is a protozoan infection which is receiving increasing attention in the developing countries of the world because of its increasing prevalence and reported involvement in complicating and debilitating disease processes (Adebayo, 1993).

The clinical manifestations of the disease are known to be different from women to men. In women, the major diseases are vaginitis and cytitis while in men the major diseases are urethritis and prostates (Omer, 1978; Krieger, 1995).

In Nigeria, only a few reports of Trichomoniasis exist with prevalence varying between 1.5% and 15.0% (Nmorsi and daudu, 1994; Konje *et al.*, 1991; Ukoli, 1990; Ikeh *et al.*, 1993; Oyawoye *et al.*, 1995). There are no major reports on the disease in Benin City apart from the preliminary examination of a few women and the study of immune responses to the parasite in women by Ibeh (1988) and Jibunoh (1989).

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The level of prostitution and sexual promiscuity in Benin City is believed to be high nowadays particularly with the poor economic state, lack of sexual discipline among youths, poor knowledge of the hazards of sexually transmitted diseases (STD) among the populace and more importantly, the recent news reports of several alleged female international prostitutes that were repatriated from Italy and other European countries. There is therefore the need to study trichomoniasis, AIDS and other STDs that share the same mode of sexual transmission with a view to providing information to control the spread.

The present study was undertaken to provide a baseline study of the overall prevalence of Trichomoniasis in Benin City using wet mount and oxoid culture medium methods. The associated clinical symptoms and infection rates in relation to sex, age groups and occupation were also studied.

## **Materials and Methods**

### *Study Area*

Benin City (6°19'N, 5°41'E) is the capital of Edo State, Nigeria. It has a population of about 2.1 million people (1996 national Population Estimates) and it is a busy commercial town being the gateway to the Eastern, Western and Northern parts of the country. Benin City has an elaborate social life.

### *Collection and Examination of Samples*

A total of 1100 individuals comprising of 104 males and 996 females were samples between March 1998 and November 1999 from various centres viz: University of Benin Teaching Hospital (UBTH), University of Benin Health Clinic, Central Hospital and from ten private Health Centres (Clinics) within Benin City. The samples taken from the individuals was the early morning urine (EMU). Other samples collected as well from some volunteers were High Vaginal Swabs (HVS), Endocervical Swab (ECS) and Urethra Swabs (US). Methods of collection of the samples, the wet microscopy examination of samples and identification of *Trichomonas vaginalis* parasite were those described by Kunin (1979); Adebayo (1988); Krieger *et al* (1988) and Krowchuk *et al* (1989). Oxoid Trichomonas medium No. 1 was used as the culture medium in which specimen from the samples collected were incubated at 37°C in anaerobic jars and examined at 2 days intervals as described by Krieger *et al* (1988) and Adebayo (1988). The results obtained were analysed with the participants detailed clinical history as well as with the answers they supplied to the questionnaire on medical and social status used for the study.

## **Results**

### *Overall Prevalence*

Out of the 1100 patients whose early morning urine (EMU) samples were screened, 136 (12.36%) were infected with *Trichomonas vaginalis* using the Oxoid Trichomonas medium culture method while only 120 (10.9%) were infected from the wet mount (direct) microscopical examination of the samples. For other samples collected, the High vaginal swabs (HVS) samples recorded the highest *T. vaginalis* prevalence of 13.25% followed by the Endocervical swab (ECS) samples (3.70%) while no infection was recorded for the urethral swab (US) samples (Table 1). Generally, the oxoid culture method gave the highest prevalence of infection than the direct wet mount microscopy method but using statistical t-test, the difference in prevalence was seen to be not significant ( $P > 0.05$ ).

### *Prevalence According to Sex*

Of the 1100 patients screened, 104 (9.5%) were males and 996 (90.5%) were females. Among the females, 129 (12.95%) were infected whereas among the males only 7 (6.73%) were infected. The difference in this infection rates in males and females was found to be significant ( $P < 0.05$ ). Non-pregnant

women also had significantly higher ( $P<0.05$ ) prevalence of infection (14.3%) than pregnant ones with 9.72% prevalence. Also, among the non-pregnant group, those on contraceptives had higher prevalence of infection (25.78%) than those not on contraceptives (12.13% prevalence) as shown in Table 2.

Table 1: Prevalence of trichomoniasis in Benin City using wet mount microscopy (Direct examination) and Oxoid culture medium methods.

