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(RESEARCH ARTICLE)



Prevalence of trichomoniasis among pregnant women attending ante-natal clinic in Bauchi state, Nigeria

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Abstract

Trichomoniasis is one of the most common sexually transmitted infections. The infection may lead to some complication in pregnancy; it has been related with premature labor and low birth weight. High vaginal swabs (HVS) and urine samples, 100 each, were collected from consenting pregnant women and examined for the presence of *T. vaginalis* under the microscope using direct wet mount microscopy within 2 hours of collection. Out of 200 samples examined, 46 (23.0%) were found to be infected with *T. vaginalis*; 17(17%) in General Hospital Bayara and 29 (29%) in Specialist Hospital Bauchi. There is no significant difference in the hospitals used ($P>0.05$). Women in the age group 25-35 years had the highest prevalence rate of 27.4%, while the lowest rate of 7.1% was observed in women at the age group 36-45, but difference was statistically insignificant($P>0.05$) among the age groups. Women in their second trimester had the highest prevalence rate of 24.5% while the lowest prevalence rate of 21% was noted among those in their third trimester. Comparing HVS and urine microscopy showed that HVS had a prevalence of 31% while urine had 15%; the difference in their detection was statistically insignificant ($P>0.05$). In relation to number of birth, women at first birth had the highest prevalence (34.4%) while the lowest prevalence (17.5%) was observed in women at second birth. These findings are useful for ante-natal care and protection against STDs. The need for improved personal hygiene and other intervention programmes among these vulnerable groups of women is advocated.

Keywords: *Trichomonas vaginalis*; Trichomoniasis; High vaginal swab; Microscopy; Bauchi

1. Introduction

Trichomonas vaginalis is an anaerobic flagellate protozoan first discovered in 1836 by Alfred Francois Donne through microscopic observation of motile trophozoites in vaginal or cervical secretion. *T. vaginalis* is a sexually transmitted disease (STD) of worldwide public health importance and one of the most prevalent causes of non-viral sexually transmitted disease [1]. It is the causative agent of trichomoniasis. It measures 7-3 μm length and 5-12 μm width. It has four anterior flagella and a posterior flagellum attached to an undulating membrane

Trichomonas vaginalis inhabits the female genital tract and urinary tract of both males and females. In female it is accompanied by frothy-greenish yellow foul-smelling discharge, vulvo-vaginal secretion, dysuria and lower abdominal pains [2]. It was reported that the vaginal pH increases by shifting from a stronger acidic (3.8-4.2) to a weaker form (5.0-6.0) thereby being conducive for the growth of *T. vaginalis* [3]. It has also been reported in pregnant women to cause premature rupture of the membrane, premature labor, low birth weight and post abortion infection [4].

Trichomonas vaginalis is more prevalent in prostitutes in KwaZulu-Natal, South Africa as revealed by Pugh [5]. *T. vaginalis* may be an important co-factor in promoting the spread of Human Immunodeficiency Virus (HIV) in Africa-

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American communities [6]. It also serves as a vector of other organism by carrying pathogens attached to their surface into fallopian tube [6].

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 [7-8] while in the United States of America, 5 million women and 1 million men are infected annually [8]. The center for disease control [9] has estimate that *T. vaginalis* is responsible for 7-9 million cases of infection each year in United State of America. In Africa, the prevalence of trichomoniasis is reported to be much higher [8]. Increasing prevalence of trichomoniasis has been reported in many states of Nigeria including Oyo, Lagos, Sokoto, Plateau and Imo states [10-12].

2. Material and methods

2.1 Sample collection

Ethical clearance was obtained for the research (See Appendix I) and samples were collected from only consenting individuals. A total of 200 samples were collected comprising of 100 urine and 100 high vaginal swap (HVS) each and data on age, pregnancy trimester, and number of birth was obtained from each woman. The samples were transported to the Laboratory of Biological Science Department, Abubakar Tafawa Balewa University, Bauchi immediately to avoid contamination and examined using wet mount preparation method for the identification of trophozoites of *T. vaginalis*.

2.2 Treatment of sample

2.1.1. Urine sample

The urine was spun at 4,000 rpm for 5 mins in a centrifuge. The supernatant was decanted and the sediment examined by making a drop on a clean grease free glass slide, covered with cover slip and viewed microscopically with low power 10X and high power 40X objectives. The presence of *T. vaginalis* was detected by the characteristic jerky movement of the parasite and identified using the characteristic four flagella, axostyle and oval shape.

2.1.2. HVS sample

A smear of the vaginal swab sample was made on a clean slide, mixed with two drops of normal saline and observed by wet mount. The presence of *T. vaginalis* was detected by the characteristic jerky movement of the parasite and identified using the characteristic four flagella, axostyle and oval shape.

