

EPIDEMIOLOGICAL SURVEY OF *TRICHOMONAS VAGINALIS* AMONG YEAR 5 STUDENTS TAKING PARASITOLOGY AT THE FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGER STATE, NIGERIA

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ABSTRACT

Aim and Objective: The aim of this study was to see how popular *Trichomonas vaginalis* was among year 5 parasitology students at the Federal University of Technology in Minna, Niger State.

Methods: A total of 239 high vaginal swabs and urine specimens were collected aseptically from male and female students, respectively, using a sterile swab stick and clean containers, for the evaluation of *T. vaginalis* occurrence under the microscope.

Results: A total of 96 (40.17%) of the 239 students examined were found to have *T. vaginalis* infection, with female students having the highest prevalence 67 (50.0%), and male students having the lowest prevalence 29 (27.62%). The department of biology education had the most infections with 25 (41.67%), followed by the department of biology with 41 (41.41%), and the department of microbiology with 30 (37.50%). The highest infection rate was 34 (50.75%) in the age group of 21–25 years, followed by 17 (44.74%) in the age group of 31–35 years, and 5 (25.0%) in the age group of 46–50 years. There was no statistically significant difference in infection rates depending on age of the students.

Conclusion: Vaginal trichomoniasis is very common among female students in year 5 at the Federal University of Technology in Minna, and it often goes unnoticed.

Keywords: *Trichomonas vaginalis*, High vaginal swabs, Futminna, Parasitology.

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INTRODUCTION

Trichomonas vaginalis is a protozoan parasite that causes trichomoniasis and is primarily transmitted through sexual contact. It is the most popular non-viral sexually transmitted infection (STI) in the world [1]. In 85% of women and 77% of men, the infection is asymptomatic [1]. *T. vaginalis* is 10 times more common in African women than in men, according to the WHO [2]. The total number of *T. vaginalis* infections in Africa is estimated to be 42.8 million [2]. Women may experience a change in vaginal discharge, intermenstrual bleeding, or vaginal blood loss during or after sexual contact if the infection is symptomatic. Vaginal itching, dysuria, and stomach pain are some of the other symptoms that can occur. Upper reproductive tract disease syndromes, such as pelvic inflammatory disease (PID), may also occur. PID [3-5] and tubal pathology [6] are 4.7-fold more likely in women who have *T. vaginalis* infection. Preterm labor is also 1.3 times more likely in women infected with *T. vaginalis* [5].

T. vaginalis infection in women can last for months and, if left untreated, can increase the risk of HIV infection in those who are exposed [6,7]. *T. vaginalis* has been linked to an increase in vaginal HIV load, which could increase the risk of HIV transmission to a sexual partner [7]. In addition, a connection has been discovered between *T. vaginalis* and *Chlamydia trachomatis* infection [8]. Both prevalent and incidence *T. vaginalis* were predicted by having a concurrent chlamydial infection.

Despite the estimated high prevalence of *T. vaginalis* infection in Africa, information on clinical presentation, demographic and behavioral factors linked to infection, and microbiological factors is scarce. Multiple researches in the form of *T. vaginalis* infections have been conducted on other continents [9-12]. The prevalence of *T. vaginalis* has been identified in a few African countries, ranging from 6.5% to 40% [13]. The lack of STI screening programs and limited control measurements is one of the reasons for the high prevalence of *T. vaginalis*. The disease's estimated burden is high, but data on symptomatology, coinfections, and pathogen load are scarce. Other essential causative microorganisms for STI include *Chlamydia trachomatis* and *Neisseria gonorrhoeae*, which have shown a connection between pathogen load and clinical presentation and the production of long-term sequelae [14,15].

The asymptomatic nature of the infection and the lack of baseline data in many parts of the state, especially in the study area, necessitated the investigation of an epidemiological survey among female students studying parasitology at the Federal University of Technology in Minna, Niger State.

METHODS

Study area

From June to September 2019, this research was conducted in Minna, Niger State, Nigeria. The study area is located at an altitude of 259.14 m and has a latitude and longitude of 9°30' 9930" 0.8°N 632" 46.74"E.

(820.21 ft). The study area's average annual temperature is 27.5°C. In January, there is the least amount of rain. Minna receives the majority of its precipitation in September, with an average of 260 mm. In March, the average high temperature is about 30.5°C. August is the coldest month of the year, with an average temperature of 25.3°C.

Study population

The research included 239 students (year 5), both male and female, from the Federal University of Technology, Minna, Niger State, who were enrolled in the parasitology class.

