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**PREVALENCE OF TRICHOMONIASIS AMONG PATIENTS ATTENDING
UMARU SANDA NDAYEKO GENERAL HOSPITAL BIDA, NIGER STATE,
NIGERIA**

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ABSTRACT

This study was carried out to determine the prevalence and risk factors of among patients attending Umaru Sanda Ndayeko General Hospital Bida, (Bida, Niger state) Nigeria. High vaginal swabs and urine samples were aseptically collected from 250 females and 250 males respectively. The samples were examined for *Trichomonas vaginalis* using standard microbiological techniques within one hour of collection. Out of the 500 samples examined, 47(9.4 %) were positive. Higher prevalence of infection was recorded among females (33.0 %) compared to males (14.0 %). Patients aged 40-50 years (18.2 %) had the highest prevalence of infection while the least was observed among those aged 51 and above 0(0.0 %). The highest prevalence (14.5 %) was obtained among the married participants, followed by the single (11.1 %), and the least was obtained among divorced participants (2.4 %). Significant risk factors for *T. vaginalis* infection were; gender (p=0.004) and marital-status (p=0.003). There was no relationship between rate of infection and age group (p=0.237), occupation (p=0.348) and educational status (p=0.614) of patients. This study has recorded a significant prevalent rate of *T. vaginalis* infection in the study area. It is therefore necessary to create more awareness about trichomoniasis in the study area.

Keywords: High vaginal swab, Sexually Transmitted Infections, Sexually Transmitted Parasitic Disease, Trichomoniasis, *Trichomonas vaginalis*

INTRODUCTION

Trichomoniasis is the most prevalent non-viral sexually transmitted infection (STI) globally (Van der Pol, 2007) and the most common sexually transmitted parasitic disease (STPD) in Nigeria, infection with STPDs sometimes result in direct damage to the male and female



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reproductive organs including impairing fertility through the inhibition of gamete production (Centre for Disease Control and Prevention (CDC), 2023; Van Gerwen *et al.*, 2023). This disease is caused by infection with a parasite called *Trichomonas vaginalis*. Trichomoniasis is recognized as a parasite that commonly infect the genital tract of both male and female (Pan African Health Organisation, 2018). Several research has shown that *T. vaginalis* infection is associated with an increased risk of infection with several sexually transmitted infections (STIs) such as gonorrhea, herpes simplex virus, human papillomavirus and human immunodeficiency virus (HIV) (Kissinger, 2015; Mabaso and Abbai, 2021; Silverberg *et al.*, 2022). Trichomoniasis is also associated with infertility, postoperative infections, cervical neoplasia and adverse pregnancy outcomes such as preterm delivery and low birth weight (Bagga and Arora, 2020; Van Gerwen *et al.*, 2021). It has also been reported that *T. vaginalis* is a major cause of infertility and a common cause of non-gonococcal urethritis (NGU) in men (Krieger, 1995). The high prevalence of *T. vaginalis* infection globally and the frequency of coinfection with other STIs make trichomoniasis a compelling public health concern (Kissinger, 2021).

The exact global prevalence of the infection is difficult to obtain because trichomoniasis is not nationally reportable and many infections are asymptomatic. The World Health Organization estimates the annual worldwide incidence of trichomoniasis at over 270 million cases, although the accuracy of this estimate is highly uncertain (Alsaad, 2022). The incidence of trichomoniasis in Europe is similar to that in the United States. In Africa, the prevalence of trichomoniasis may be much higher. The prevalence of vaginal *T. vaginalis* infection was estimated to be 11-25% among African study populations (Mabaso and Abbai, 2021). It has also been reported that annually, an estimate of about one billion people suffer trichomoniasis worldwide while in Nigeria approximately 25% of students and 20% of pregnant women are infected (Ogomaka *et al.*, 2018).

