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Epidemiology of *Trichomonas vaginalis* among Women in Lagos Metropolis, Nigeria

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Abstract: A total of 544 women outpatients comprising 320 and 224 from Lagos University Teaching Hospital (LUTH), Idi-Araba, Lagos and Military Hospital, Yaba, Lagos, respectively, were examined for *Trichomonas vaginalis* infection. Both wet mount microscopy and Giemsa staining technique were used. A prevalence of 3.3% was recorded from the 544 women using both methods, 5.4% in the Military Hospital and 1.9% from LUTH. The difference in prevalence was statistically significant using Chi-square test analysis ($p<0.05$). Age group 21-30 years had the highest prevalence of 1.8%; A higher prevalence of 2.9% was recorded among married women compared to 0.4% prevalence in unmarried women. About one-fifth of the infected individuals were asymptomatic. Symptomatic patients had characteristic symptoms such as greenish yellow vaginal discharge (33.3%), itching/pruritus (22.2%) and malodorous discharge (11.1%) Water system toilet users had the highest prevalence of *T. vaginalis* infection compared to others using different types of toilet facilities. About 1% of *T. vaginalis* infection were mixed with *Candida albicans*. Single infections of *Candida albicans* was recorded in 33.6% of the total population examined. Sexual promiscuity, age and socio-economic status were important contributory factors in the pattern of infection amongst studied population.

Key words: *Trichomonas vaginalis*, *Candida albicans*, prevalence, women, Lagos, Nigeria

INTRODUCTION

Trichomonas vaginalis infection is the most prevalent non-viral sexually transmitted disease in the world (Rein, 1995). In the United States, an estimated 5 million women contract trichomoniasis annually (Cates, 1999). In Africa, a median of 20% of women attending family planning, antenatal or other clinics had trichomoniasis while the prevalence in Asian studies was 11% and in Latin America 12% (Emarievcoe, 2000). *Trichomonas vaginalis* may be emerging as one of the most important cofactors in amplifying HIV transmission, particularly in African-American communities of the United States (Sorvillo *et al*., 2001). In a person co-infected with HIV, the pathology induced by *T. vaginalis* infection can increase HIV shedding; *Trichomonas* infection may also act to expand the portal of entry for HIV in an HIV-negative person (Sorvillo *et al*., 2001).

In females, *T. vaginalis* primarily inhabits the vagina but may also invade the urethra. In women, it is associated with a classically green, frothy liquid discharge with an odour rather like dirty chamois leather (Pugh, 1982). Dysuria and dyspareunia are also common (Rein, 1995; Sobel, 1996). *T. vaginalis* can be asymptomatic in 10-50% of women (Heine and McGregor, 1993; Wolner-Hanssen *et al*., 1989). In males, it occurs in the urethra and prostate gland. Men appear to be infested more commonly than infected; *T. vaginalis* infection is found to be highly prevalent in prostitutes in Kwa Zulu-Natal, South Africa, as revealed by Pugh (1982). The incidence of trichomoniasis is highest in women with multiple partners and in groups with a high prevalence of other STDs (Cotch *et al*., 1991). On univariate analysis, there was an association, although not statistically significant, between the existence of *T. vaginalis*, multiple sexual partners, drug addiction and no condom use (Garcia *et al*., 2004). A statistically significant association was found between trichomoniasis, prostitution and other STDs (Garcia *et al*., 2004).

Barberis (1998) reported the prevalence of mixed infections with *T. vaginalis* and *Gardrenella vaginalis* (5.5%) and with *Neisseria gonorrhea* (2.2%). Studies by Shuter (1998) and Sorvillo (2001) revealed that *T. vaginalis* might serve as co-factor in HIV transmission and also in amplifying its transmission particularly in African-American communities in the United States. In Nigeria, cases of *Trichomonas vaginalis* have been reported. Nimorsi *et al.* (2001) recorded the occurrence of

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urinary schistosomiasis and trichomoniasis co-infection in the genito-urinary tract of 14 (6.3%) female inhabitants of Ikao Village, in Owan Local Government Area of Edo State, Nigeria. Earlier, Konje *et al*. (1991) reported an incidence of 2.52% from the cytology clinic University College Hospital, Ibadan, Nigeria. An association of Pelvic Inflammatory Disease (PID), tubal infertility and cervical cancer with previous episodes of trichomoniasis has been reported but may be explained by its association with other STDs (Okonofua, 1995; Paisarntantiwong *et al*., 1995 and Zhang *et al*., 1995). Complications of trichomonal vaginitis that have been reported include premature rupture of membranes, premature labour, low birth weight and post- abortion or post-hysterectomy (Sobel, 1996; Soper *et al*., 1990). The aim of this study is to examine the prevalence, symptoms and factors that promote transmission of *Trichomonas vaginalis* among women in Lagos metropolis, Nigeria.