S/No.	Specimen Type	Wet Mount	Microscopy	Oxoid Medium	Culture examinations
		No. examined	No. (%) infected	No. examined	No. (%) infected
1.	Early morning urine (EMU)	1100	120 (10.9)	1100	136 (12.36)
2.	High vaginal swab (HVS)	332	40 (12.04)	332	44(13.25)
3.	Endocervical swab (ECS)	108	3 (2.77)	108	4 (3.70)
4.	Urethral swab (US)	28	0 (0.0)	28	0 (0.0)
	Total No. of specimen used and prevalence	1100	120 (10.9)	1100	136 (12.36)

Table 2: Prevalence of Trichomoniasis in various categories of women.

Status		No. examined	No. (%) infected	% infected with respect to the total no. of females infected
1	Pregnant group	144	14 (9.72)	10.85
2	Non-pregnant group	804	115 (14.3)	89.14
	(a) Females on contraceptives	128	33 (25.78)	25.58
	(b) Females not on contraceptives	676	82 (12.13)	63.56
3*	Unclassified group	48	(0.0)	0(00)
	Total	996	129	-

\*Members include old women above 60 years old.

#### *Prevalence in Relation to Clinical Symptoms*

The classification of patients according to the clinical symptoms seen in them revealed that patients with vaginal discharge (VD) had the highest prevalence (44.1%) followed by those with vulvo vaginitis/pruritis (vv/p), and urethritis/discharge (UD), each of which had 11.8% prevalence (Table 4). Various other clinical symptoms were seen among *T. vaginalis* patients e.g. urinary tract infection and

frequent micturition as shown in Table 4 but the least prevalent was pelvic inflammatory disease and appendicitis each of which recorded 2.9% prevalence.

#### Prevalence According to Occupation

The distribution of *T. vaginalis* in relation to occupation showed that of the 136 positive cases, students had the highest prevalence of 17.14% (i.e. 48 patients) which is significantly higher ( $P < 0.05$ ) than prevalence recorded by private workers (14.03%), civil servant (10.37%) and the unclassified group, i.e. housewives and those without specific occupation (7.54%) (Table 5). No female participant claimed to be a prostitute or a commercial sex worker.

Table 3: Prevalence of *T. vaginalis* according to age groups.

S/No.	Age group (yrs)	No. examined	No. (%) infected	% with respect to total No. of patients infected	% with respect to total No. of people examined.
1.	1-10	-	-	-	-
2.	11-20	156	16 (10.3)	11.8	1.45
3.	21-30	448	68 (15.17)	50.0	6.18
4.	31-40	260	32 (12.3)	23.5	2.90
5.	41-50	128	14 (10.9)	10.29	1.27
6.	51-60	60	6 (10.0)	4.41	0.54
7.	61 and above	48	-(0.0)	0.0	0.0
Total		1100	136 (12.30)	100.0	12.4

Table 4: Prevalence of clinical symptoms among *T. vaginalis* infected individuals.

Clinical Symptoms	Nos. infected	% infected with respect to the total Nos. of patients infected	% infected with respect to the whole patients.
Vaginal discharge (VD)	60	44.1	5.45
Vulvo vaginitis/pruritis (VVP)	16	11.8	1.45
Pelvic inflammatory disease (PID)	4	2.9	0.36
Urethritis/Discharge (UD)	16	11.8	1.45
Appendicitis (APP)	4	2.9	0.36
Frequent Micturition (FM)	8	5.9	0.73
Other diseases (OD)	8	5.9	0.73
Routing check/No. Sympton (RC/NS)	8	5.9	0.73
Total No. of patients	136	100	12.35

Table 5: Prevalence of *T. vaginalis* according to the occupation of the infected individuals.