Sample collection

The female students' high vaginal swab was collected aseptically with the help of medical laboratory scientists using sterile cotton swab sticks, while the men's urine specimens were collected using clean sterile sample bottles as directed. To prevent loss of the organism's characteristic tumbling motility and death due to moisture loss, the specimens were immediately taken to the diagnostic laboratory section of the school clinic for immediate analysis and inspection within an hour of collection.

Parasitological examination of specimen

The vaginal discharge and urine were macroscopically examined, with the color, odor, and hydrogen ion concentration (pH) levels of the discharge being noted using a pH paper strip. A small portion of the discharge was suspended in one drop of 0.85% physiological saline and covered with a coverslip for microscopic inspection. The urine was centrifuged for 3 min at 3000 rpm. Following centrifugation, a drop of the sediment from centrifuged urine samples was put on a clean slide, covered with a coverslip, and studied under the microscope with $\times 10$ and $\times 40$ objectives, respectively [16-18].

RESULTS

The epidemiological survey of *T. vaginalis* among year 5 students taking parasitology at the Federal University of Technology, Minna, Niger State, Nigeria, showed that 96 (40.17%) of the 239 (100%) students tested positive for *T. vaginalis*. Female students had the highest infection rate of 76 (50.0%), while male students had the lowest rate of 29 (27.62%) (Table 1). In terms of infection rate, there was a statistically significant difference ($p=0.05$) between men and women.

T. vaginalis infection was studied among the different departments of the students taking parasitology. The highest infection of 25 (41.67%) was registered among students of biology education, followed by

biology department 41 (41.41%) while department of microbiology had the least infection rate of 30 (37.50%). Infection rates in relation to the various departments of students taking parasitology showed no statistical difference ($p>0.05$) (Table 2).

In terms of student age groups, the age group of 21–25 years had the highest age-related prevalence of 34 (50.75%), followed by 31–35 years 17 (44.74%), and age group of 46–50 years had the lowest infection rate of 5 (25.0%). There was no statistical difference ($p>0.05$) in *T. vaginalis* infection between the different age groups of parasitology students (Table 3).

DISCUSSION

T. vaginalis is one of the most common STIs worldwide, but its prevalence varies greatly from country to country [19,20]. Data on the epidemiological profile of *T. vaginalis* in Minna, Niger State, Nigeria, are scarce. The aim of this study was to explain the epidemiology of *T. vaginalis* among parasitology students in their final year (both male and female). Disease occurrence varies, and diagnosis is often difficult due to the existence of the organism and the unwillingness of subjects to consider the presence of symptoms or consent to screening for personal reasons.

T. vaginalis was found to be present in 96 (40.17%) of the women in this sample. However, when compared to the work of Arambulo *et al.* [21] in Filipino women, the prevalence rate observed in this study is high, with 19 (6.8%) positive cases identified out of 288 women. *T. vaginalis* was found to be prevalent in 81 (40.05%) of the people studied by Ogomaka Ijeoma *et al.* [22]. Adults in Oru-East LGA, Imo State, Nigeria, have *T. vaginalis*. In terms of gender, females had a higher prevalence rate than males, with 67 (50.0%) cases compared to 29 (27.62%) cases. This is close to the findings of Onwuluri *et al.* [23] who found 374 (31.0%) females and 131 (15.6%) males in their study.

Females had a higher prevalence rate of 52 (52.02%) than males with 29 (29.0%), according to Ogomaka Ijeoma *et al.* [22]. *T. vaginalis* was found in 24.7% of the 505 people tested by Anosike *et al.* [23] and it was significantly higher in females than in males. He also claimed that *T. vaginalis* infection was substantially higher in females than males in the second and third decades of life compared to the fourth and fifth decades, and that infection rises gradually with age. This is also possible due to the low detection of *T. vaginalis* in men using wet mount microscopy, as well as the lack of an ideal diagnostic process. Furthermore, the prostate contains a high concentration of zinc and antitrichomonal substances, which affects detection [24].