MATERIALS AND METHODS

A total of 544 High Vaginal Swabs (HVS) were obtained from patients attending Gyneacological and Antenatal Clinics at Lagos University Teaching Hospital, Idi-Araba and Military Hospital, Yaba, Lagos, Nigeria. Symptomatic and asymptomatic patients were sampled. HVS samples were collected by inserting a sterile speculum into the posterior fornix of the vagina while the individual is in the lithotomy position. The nature of the collected samples were noted such as the colour, consistency and odour; the samples were then put in 0.3 mL of sterile physiological saline. The resulting suspension was put on a clean slide, covered with a cover slip and examined immediately under the microscope. A smear of the secretion was also made on a slide, air dried and fixed in absolute methanol for 1 min. Diluted Giemsa stain was poured on the smear and allowed to stain for 10 min after which it was washed, air dried and examined under the microscope.

RESULTS AND DISCUSSION

Out of the 544 individuals examined for *T. vaginalis*, a total of 18 samples (3.3%) were infected. Of the 320 samples collected from Lagos University Teaching Hospital (LUTH), 6(1.9%) were positive for *T. vaginalis* while 12 (5.4%) were infected out of the 224 sampled from the Military Hospital (Table 1). The differences in prevalence were statistically significant using Chi-square test analysis ($p<0.05$). Prevalence of 1.8 and 1.5% were recorded amongst non-pregnant and pregnant women, respectively. Zero prevalence was recorded in the menopausal and pre-puberty groups. Peak prevalence of 1.8% occurred in the age group 21-30 years while none of the subjects below 21 years and above 50 years had trichomoniasis. Among the infected individuals, 22.2% were asymptomatic while the remaining patients showed characteristic symptoms such as greenish yellow vaginal discharge (33.3%), itching/pruritus (22.2%), malodorous discharge (11.1%), itching and malodorous discharge with 5.6% each. The marital status and frequency of sexual intercourse in those infected were also recorded. 88.9% of those infected were married; 44.4% of the infected women had sexual intercourse about once a week, 27.8% had sexual intercourse 2 to 3 times a week and 16.7% had sexual intercourse very often (more than four times a week).

Table 1: Prevalence of *trichomonas vaginalis* in samples obtained from luth and military hospital

Hospital	No. examined	No. infected	% infected
Luth	320	6	1.9
Military hospital	224	12	5.4
Total	544	18	3.3

Table 2: Prevalence of *T. vaginalis* infection in relation to toilet facilities

Toilet type	No. infected	% infected in total infection	% infected in total pop. Exam.
Water system	14	77.8	2.6
Putty	1	5.6	0.2
Pit latrine	3	16.7	0.6
Directly into water	-	-	-

Table 3: Prevalence of *T. vaginalis* infection in relation to occupation

Occupation	No. infected	% infected in total infection	% infected in total pop. Exam.
Student	1	5.6	0.2
Civil servant	1	5.6	0.2
Trader	6	33.3	1.1
House wife	5	27.8	0.9
Soldier	2	11.1	0.4
Doctor	1	5.6	0.2
Typist	1	5.6	0.2
Corper	1	5.6	0.2

Table 4: Prevalence of *T. vaginalis* and Candida infection

Infection	No. of patients infected	% infected in total pop. Exam.
T. vaginalis only	12	2.2
Candida only	183	33.6
T. vaginalis and *Candida* (mixed infection)	3	0.6

Peak prevalence of 2.6% was recorded in water cistern users, 0.6% amongst pit latrine users while putty users had the lowest prevalence of 0.2% as shown in Table 2. 77.8% of those infected made use of the water cistern, 16.7 and 5.6% used pit latrine and putty, respectively (Table 2). Similarly, of the positive cases, 33.3% were traders, 27.8% were housewives while 11.1% were soldiers (Table 3). Other categories of workers such as civil servants, doctors, typists and students were 5.6% each as shown in Table 3. About 1% of *T. vaginalis* infection were mixed with *Candida albicans* as shown in Table 4. Single infections with *Candida albicans* was recorded in 33.6% of the total population examined (Table 4).

