



Study on *Trichomonas vaginalis* and *Candida albicans* in Pregnant Women in Onitsha, Nigeria

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Abstract

An investigation on the incidence of *Trichomonas vaginalis* infection amongst pregnant women in Onitsha urban area of Anambra State, Nigeria was carried out between April 2013 and June 2014. The survey was done by random screening of 232 urine and 568 high vaginal swab samples of pregnant women in different gestational periods. The samples were collected during antenatal sessions at three different hospitals in Onitsha designated Hospitals I, II, and III. *Trichomonas vaginalis* was identified in 78 (9.8%) of the total number of samples. Some of the infected women had *T. vaginalis* infection alone while some were found to have mixed infection of trichomoniasis and candidiasis. *Candida albicans* infection was observed to be of higher incidence occurring in 284 samples (35.5%) of the total number of women studied. Some women (52%) had vaginal discharge with abnormal vaginal odour and some had vulval erythema. Some reported they had yeast infections in the past. Some have had gonorrhoeal infections, while some reported that they had slight temperature rises above 37°C in the night accompanied by abdominal pain.

Keywords: *Candida albicans*; Nigeria; *Trichomonas vaginalis*; Pregnant

Introduction

Trichomonas vaginalis is a pathogenic protozoan commonly found in the urinogenital tract of man. The organism is not a commensal but is sexually transmitted organism causing trichomoniasis in women and non-gonococcal urethritis in men [1-4]. The infection occurs in normal populations in the range of 2-15 percent and is one of the most widespread sexually transmitted diseases in the world [5,6]. Although not life-threatening, trichomoniasis is a major health problem, especially in women [1]. In men, infection has been found to be low. This, according to WHO [7] could be due to the high zinc concentration in men, which may prevent *T. vaginalis* from being established in the male reproductive tract. Most infected males produce semen that contains only small numbers of *Trichomonas vaginalis* [8].

In women, *T. vaginalis* infects primarily the vaginal epithelium and is commonly isolated from the endo-cervix of infected women [9]. Donbraye., *et al.* [9] observed that *T. vaginalis* is not just a nuisance but causes more serious diseases of the upper genital tract acting as a vector for the spread of other pathogens and is a source of considerable distress in adult women. It has been implicated in tubal pregnancy and tubal infertility, pre-term labour and puerperal infections [10-13]. Rasti., *et al.* [14] observed optimum haemolysis of human erythrocyte by live *T. vaginalis* at parasite to erythrocyte ratio of 1:5 during a 2-hour period of incubation. The organism also occurs in childhood in the period of hormonal inactivity though its rate is not as high as in women of childbearing age and full sexual activity [15].

Candida albicans is regarded as the best known of potential pathogenic species of yeasts responsible for majority of candida infections. The yeast is estimated to affect all adult women at least once in their lifetime [16] or during their childbearing period [17,18]. Pregnancy has been exclusively regarded as one of the factors that predispose in vulvovaginal candidiasis [16,19,20], the predominant symptom of vaginal candidiasis is itching, vaginal discharge may be profuse or minimal although the mucosa is usually inflamed with extreme soreness [21]. The isolation of *C. albicans* from the female lower genital tract should always be regarded as significant [22]. Very few control measures are available.

Investigations involving trichomoniasis have been carried out in Nigeria and usually centres in urban areas of the country [23-26]. Apalata, *et al.* [23] commented on the minimal investigations conducted on trichomoniasis and called for more epidemiological studies on *T. vaginalis* and *Candida albicans* to help know more about their prevalence and distribution, and initiate control measures. This study therefore is to investigate the incidence of *Trichomonas vaginalis* in so-called healthy populations of pregnant women and to add more data to the epidemiological picture being called for in Nigeria. A high incidence of the infection among pregnant women would call attention to greater care and hygiene among women.

Materials and Methods

The study area was Onitsha, Anambra State in the South-Eastern part of Nigeria. The area is a cosmopolitan and highly commercial city. The study population was 800 pregnant women. The hospitals from which sample were collected were the most popular in the area and are henceforth designated Hospital I, Hospital II and Hospital III.