2.3 Statistical 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 ($P < 0.05$) was considered statistically significant.

3. Results

Out of two hundred (200) samples examined, 100 urine and 100 high vaginal swab, 46 (23.0%) were infected with *T. vaginalis* while 154 (77%) were not infected. Out of the 46 infected women 31 (15.5%) had infection vaginal swabs with no infection in urine samples while 15(7.5%) had *Trichomonas vaginalis* urine but none in vaginal swabs (Table 1). Also out of the 100 samples collected from specialist hospital Bauchi, 29 (29%) were positive for *T. vaginalis* while 17(17%) infected out of the 100 samples from general hospital Bayara (Figure 1). A highest prevalence of 27.4% was observed among women aged between 26-35 years, followed by those aged 15-25 years (22.6%) and the least prevalence of infection rate of 7.1% was recorded amongst the age group of 36-45 years (Table 2). Peak prevalence was recorded in pregnant women in the second trimester of pregnancy (24.5%) followed by those in the third trimester (21.1%) and no sample was examined from those in their first trimester as shown in table 3. Prevalence of the infection as depicted in figure two shows that those at their first birth have the highest prevalence of 34.4% followed by those at birth ≥ 3 with 18.4% prevalence and those at second birth have the least prevalence of 17.5%.

Table 1 Prevalence of *T. vaginalis* in relation to sample type

Sample type	Number of examined	Number of infected (%)
HVS	100	31(31)
Urine	100	15(15)
Total	200	46(23.0)

Table 2 Prevalence of *T. vaginalis* in relation to age

Age (years)	Number of examined	Number of infected (%)
15 – 25	124	22(22.6)
26 – 35	62	17(27.4)
36 – 45	14	1(7.1)
Total	200	46(23.0)

Table 3 Prevalence of *T. vaginalis* in relation to pregnancy trimester

Pregnancy trimester	Number of examined	Number of infected (%)
1 st Trimester	0	0(0)
2 nd Trimester	110	27(24.5)
3 rd Trimester	90	19(21.1)
Total	200	46(23.0)

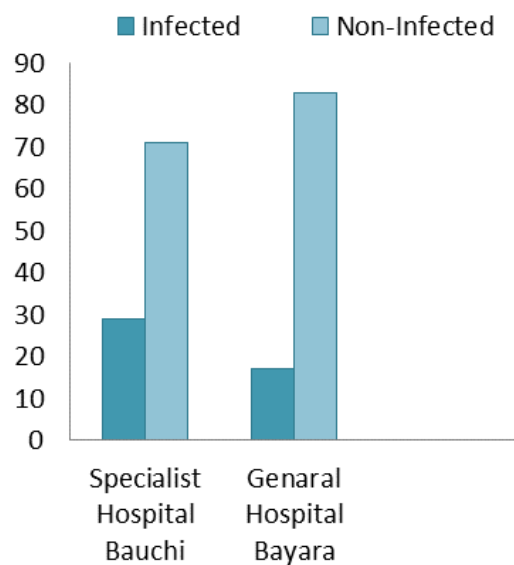


Figure 1 Hospital related prevalence of *T. vaginalis*

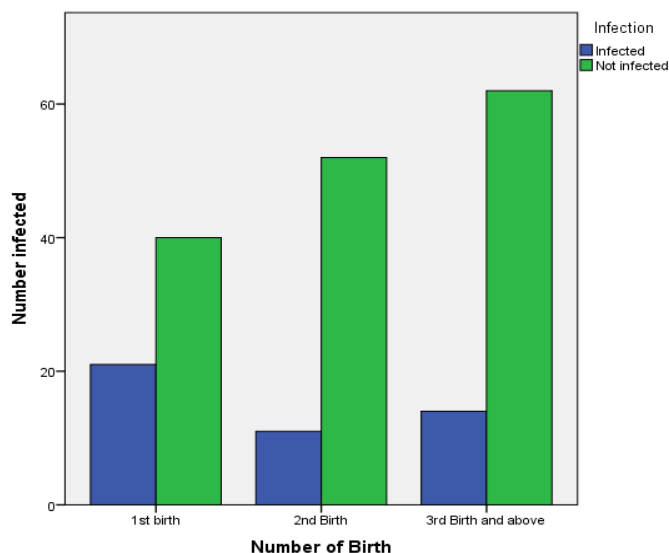


Figure 2 Prevalence of *T. vaginalis* in relation to parity

4. Discussion

The result of this study has demonstrated the prevalence of *T. vaginalis* infection in pregnant women Bauchi state. *T. vaginalis* was found in 46(23.0%) of the pregnant women examined in this study. This result is far higher when compared with findings from some previous studies, for example 4.7% reported in Illorin, Nigeria, 2.7% prevalence in Jos, Nigeria [11], 2.8% in Abakaliki, Nigeria [13] and 3.3% in Lagos, Nigeria [12]. This high prevalence may be attributed to little or no attention given to this disease of public health importance [14-15]. However, outside Nigeria there are high prevalence rates reported in a number of other studies; for example 24.7% in Tanzania [16] and 34.0% in Nairobi, Kenya [17].