Category/Group	No. Examined	No. (%) infected	% with respect to total No. of patients infected	% infected with respect to the whole patients examined
Students	280	48 (17.14)	35.3	4.36
Civil servants	270	28 (10.37)	20.6	2.54
Private workers	285	40 (14.03)	29.4	3.64
Unclassified individual	265	20 (7.54)	14.7	1.82
Total	1100	136	100.0	12.36

## Discussion

A 12.4% prevalence of Trichomoniasis recorded in the present study is relatively high when compared to lower prevalence of 2.52% (Kronje *et al.*, 1991) and 10.0% (Ukoli, 1990) and this calls for concern. Higher prevalence have been recorded from other countries in Africa and elsewhere in the world – 32.0% in Harare, Zimbabwe (Mason *et al.*, 1990), 20.2% in Khartoun, Sudan (Omar, 1978), 28.5% in Czechoslovakia (Unzeitig *et al.*, 1989), 20.7% in Turkey (Ozbilgin *et al.*, 1994), 15.8% in India (Iyer *et al.*, 1991), and 15.0% in Washington D.C., USA (Jenny *et al.*, 1990). The high prevalence presently observed can only be attributed to increasing promiscuity and lack of sexual discipline among the youths particularly students and privately employed workers who were found in the study to have the highest prevalence. Freedom of indiscriminate sexual activities has been enhanced by the use of contraceptives which help to prevent unwanted pregnancies and it was the non-pregnant females on contraceptives that had the highest *T. vaginalis* prevalence.

The present study also show that the culture method of diagnosis yielded a higher prevalence than the wet mount (direct) microscopy method and this is in line with earlier reports of Wilkinson *et al* (1972), Sparks *et al* (1975), Omer (1978) and Krowchuk *et al* (1989). However since the difference in prevalence between the two methods was not significant, it can be suggested that both methods be adapted for diagnosis particularly that the direct method is cheap, fast and very ideal for large population study.

The present findings of infection more common in females than in males is in consonance with the findings of Roche (1983) and Ibeh (1988) who stated that the female genital tract provides the most suitable conditions for growth of the parasite. Although the difference in infection rate between males and females was significant, it should be recommended that more thorough diagnosis be done on males because infection can be concealed in the prostate gland of males (Omer, 1978) and only very little *T. vaginalis* are shed at a time in males (Sexana and Jenkins, 1989).

The age distribution of *T. vaginalis* infection revealed that the infection gradually increased with age to a peak prevalence at the sexually active age of 21 – 30 years and then dropped as menopause approached. This agrees with the reports of Omer (1978) on infection pattern among Sudanese women and Franjola *et al* (1989), Ukoli (1990), Adungo *et al* 1991) and Oyawoye *et al* (1995) on infection of women in Bauchi metropolis, Nigeria. Oyawoye *et al* (1995) and Ibeh (1988) further stated that the very low or total absence of infection in women at about 60 years of age was due to decrease in concentration of glycogen and changes of the pH of vagina which make the environment unsuitable for the growth of the parasite.

Observation of vaginal discharge, vulva vaginitis/prutitis and urethritis/discharge as the most common clinical symptom among patients with trichomoniasis also agree with previous reports of Omer (1978) in Sudan; Ibeh (1988) and Jibunoh (1989) in Nigeria. The extent to which other observed clinical symptoms are related to trichomoniasis require further investigation.