The samples were obtained during the anti-natal sessions in the hospitals with the kind co-operation of the attending clinical Doctors. The Doctors required that the patients submitted their urine samples once a week for this and other clinical checks.

The randomly-selected pregnant women were given clean, sterile, stoppered specimen bottles with clear instructions on how best to collect urine specimens. The samples were supposed to have been collected after allowing the first flow of urine to flush the urethra (mid-stream- urine). Samples were processed within one hour of collection or stored at 4°C and cultured within 12 hr. of collection. The urine samples (232) were collected using this method.

High vaginal swab samples 568 were also collected with the aid of the medical officers in charge of the hospitals. Previous history of each patient was obtained from the medical records.

The urine samples were centrifuged and wet mounts in saline were prepared from the sediments. The wet mounts were examined under the X40 magnification for the presence of *Trichomonas vaginalis*. Specimens were considered negative after 5min of microscopic search [27].

Sterile swab was used for collection of the high vaginal swab specimens. A smear of the discharge was made on clean grease – free slide. A drop of fresh physiological saline was placed on his smear; a cover slip was used to cover the spot before viewing under the microscope.

The samples were also examined for the presence of *Candida albicans*. A smear of each of the samples was made on a clean slide and stained by the method of Gram [28]. Yeast cells appeared as large coccoid Gram- positive cells. For confirmation, samples were cultured using Sabauraud glucose agar. *C. albicans* appeared after 3 days at room temperature as cream-coloured, smooth colonies with pseudo-mycelium growing into the agar.

Results

Of the 232 urine and 468 high vaginal swab samples examined from the pregnant women in different gestational periods, 76 had *T. vaginalis* infection (Table 2). Infection seemed to be highest in the 1-3 months of pregnancy. In Hospital 1, 48 out of 200 samples examined were positive during the 1-3 months while in the same hospital, at 7-9 months of pregnancy, only 12 were positive. Higher incidences were recorded for the other two hospitals for women in the early months of pregnancy.

Hospital	Number of women of examined.			Total number examined
	1 st Tri.	2 nd Tri.	3 rd Tri.	
I	200	200	68	468
II	60	30	10	100
III	180	30	12	232
Grand Total	440	260	90	800

Table 1: Number of pregnant women tested for *Trichomonas vaginalis* and *Candida albicans* infections at different trimesters.

Hospital	Trimester of pregnancy (months)			Total Number of positive cases. / Tri. of pregnancy
	1 st Tri.	2 nd Tri.	3 rd Tri.	
I	48	0	12	60
II	3	1	0	4
III	6	2	4	12
Grand Total	57	3	16	76

Table 2: Number of positive cases in the pregnant women tested for *Trichomonas vaginalis* infection at different trimesters.

In Hospital II, 3 out of 60 sample examined were positive during the 1-3 months and 1 sample out of 30 during the 4-6 months were positive while no result was noted at 7-9 months of pregnancy, in the same hospital out of 10 samples examined.

In the hospital III, 180 samples were examined and 6 were positive during the 1-3 months of pregnancy; 2 out of 30 were positive in the 4-6 months of pregnancy while 4 out of 12 were positive in the 7-9 months of pregnancy. The concomitant infection of *Candida albicans* occurred with a higher frequency than trichomoniasis.

Table 3 shows that in Hospital 1, there are 174 candidiasis positive cases out of 468 examined. In Hospital II, there were 17 candidiasis positive specimens out of 100, while in Hospital III there were 89 positive candidiasis cases out 232 samples examined. The overall percentage of infection for *T. vaginalis* was 9.5% (Table 4) as compared to the overall percentage of infection for candidiasis which was 35% (Table 5).

Hospital	Trimester of pregnancy			Total Number of positive cases. / Tri. of pregnancy
	1 st Tri.	2 nd Tri.	3 rd Tri.	
I	124	31	19	174
II	11	4	2	17
III	63	17	8	89
Grand Total	198	52	29	280

Table 3: Number of positive cases in the pregnant women tested for *Candida albicans* infection at different trimesters.