According to the findings of this study, the age group of 21–25 years had the highest prevalence rate of 34 (50.75%), followed by the age group of 31–35 years with 17 (44.74%), and the age group of 46–50 years had the lowest infection rate of 5 (25.0%). According to Krieger [19] and Seña *et al.* [10], the prevalence of disease was linked to the extent of sexual activity of the study population. Furthermore, there is clear evidence that *T. vaginalis* is transmitted sexually, as prevalence is highest in patients who have increased sexual behaviors and multiple

Table 1: Prevalence of *Trichomonas vaginalis* in relation to gender

Gender	Number of examined (%)	Number of infected (%)
Male	105 (43.93)	29 (27.62)
Female	134 (56.07)	67 (50.0)
Total	239 (100)	96 (40.17)

χ^2 call=12.27, χ^2 tab=3.84, df=1

Table 2: Prevalence of *Trichomonas vaginalis* in relation to the various departments of the students

Departments	Gender		Total			
	Male	Female	Male	Female		
	Number of examined (%)	Number of infected (%)	Number of examined (%)	Number of infected (%)		
Biology	45 (42.86)	13 (28.89)	54 (40.29)	28 (41.79)	99 (41.42)	41 (41.41)
Microbiology	37 (35.24)	9 (24.32)	43 (32.09)	21 (31.34)	80 (33.47)	30 (37.50)
Biology Education	23 (21.90)	7 (30.43)	37 (27.61)	18 (26.87)	60 (25.10)	25 (41.67)
Total	105 (43.93)	29 (27.62)	134 (56.07)	67 (50.0)	239 (100)	96 (40.17)

χ^2 call=0.36, χ^2 tab=5.99, df=2

Table 3: Prevalence of *Trichomonas vaginalis* in relation to age

Age group	Gender				Total	
	Male		Female			
	Number of examined (%)	Number of infected (%)	Number of examined (%)	Number of infected (%)	Number of examined (%)	Number of infected (%)
21-25	33 (31.43)	12 (36.36)	34 (25.37)	22 (64.71)	67 (28.03)	34 (50.75)
26-30	23 (21.90)	7 (30.43)	27 (20.15)	12 (44.44)	50 (20.92)	19 (38.0)
31-35	16 (15.24)	5 (31.25)	22 (16.42)	12 (54.55)	38 (15.90)	17 (44.74)
36-40	15 (14.29)	4(26.67)	23 (17.16)	9 (39.13)	38 (15.90)	13 (34.21)
41-45	10 (9.52)	1 (10.0)	16 (11.94)	7 (43.75)	26 (10.88)	8 (30.77)
46-50	8 (7.62)	0 (0.00)	12 (8.96)	5 (41.67)	20 (8.37)	5 (25.0)
Total	105 (43.93)	29 (27.62)	134 (56.07)	67 (50.0)	239 (100)	96 (40.17)

χ^2 call=6.98, χ^2 tab=11.07, df=5

sex partners. Adults between the ages of 21 and 25, as well as those between the ages of 31 and 35, were found to be more likely to contract the infection during sexual intercourse in the current research.

This is consistent with Tanyukseli and Doganci's findings [20] who found that prostitutes were a significant community for the transmission of a variety of sexually transmitted diseases (STDs) around the world, with *T. vaginalis* infection being one of the most common. The reasons for this rise in infection among people aged 21-25 may be due to their failure to stick to their sexual partners, avoid contact with infected items such as sheets, bathtubs, and clothing, and have no control over their sexual urge. As compared to Woken's [25] findings in the Niger Delta Region River state, this is a significant increase.

This high prevalence of trichomoniasis may be due to a lack of attention paid to this important public health disease. Acholonu [26] and Petrin *et al.* [27] have made similar observations. They discovered that trichomoniasis is the most common sexually transmitted parasitic infection in the world, but it is largely ignored [28]. Previous researchers in Nigeria have linked STD to rising poverty, unemployment, and violence among women and children [29,30], as well as other factors such as sexual recklessness, lack of awareness, and poor personal hygiene. There are certain drawbacks to the research. *T. vaginalis* detection in this study was focused solely on wet mount smear microscopic analysis as part of normal procedure, with no additional investigations such as culture or PCR performed. However, bacteria can contaminate culture, preventing it from growing [27,31,32], and a higher prevalence of *T. vaginalis* was found in the study among patients with bacterial vaginosis.

CONCLUSION

T. vaginalis is still common in women who have a lot of vaginal discharge, though it is more common in sexually active women. Health promotion, education, and prevention strategies aimed at improving disease awareness among these high-risk groups are needed and should include sexual behavior prevention. To better understand the epidemiology of *T. vaginalis*, however, more epidemiological data are needed.

DECLARATIONS

Authors' contributions

SSE and ICJO conceived and design the experiments. SSE and FAN performed the experiments. ICJO, OJO, and YHU review and editing. SSE and FAN wrote the first draft of the manuscript. OCA, UEO, and OVO analyzed the data. All authors agreed to the final state of the manuscript.

Competing interest

The authors declared that they have no competing interest.

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Ethical approval and clearance

Individual informed consent was also gotten from all the participants (students) after the aim and objectives of the study was fully explained to them.

Availability of data and material

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study

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