The overall prevalence of *T. vaginalis* was higher at state specialist hospital (29%) than at General Hospital Bayara (17%) as shown in figure 1. There is a general consensus that the prevalence of *T. vaginalis* vary markedly according to settings [7]. The differences in the prevalence rates at the different hospitals could be as a result of differences in the environmental background of the individuals used in the study.

Amongst the different age groups investigated, (Table 2) *T. vaginalis* infection distribution was highest in women aged 26-35 years (27.4%) which is the middle aged group followed by women aged 15-25 years (22.6%) and least in women aged 36-45 years (7.1%). The result of this study is in agreement with the finding of a previous work [7] he reported that trichomoniasis is more prevalent among sexually active young people. It has generally been observed 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 [18]. These age groups reported by other researchers [11-13, 19] are documented to be persons with the greatest sexual activity and that incidences decreases with age. The peak incidence of trichomonal infections is usually between 16 and 35 years of age [20]. The rate of 26% was recorded among female students aged 26-35years of age [21]. It was also observed that *T. vaginalis* infection is widely distributed among individuals between 20 and 45 years of age [3]. It was also noted that the incidence of trichomoniasis depends on sexual activities. Hence, *T. vaginalis* is transmitted primarily by sexual intercourse.

Women in the second trimester of pregnancy were observed to be more infected with *T. vaginalis* (24.5%), followed by those in the third trimesters (21.1%) as shown in Table 3. 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 third trimester. This finding is consistent with previous reports in Imo state, Nigeria [10] and Cross River [22] 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 [13] who reported that women in the third trimester of pregnancy were more infected with *T. vaginalis* in their study. These differences could be attributed to other factors such as physiological, drug use, etc.

All the women examined were apparently healthy without complaints of any signs and symptoms associated with *T. vaginalis* infection. Other researchers showed that most infections are asymptomatic or mild. In Zimbabwe, South Africa,

it was observed that 75% of women, who were found to be asymptomatic on questioning, were 16% *T. vaginalis* positive on laboratory diagnosis [23]. Although trichomoniasis is now recognized as a serious public health problem, it was originally thought to be innocuous [24]. The apparently innocuous nature of the infection could be responsible for its increase in the population since it may be taken for granted by most victims.

Examination of urine samples recorded prevalence of 15% while vaginal swab recorded 31% (Table 1). This shown that either urine sample or vaginal swab is insufficient for proper diagnosis of *Trichomonas vaginalis* infection. For better results both urine and vaginal swab should be used. This report agrees with the finding of other researchers [25-26].

Women at first birth in this study were seen to have the highest prevalence of 21 (34.4%) and those at second birth have the least prevalence of 11 (17.5%) and those at ≥ 3 birth have a prevalence of (18.4%) (Figure 2).

Several authors have shown a greater prevalence of trichomoniasis in multiparous women, women who married at an early age and during pregnancy. This is because the growth and multiplication of *T. vaginalis* is optimal in most milieus with temperatures between 35°C and 37°C and pH between 4.9 and 7.5. Also host factors which increase vaginal pH such as pregnancy, menses and co-incident anaerobic infections in the vaginal wall, appear to encourage the development of symptomatic trichomonal vaginitis [24-27]. The high prevalence could be the practice of polygamy in the community, where the husband may be asymptomatic carrier, transmitting the infection to wives.

Worldwide, the incidence of *T. vaginalis* is high, usually co-infecting with other sexually transmitted diseases. This often results in pelvic inflammatory diseases and tubal infertility [28-29]. This high incidence rate is associated with factors as low socio-economic status, poor personal hygiene, underdevelopment and multiple sex partners [19, 30].

5. Conclusion

This study has confirmed the endemicity of *Trichomonas vaginalis* infection among pregnant women in Bauchi, Bauchi State and suggests that the control of trichomoniasis 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.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors declare no conflict of interest of any form.

Statement of ethical approval

Ethical clearance for the research was obtained from concerned authorities of Anti-natal Clinic at Specialist Hospital and General Hospital Bayara, Bauchi State, Nigeria (Permission ref no. NGHB/HBM/ADM/S/V.II dated 16/08/2017).

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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