

(RESEARCH ARTICLE)



Correlational studies on clinical and laboratory diagnoses of *Trichomonas vaginalis* coinfection with HIV candidiasis and syphilis among women of reproductive age in Jalingo North-central Nigeria

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Abstract

Background & objective: The high prevalence of *Trichomonas vaginalis* infection globally and the frequency of coinfection with other STIs make Trichomoniasis a compelling public health concern. Research has shown that *T. vaginalis* infection is associated with high risk of several sexually transmitted infections. This study was to provide information on the coinfection rate with some STDs and the correlation between clinical diagnoses and confirmatory laboratory diagnosis among women of reproductive age in Jalingo.

Methods: A prospective, cross-sectional and laboratory-based research was carried out on the Correlational studies on clinical and laboratory diagnoses of *T. vaginalis* and its co-infection with HIV, Candidiasis and Syphilis among women of reproductive age in Jalingo North-Central Nigeria, between November 2022 to March 2023. A health facility (Mimllins Laboratories Limited) was selected from Jalingo local government area. One hundred (100) Women within the reproductive age group of 15 to 50 years, seeking health care in the selected facility that fulfilled the inclusion criteria and grant consent were enrolled. A pretested structured interviewer's questionnaire was used to collect data on clinical presentation.

Results: A total of 100 eligible women between the ages of 15 to 50 years' resident in Jalingo, Taraba State and attends to at the selected facility were examined. The overall prevalence of Trichomoniasis among the general population was 13%. For co-infection rates with HIV, syphilis, and Candidiasis, all the HIV-infected participants (4) had *T. vaginalis* infection while 70% (7/10) of the population that had syphilis had *T. vaginalis* infection. Both diseases (HIV and Syphilis) had a very strong association with *T. vaginalis* infection among the population (both p-values= 0.000). Candidiasis on the other hand had no significant association with *T. vaginalis* infection (p=1.000). Based on the clinical diagnosis, abdominal pain and burning sensation gave strong associations with *T. vaginalis* infection (p values were 0.001 and 0.005 respectively). However, the reverse was the case for vaginal itching and discharge (both p-values were 1.000).

Conclusion: A greater percentage of *T. vaginalis* positive women came to the laboratory because they had related uncomfortable symptoms. This is problematic since some women in this area are unaware of the importance of having regular gynecological examinations unless symptoms appear. Hence, general surveillance for sexually transmitted diseases, an effective way to prevent *T. vaginalis* infection, is needed.

Key words: Taraba; Jalingo; Women of reproductive age; *Trichomonas vaginalis*; Co-infection; STDs.

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1. Introduction

Trichomoniasis is a sexual transmitted disease caused by an anaerobic, flagellated protozoan called *Trichomonas vaginalis* and is known to be the most common pathogenic protozoan infection affecting humans in developing nations (Soper, 2004). *T. vaginalis* can be pyriform or amoeboid in shape, possess five flagella, and exist only in a trophozoite stage (Schwebke and Burgess, 2004). Although *T. vaginalis* was first described as a clinical entity in 1916 by Hohne, its examination dated as early as 1836 when Alfred François Donné described it as a single unit that was hairy in nature which was recovered from vaginal secretion of women with vaginal discharge and genital itching (Kashibu *et al.*, 2018).

According to The World Health Organization (WHO) over 276 million people were infected with *T. vaginalis* on a global scale in 2008, this has increased by 11% compared to a study in 2005 (World Health Organization, 2012; Jarrett *et al.*, 2019). About 5 million people are infected with *T. vaginalis* every year, in Japan the infection rate in women were 4.3%. The prevalence in targeted populations in rural Uganda and South Africa was 23.8 and 18.0%, respectively, (Zhang *et al.*, 2018). Mode of transmission is majorly through sexual contact although horizontal transmissions such as contact with fomites have been reported (Alcamo, 2000). Certain factors associated with the transmission of *T. vaginalis* include but not limited to multiple sexual partners, early onset of sexual activities, multi-parity, pregnancy, sexual contact, drug abusers, and low socio-economic status (Kashibu *et al.*, 2018)

T. vaginalis is associated with some clinical manifestation such as pelvic inflammation in women, Trichomonas pneumonia, bronchitis and oral lesions in newborns (Patel *et al.*, 2018). Other manifestations include premature rupture of membranes, premature delivery, abortion and low birth weight in pregnant women. Recently, studies have shown that cervical cancer in women, prostate cancer in men and infertility are associated with the infection of *T. vaginalis* (Langston *et al.*, 2019).