Humans are the only known host of *T. vaginalis*. Transmission occurs predominantly via sexual intercourse. The organism is most commonly isolated from vaginal secretions in women and urethral secretions in men. Trichomoniasis is thought to be widely underdiagnosed owing to various factors, including a lack of routine testing, the low sensitivity of a commonly used diagnostic technique (wet mount microscopy), and nonspecific symptomatology. Infection in the majority of the men and women are often asymptomatic thereby escaping diagnosis and treatment. Self-diagnosis and self-treatment



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or diagnosis by practitioners without adequate laboratory testing may also contribute to misdiagnosis (Obeagu *et al.*, 2018).

Despite the prevalence of these diseases in Nigeria, studies on the relative prevalence especially in Niger State remain scanty. This present study thus determines the prevalence of trichomoniasis among adults attending. Early diagnosis of the infection with trichomoniasis is important to avoid obvious adverse effects to the infected individual, their sex partners and the unborn babies.

MATERIALS AND METHODS

Study design

This study is a hospital-based cross-sectional study that was conducted among patients attending Umaru Sanda Ndayeko General Hospital Bida, Niger State, Nigeria. The Umaru Sanda Ndayeko General Hospital Bida located in the ancient city of Bida, Niger State, Nigeria, is a reference centre for health care for majority of locales within the city and its environs. Ethical approval to carry out this research was obtained from the Research and Ethics Committee of the Umaru Sanda Ndayeko General Hospital, Bida.

Study participants

A total of 500 patients, both male (250) and female (250) aged 18 years and older (older were) consented to participate in the study. These patients were invited to participate during their visit to the General Outpatients Department of Umaru Sanda Ndayeko General Hospital Bida. An informed consent document was signed by patients. Participation consisted of answering a structured self-administered questionnaire (with closed-ended questions). The participants answered a self-administered questionnaire that addressed demographic data (age, marital status, level of education, marital status, occupation, number of sexual partners, previous STI) and collection of samples.

Sample collection

Two hundred and fifty (250) samples of High Vaginal Swabs (HVS) were collected by the lab scientist using sterile cotton swabs sticks to swab the inside of the female patient's vagina while 250 early morning mid-stream urine samples were collected by the male patients themselves inside a sterile universal sample bottles after appropriate labeling and coaching on method of sample collection. Samples were transported to Microbiology Laboratory of



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Umaru Sanda [Ndayeko](#) General Hospital Bida, for analysis within an hour of collection to avoid loss of motility and/or death of the parasite.

Sample analysis

Macroscopic examination was done by checking for the yellowish-green colour, frothy odour and using paper strip to determine the pH level of the specimen. Wet mount preparation was done by dropping a drop of 0.85% normal saline on a clean grease-free glass slide and the swab stick was emulsified in the normal saline on the slide to make a smear. It was covered with a cover slip and then viewed under the microscope using x10 and x40 objective lens. The same procedure was used for the urine samples. Trichomoniasis was identified by the presence of motile *Trichomonas vaginalis* in wet smear examination.

Data Analysis

Descriptive analyses were performed and results were presented with frequency tabulations and percentages. Chi-square tests was used to compare categorical variables. All computations were conducted using SPSS version 25.0 software and the level of significance was set at $p \leq 0.05$.

RESULTS

Table 1 shows the prevalence of trichomoniasis among patients attending Umaru Sanda [Ndayeko](#) General Hospital Bida, Niger state, Nigeria. Out of 500 participants screened for *T. vaginalis* infection, 9.4% turned out to be infected. Females had a higher prevalence of 13.2% compared to males 5.6%. Gender is a significant factor ($p = 0.004$) associated with the distribution of *T. vaginalis* infection among the participants.

Prevalence of *T. vaginalis* based on marital status showed that the highest prevalence 14.5% was obtained among the married participants, followed by single 11.1%, widowed 4.0% and the least was obtained among divorced participants 2.4%. Prevalence of *T. vaginalis* is significantly associated ($p = 0.003$) with the marital status of the patient.