Hospital	Number of positive	Percentage positive %
I	60	7.5
II	4	0.5
III	12	1.5
Grand Total	76	9.5
Grand Number Tested = 800		

Table 4: Percentage number of positive cases in the pregnant women tested for *Trichomonas vaginalis*.

Hospital	Number of positive	Percentage positive %
I	174	21.75
II	17	2.125
III	89	11.125
Total	280	35.00
Grand Number Tested = 80		

Table 5: Percentage number of positive cases in the pregnant women tested for *Candida albicans* infection

Discussion

This study investigated the incidence of *Trichomonas vaginalis* and *Candida albicans* in 3 different hospitals in Onitsha area of Anambra State, Nigeria. The result presented shows a 9.5 of infection for *T. vaginalis* (Table 4). Higher percentages have been recorded by [27] in separate studies of the incidence of the organism in pregnant women. In a study in Nigeria by [27], the organism was investigated among pregnant women living in Jos, Nigeria. Rate of infection was 37.6 percent for women living in Jos metropolis and 24.8 percent for Jos rural women. However, we recorded 35 percent *Candida albicans* infection in this study.

Our study showed that in one of the hospitals, a general hospital, higher incidence was observed in hospital attended by women of low-income group and the uneducated. This is in accordance with the study of Okonkwo and Umeaku, [29] on prevalence rate of UTIs among pregnant women in relation to their occupational status. They observed an infection rate of 54.5% amongst traders,

30.7% amongst housewives and 14.9% amongst civil servants. In addition, rate of infection was higher in women in the first three months of pregnancy than in the advanced periods of pregnancy (Table 2). This trend can be explained by the reduced activity at late pregnancy both sexually and otherwise. Improvement in personal hygiene and treatment of earlier cases of infection is suggested.

Virtually all cases of positive trichomoniasis had candidiasis, pus cells, epithelial cells and numerous bacteria, suggesting a concomitant infection [30].

This study was done with the aim of contributing to the epidemiological studies in Nigeria of *T. vaginalis* and *C. albicans* producing non-gonococcal urethritis. Much research has been done in Nigeria concerning other parasitic diseases but trichomoniasis has been largely ignored in the tropics and not enough had been done on the incidence of this organism especially in pregnant women where infection of any kind can endanger the life of the unborn child. Effective intervention to improve the general health of women depends upon adequate knowledge of such diseases [28,31].

Bibliography

1. Akerele, et al. "Prevalence of asymptomatic genital infection among pregnant women in Benin City, Nigeria". *African Journal of Reproductive Health* 6 (2002): 93-97.
2. WHO. Global incidence and prevalence of selected curable sexually transmitted infections -2016 (2008).
3. Kissinger P. "Trichomonas vaginalis: a review of epidemiologic, clinical and treatment issues". *BMC Infectious Diseases* 15 (2015): 307.
4. Sobel R and Sobel J D. "Metronidazole for the treatment of vaginal infections". *Expert Opinion on Pharmacotherapy* 16.7 (2015): 1109-1115.
5. Ojurongbe, et al. "Prevalence of Trichomonas vaginalis infection among pregnant women in Abeokuta, Nigeria". *Sierra Leone Journal of Biomedical Research* 2 (2010): 82-6.
6. Onyido, et al. "Prevalence of Trichomonas vaginalis among the rural women of Ekwulumili community Anambra State, Southeastern Nigeria". *Natural Science* 12 (2014): 129-134.
7. WHO. Sexually Transmitted Infection. WHO Media Centre (2008).
8. Usanga, V, et al. "Trichomonas vaginalis infection among pregnant women in Calabar, Cross River State, Nigeria". *International Journal of Gynecology and Obstetrics* 14 (2009): 1-7.
9. Donbraye, et al. "Detection of prevalence among pregnant women in Ibadan, South-Eastern Nigeria". *World Applied Sciences Journal* 11 (2010): 1512-1517.
10. Nathan, et al. "Microscopy outperformed in a comparison of five methods for detecting Trichomonas vaginalis in symptomatic women". *International Journal of STD and AIDS* 26.4 (2015): 251-256.
11. Workowski KA, et al. "Sexually transmitted diseases treatment guidelines". *Morbidity and Mortality Weekly Report* 59 (2010): 1-110.
12. Harp, et al. "Trichomoniasis: evaluation to execution". *European Journal of Obstetrics & Gynecology and Reproductive Biology* 157 (1) (2011): 3-9.
13. Vatanshenassan M, et al. "Trichomonas vaginalis: investigation of a novel diagnostic method in urine samples using cysteine proteinase 4 gene and PCR technique". *Experimental Parasitology* 126 (2) (2010): 187-90.
14. Rasti S, et al. "Complications of trichomoniasis on the pregnant women". *Jundishapur Journal of Microbiology* 4 (2011): 61-63.
15. Chinyere, et al. "Trichomonas vaginalis associated with adverse pregnancy outcomes: Implications for maternal health care delivery system in South-Eastern Nigeria". *British Journal of Biomedical Research* 2 (4) (2012): 568-574.
16. Nourian, et al. "Prevalence of Trichomonas vaginalis in pregnant women in Zanjan, Northwest of Iran". *Jundishapur Journal of Microbiology* 6 (2013): e7258.
17. Mahmoud, et al. "Prevalence of Trichomonas vaginalis infection among Egyptian women using culture and Latex agglutination: cross-sectional study". *BMC Women's Health* 15 (2015): 7.