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## References

- Adebayo, J.A. (1988). Isolation of *Trichomonas vaginalis*; a simple diagnostic medium for use in developing countries. *Med. Lab. Sciences*, 45: 273-274.
- Adebayo, J.A. (1993). Leucorrhoea by gram stain as an aid to selection of vaginal swabs for *Trichomonas vaginalis* cultivation. *J. med. Lab. Sc.* 3: 34-36.
- Adungo, N.I.; Ondijo, S.O. and Otieno, L.S. (1991). Intestinal parasitoses and other infections in a college community. *Eas Apr. Med. J.* 68(1): 52-56.
- Franjola, R.; Anazco, R.; Puente, R.; Moraleta, L.; Herrmann, and Palma, M. (1989). *Trichomonas vaginalis* infection in pregnant women and newborn infants. *Rev. Med. Chil.* 117(2): 142-145.
- Ibeh, I.N. (1988). Incidence of and immune response to *Trichomonas vaginalis* in women in Benin City. M.Sc. Thesis, University of Benin, Nigeria.
- Ikeh, E.I.; Ajayi, J.A. and Bello, C.S.S. (1993). In-vitro susceptibility of *Trichomonas vaginalis* to metronidazole (flagyl). *Nig. J. Parasit.* 14: 41-43.
- Iyeer, S.V.; Deodhar, I. and Gogate, A. (1991). Microbiological evaluation of female patients in sexually transmitted disease clinics. *Ind. J. Med. Res.* 93: 95-97.
- Jenny, C.; Hooton, T.M.; Bowers, A.; Copass, M.K.; Krieger, J.N.; Hillier, S.L.; Kiviat, N.; Corey, L.; Stamm, W.E. and Holmes, K.I. (1990). Sexually transmitted disease in victims of rape. *Nor. Engl. J. Med.* 322(ii): 713-716.
- Jibunoh, C.N. (1989). Aetiology of vaginitis, with special emphasis on *Gardnerella vaginalis* among University of Benin Teaching Hospital patients. A.I.M.L.S. Thesis, Institute of Medical Laboratory Sciences, Nigeria.
- Konje, J.C.; Otolorin, E.O.; Ogunniyi, J.O.; Obisesan, K.A. and Ladipo, O.A. (1991). The prevalence of *Gardnerella vaginalis*, *Trichomonas vaginalis* and *Candida albicans* in the cytology clinic at Ibadan, Nigeria. *Afr. J. Med. Sci.* 20(1): 29-34.
- Knega, J.N.; Tam, M.R. and Stevens, C.E. (1988). Diagnosis trichomoniasis: Comparison of conventional wet mount examination with cytologic studies, culture and monoclonal antibody staining of dried specimen. *J. Amer. Asso.* 259: 1223-1227.
- Krieger, J.N. (1995). Trichomoniasis in men: Old issues and new data. *Sex transm. Dis.* 22(2): 83-96.
- Krowchuk, D.P.; Trina, M. and Kumar, M.L. (1989). Rapid diagnosis of common sexually transmitted diseases in adolescents: A Review. *Adolesc. Paediatr. Gynaecol.* 6(4): 275-288.
- Kunin, C.M. (1979). Detection, prevention and management of urinary tract infections. 3<sup>rd</sup> ed. Lea and Febinger Publishers, Philadelphia.
- Mason, P.R. and Forman, L. (1980). Serological survey of *Trichomonas vaginalis* infection in Zimbabwe, Rhodesia. *Cent. Afri. J. Med.* 26(1): 6-8.
- Nmorsi, O.P.G. and Daudu, O.P. (1994). Candidiasis and trichomoniasis among hospital patients at Ekpoma, Edo State, Nigeria. Abstract of the 18<sup>th</sup> Annual Conference of the Nigerian Society for Parasitology, p. 49.
- Omer, E.F.E. (1978). Trichomoniasis in Sudanese women presenting with vaginal discharge. *Sud. Med. J.* 16: 1-5.
- Oyawoye, O.M.; Fabiyi, J.P. and Ephraim, A.A. (1995). Prevalence of *Trichomonas vaginalis* amongst different categories of women in Bauchi metropolis. Abstract of the 18<sup>th</sup> Annual Conference of the Nig. Soc. Parasit., p. 19.
- Ozbilgin, A.; Ozbek, Y.; Alkan, M.Z.; Guruz, Y.; Atambay, M.; Tasci, S. and Ozel, M.A. (1994). Trichomoniasis in non-gonococcal urethritis among male patients. *J. Egypt Soc. Parasitol.* 24(3): 621-625.
- Roche, Co Ltd. (1983). *Trichomoniasis, Candidiasis and Giardiasis (Lambliasis)* In: The most recent reports on urogenital Trichomoniasis and treatment. Tiberall Roche Nig.Ltd., Nigeria, 52pp.
- Sexana, S.B. and Jenkins, R.R. (1989). Prevalence of *Trichomonas vaginalis* in young men. *J. Adolesc. Hlth. Car.* 10: 250.
- Sparks, R.A.; Williams, J.M.H.; Boyce, T.C.; Fitzgerald, C. and Shelley, G. (1975). Antenatal screening of Candidiasis, Trichomoniasis and gonorrhoea. *Brit. J. vener. Dis.* 51: 110-115.
- Ukoli, F.M.A. (1990). Introduction to Parasitology in Tropical Africa. Textflow Publishers Ltd., Nigeria.
- Unzeitig, V.; Cupr., Z. and Bucek, R. (1989). Use of native microscopic examination of the vaginal flora in the diagnosis of trichomoniasis. *Britis. Lek. Listy.* 90(8): 608-613.
- Wilkinson, A.E.; McSwiggan, D.A.; Turner, G.C.; Rkycroft, J.A. and Lowe, G.H. (1972). Laboratory diagnosis of venereal diseases. Public Health Service Monograph Series No. 1, H.M.S.O.; London.