Distribution of *T. vaginalis* infection in accordance to age group among patients attending Umaru Sanda [Ndayeko](#) General Hospital Bida, Niger State. The highest prevalence of trichomoniasis was recorded among participants aged 40-50 years (18.2%), followed by 29-39 years (11.0%), then 18-28 years (7.5%) while the least prevalence was recorded among patients aged 51-61 years (0.0%) and above 61 years (0.0%). Age is not a significant factor ($p = 0.237$) associated with the prevalence of infection.



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Based on (on the) level of participants' education, the highest prevalence was recorded among participant that had no formal education 11.21%, followed by those that attained tertiary level of education (10.5%), those with secondary education (8.6%) while the least prevalence was recorded among those that had primary education (5.8%). Educational status of the patients is not associated with the rate of infection ($p = 0.614$).

The result also showed that there was no significant association ($p = 0.348$) between the patients' occupation and prevalence of Trichomoniasis. The highest prevalence of *T. vaginalis* infection was obtained among those whose occupation is recorded as unclassified (not placed in the category of students, civil servant or self-employed) (12.4%), followed by the civil servants (1.3%), self-employed (5.8%) while the least was recorded among students (3.3 %).

Table 1: Prevalence and risk factors associated with *Trichomonas vaginalis* infection among patients attending the Umaru Sanda Ndayeko General Hospital Bida

Risk Factor	Number examined	Prevalence of infection	P-value
Gender			0.004
Female	250	14 (5.6)	
Male	250	33 (13.2)	
Total	500	47 (9.4)	
Age range (years)			0.237
18-28	253	19 (7.5)	
29-39	219	24 (11.0)	
40-50	22	4 (18.2)	
51-61	5	0 (0.0)	
Marital Status			0.003
Single	144	16(11.1)	
Married	173	25 (14.5)	
Divorced	84	2 (2.4)	
Widowed	99	4 (4.0)	
Educational Status			0.614
No formal education	107	12(11.2)	
Primary	69	4(5.8)	
Secondary	162	14 (8.6)	
Tertiary	162	17(10.5)	
Occupation			0.348
Self-employed	120	7(5.8)	
Civil servants	80	9 (11.3)	
Students	91	3 (3.3)	
Unclassified	209	26 (12.4)	



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Hydrogen Ion Concentration (pH) value of Samples

Average pH value of 6.0 was observed among those aged 51 – 61 and those above 61 years, 7.0 among those aged 18-28 and 29-39 years while average pH value of 7.5 was recorded among those aged 40-50 years

Table 2: Prevalence of *T. vaginalis* Based on Hydrogen Ion Concentration (pH) value

Age Range (years)	Number examined	Number infected (%)	pH value
18-28	253	7.5	7.0
29-39	219	11.0	7.0
40-50	22	18.2	7.5
51-61	5	0.0	6.0
> 61	1	0.0	6.0

DISCUSSION

The prevalence of *T. vaginalis* among patients attending Umaru Sanda Ndayeko General Hospital during the study was 47(9.4%) out of 500 samples obtained. This is lower than the prevalence of 40.5% reported by Ogomaka et al. (2018) in Oru-East LGA Imo State, 12% reported by Gberikon et al. (2015) in Benue and 15.71% reported by Alaku et al. (2014) in Nasarawa. However, other studies reported a lower prevalence of 1.3% in Imo state (Acholonu, 2018) and 2.6% in Adamawa (Abdulazeez *et al.*, 2017). Variation in prevalence could be attributed to differences in study area, population type and diagnostic method. High prevalence of trichomoniasis reported in the present study could be attributed to sexual activities like multiple sex partners usually practiced in the study area and low level of awareness on the prevalence of the infection.

Gender is a significant factor ($p = 0.004$) that influences the distribution of trichomoniasis. Prevalence of infection among females 33(13.2 %) was higher than in males 14(5.6 %) and this is consistent with the findings of Ogomaka et al. (2018) that reported a higher prevalence of *T. vaginalis* infection among females than in males. Both men and women can be infected with *T. vaginalis*, though trichomoniasis in men tends to be less prevalent and of shorter duration (Schwebke *et al.*, 2013). Higher prevalence of infection recorded among females



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may be due to the fact that wet mount microscopy is usually attributed to low detection rate of *T. vaginalis* in men. The level of detecting the parasite in specimen collected from male might also have been affected, due to high concentration of Zinc and anti-trichomonal substances in the prostate (Annang *et al.*, 2010).