18. Mairiga, *et al.* "Prevalence of *Trichomonas vaginalis* infections among antenatal clients in Maiduguri Nigeria". *International Journal of Biological Medical Research* 2.4 (2011): 998-1002
19. Miranda, *et al.* "Trichomonas vaginalis infection among young pregnant women in Brazil". *Brazilian Journal of Infectious Diseases* 18.6 (2014): 669-71.
20. Samuel B. O., *et al.* "Prevalence of *Trichomonas vaginalis* among pregnant women from selected hospitals in Ilorin metropolis". *Journal of Pharmaceutical and Scientific Innovation* 4 (2) (2015): 108-111.
21. Silver B. J., *et al.* "Trichomonas vaginalis as a cause of perinatal morbidity: A systematic review and meta-analysis". *Sexually Transmitted Diseases* 41.6 (2014): 369-76.
22. Kumari, *et al.* "Emergence of non-albicans *Candida* among candidal vulvovaginitis cases and study of their potential virulence factors, from a tertiary care center, North India". *Indian Journal of Pathology and Microbiology* 56 (2013): 144-147.
23. Apalata, *et al.* "Factors associated with symptomatic vulvovaginal candidiasis: A study among women attending a primary healthcare clinic in kwazulu-natal, South Africa". *Annals of Medical and Health Sciences Research* 4 (2014): 410-416.
24. Nwadioha, *et al.* "Risk factors for vaginal Candidiasis among women attending primary health care centres of Jos, Nigeria". *Journal of Clinical Medical Research* 2 (2010): 110-113.
25. Landers, *et al.* "Predictive value of the clinical diagnosis of lower genital tract infection in women". *American Journal of Obstetrics and Gynecology* 190 (2004): 1004-1010.
26. Adib SM, *et al.* "Practices of Lebanese gynaecologist regarding treatment of recurrent vulvovaginal Candidiasis". *Northern American Journal of Medical Science* 3 (2011): 406-410.
27. Okonkwo, *et al.* "Prevalence of vaginal candidiasis among pregnant women in Nnewi town of Anambra state". *African Research Review* 4 (2010): 539-548.
28. Vijaya D, *et al.* "Changing trends of vulvovaginal candidiasis". *Journal of Laboratory Physicians* 6 (2014): 28-30.
29. Okonkwo, *et al.* "Prevalence of urinary tract infections among pregnant women attending antenatal clinic in some selected hospitals in Anambra State". *Nigerian Journal of Microbiology* 31.2 (2017): 4032-4039.
30. Molgaard-Nielsen, *et al.* "Use of oral fluconazole during pregnancy and the risk of birth defects". *New England Journal of Medicine* 369 (2013): 830-839.
31. Ibrahim, *et al.* "Prevalence of vaginal candidiasis among pregnant women with abnormal vaginal discharge in Maiduguri". *Nigerian Journal of Medicine* 22 (2013): 138-142.

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