The overall prevalence of *T. vaginalis* was more prevalent (5.4%) at Military Hospital than at LUTH (1.9%). This may be due to the lifestyle of military men, which could sometimes be promiscuous. It was found that 88.9% of those infected were married; This presupposes that sexual intercourse have some effect on trichomoniasis. This presumption agrees with the report by Ukoli (1990) that trichomoniasis is rare among virgins, but reaches its peak between the ages 20 and 40. Mason *et al.* (2005) reported that after controlling for age, seropositivity was significantly associated with being sexually active, having multiple sex partners, having a partner who had multiple sex partners and having a new sex partner in the past year. The frequency of sexual intercourse per week did not increase the prevalence of trichomoniasis in this study; in contrast, those who had sexual intercourse about once a week formed 44% of the infected women while those who had it more than four times a week were 16.7%. This means that it is the act of sexual intercourse that affects the prevalence of trichomoniasis, not the intensity of sexual intercourse.

Pregnancy did not affect the prevalence of trichomoniasis in this study as the difference between the pregnant and non-pregnant women were insignificant. The peak prevalence recorded in the age group 21-30 years falls within the peak range (20-40 years) reported by Garcia *et al.* (2004) from female inmates in a prison in Lisbon, Portugal. Nimorsi *et al.* (2001), also reported the highest *Trichomonas vaginalis* infection in female subjects within 20-25 years old. Earlier in 1987, Omer reported peak occurrence of *T. vaginalis* between age group 20-29 years among Sudanese women. None of the subjects below 21 years and above 50 years had trichomoniasis in this study, due to the reduced sexual activities of those in pre-puberty and menopausal age groups. 22.2% of the infected patients were asymptomatic; This means the patients were unaware of their infection status and will likely continue to remain sexually active. Wilkinson *et al.* (1999) suggested that approximately 50-70% of persons with *T. vaginalis* have subclinical infection. According to Wendel *et al.* (2002), patients infected with type I *Trichomonas vaginalis* have subclinical infection or are asymptomatic, while those infected with type II often present with genital irritation and odour. The patients who showed characteristic symptoms such as greenish yellow vaginal discharge (33.3%), itching/pruritus (22.2%), malodorous discharge (11.1%), itching and malodorous discharge (5.6%) in this study were likely to have type II *Trichomonas vaginalis.* Greenwell and Rughooputh (2004) stated that discharge is more common in patients with type II. Reports on similar purulent malodorous vaginal discharge and pruritus were made earlier by Burja and Shurbaji (2001). *T. vaginalis* is associated with the condition known as strawberry cervix, an inflammatory reaction that can mimic the cervical motion tenderness associated with Pelvic Inflammatory Disease (PID) (Moodley *et al.*, 2002). Evidence has however been presented that links *T. vaginalis* with the development of cervical cancer (Dunne *et al.*, 2003).

The report of this study also shows that individuals using water cistern had the highest prevalence of trichomoniasis. This may be as a result of the non-venereal mode of transmission as the parasite may remain viable in urine on a lavatory seat for 30-45 min. Jibunoh (1989) and Ukoli (1990) reported that spread by such agent undoubtedly occur, especially in areas with poor environmental hygiene. The peak prevalence of *T. vaginalis* recorded among traders may not be unconnected to their sexual promiscuity, lack of contraceptives, low educational level and socio-economic status. There was also an association of *T. vaginalis* with *Candida* in this study (0.6%). The report of mixed infection is in agreement with report by Jibunoh (1989). Furthermore, in a cohort of 15,933 studied in Taipel by Wang and Lin (1995), the presence of candidiasis and trichomoniasis showed significance association with abnormal cytological findings consistent with inflammation; however, the researchers were unable to associate cervical cancer with trichomonad infection. In the same year, Zhang *et al.* (1995) published their study of a cohort of 16,797 and showed that *T. vaginalis* infection contributed to the risk of cervical cancer. Studies from Africa have suggested that *T. vaginalis* infection may increase the rate of HIV transmission by approximately twofold (Sorvillo *et al.*, 2001). Detection and treatment of trichomoniasis may be important strategies in reducing HIV transmission through sexually transmitted infection control.

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