Prevalence of *T. vaginalis* infection is significantly associated with the marital status of the patient ($p = 0.004$). The highest prevalence was recorded among married participants while the least prevalence was recorded among divorced participants. This is in contrast with the study of Tompkins *et al.* (2013) and Patel *et al.* (2018) that reported higher rate of infection among divorced participants. The result obtained in the present study could be attributed to the rate of sexual activity. The prevalence of Trichomoniasis is usually higher in sexually active individuals (Opara *et al.*, 2018). Married adults are presumed to be sexually active with some even having multiple partners especially those in polygamous marriage while the divorced participants are assumed to have no or reduced level of sexual activity.

The result of the present study revealed that highest prevalence of infection was recorded among patients aged 40-50 years while the least prevalence was recorded among those aged above 50 years. Though, age is not a statistically significant ($p = 0.237$) factor in the distribution of trichomoniasis. In a similar study, Ogomaka *et al.* (2018) recorded a higher prevalence of infection among adults aged 29-39 years and the least prevalence among adults aged 61-72 years. Participants aged 40-50 years were likely to have contacted the infection during sexual intercourse. It has been reported that the occurrence of the disease correlates with the rate of sexual activity among the group of individuals being studied. This proved that *T. vaginalis* is sexually transmitted as the highest prevalence was recorded among patients with increased sexual activities and multiple sex partners.

The pH of the discharge and urine recorded among the individual aged above 50 years could be due to the low rate of infection among the age group. This could be justified since *Trichomonas* grows best in more alkaline environment (>6) than in the acidic and neutral environment (Gary and Garber, 2015). Consequently, low pH of the vagina environment is highly unfavorable for *Trichomonas vaginalis* survival and this agrees with pH (7.5 and 7.0) level and infestation observed among adults aged 40-49, 18-28 and 29-39 years respectively.

A major cause of sexually transmitted disease such as trichomoniasis in Nigeria has been associated with increasing poverty, unemployment (Woken, 2006) ignorance, poor personal hygiene and sexual recklessness among individuals. Though, there was no significant



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relationship between level of education ($p = 0.614$) and occupation ($p = 0.348$) of the participants in this present study. Highest prevalence of infection was recorded among unemployed patients while the least was recorded among students. This could be attributed to sexual recklessness, promiscuous life or in-ability of the patients to avoid contact with fomites and the level of awareness among the participants as students contributed to the low prevalence as they are more aware of sexually transmitted diseases than other patients. The prevalence of infection was also very high in participants with no formal education whereas, those with primary level of education had the least prevalence. Similar study carried out in Sri Lanka reported a higher prevalence of *T. vaginalis* infection among women with low educational level than women with high educational level (Sumadhya *et al.*, 2012).

The high prevalence rate of *T. vaginalis* among patients attending Umaru Sanda General Hospital, Bida Nigeria might be due to poor sanitary condition of toilet facilities in the areas. Other reasons could be attributed to little or lack of personal hygiene such as the use of untidy under wears toilet rolls, sanitary pads, dirty towels, and clothes.

CONCLUSION

Trichomoniasis is associated with transmission of sexually transmitted diseases and it is therefore a significant public health concern. The parasite *T. vaginalis* from infected individual was isolated and identified using microscopic technique. Prevalence of trichomoniasis among patients attending Umaru Sanda *Ndayeko* General Hospital Bida, Niger State, Nigeria recorded in this study was 47(9.4 %). Therefore, it is crucial to increase public awareness and also implement regular diagnosis of the infection. Socio-demographic factors such as gender and marital status of participants had significant association with the prevalence of infection whereas, age, level of education and occupation of participants had no significant influence on the prevalence of trichomoniasis in the study area.

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