Regarded as the most curable sexually transmitted infection, Trichomoniasis still remains prevalent globally, because of poor diagnosis. Clinical diagnosis has low specificity because other urogenital infection has similar presentation. Definitive diagnosis requires laboratory investigations. The most readily available method of diagnosing *T. vaginalis* is by the use of wet mount microscopy (direct observation of the pear-shaped trichomonads with their characteristics jerky or tumbling motility). This method over the years has been observed to be advantageous, being timely, non-cumbersome, and inexpensive and the availability of diagnostic materials gives the wet mount microscopy the advantage it has. Several other microscopy techniques involving the use of stains such as giemsa, pap, acridine-orange etc. have been reported to have similar or improved sensitivity when compared with wet mount microscopy.

Different techniques for the diagnosis of *T. vaginalis* have been approved with few other still under evaluation. However, the gold standard for *T. vaginalis* diagnosis requires biological amplification in liquid media such as Diamond's modified and Inpouch TV test. Cultures are incubated at 37^o C and examined microscopically for about 5 days (Kashibu *et al.*, 2018).

2. Materials and methods

2.1. Description of the Study area

Jalingo metropolis is a capital of Taraba state which was created out of Gongola state in 1991 it was named after the Taraba River which flows through the southern part of the state. It is bounded on the North by Bauchi State and Gombe State in the North-East. Adamawa State at the East Benue State in the South-West Plateau State in the North West while it shares an international boundary with the Republic of Cameroon to the South-East.

The State's population as of 2006 Census was; 2,294,800 (NPC, 2006). The coordinates are 8°00'N 10°30'E, land area is 54,473km², which is known for businesses such as fishing, agriculture, trading, tourism and civil servants. Taraba state has three senatorial zones.

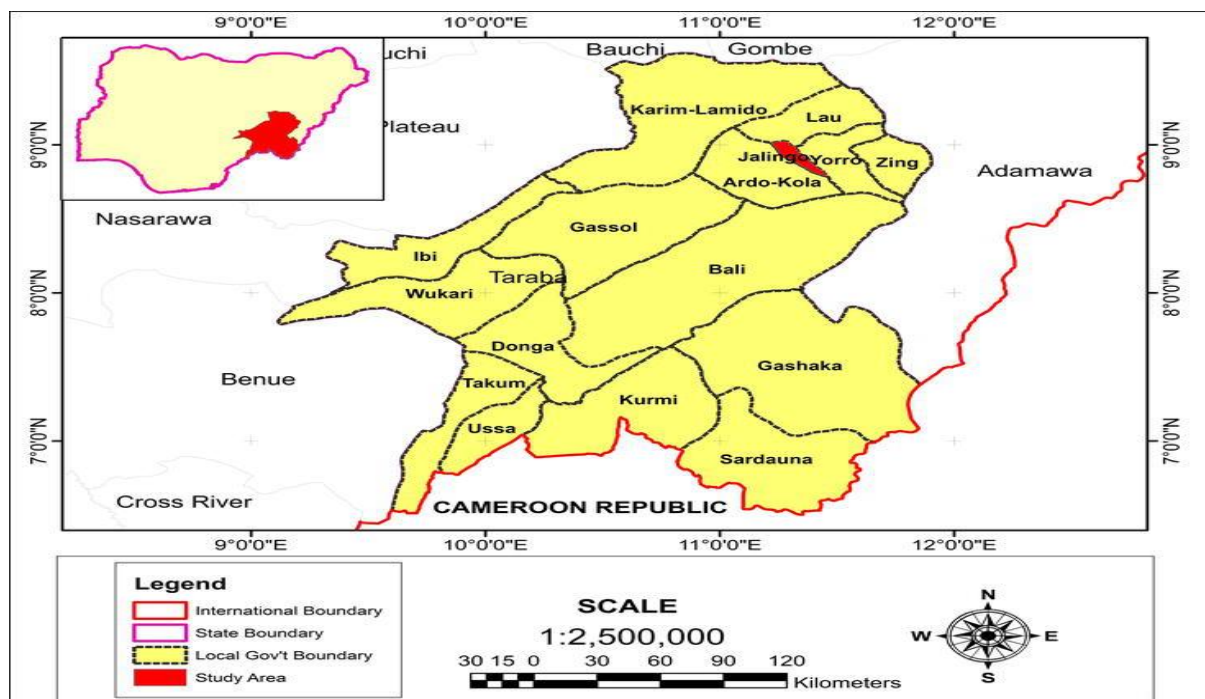


Figure 1 Taraba State Showing the Study Area Source: (Taraba State Ministry of Land and Survey Jalingo, 2006)

2.2. Methods of sample collection

High vaginal swab samples were collected from each participant while the individual is in the dorsal position, using a sterile disposable Cusco speculum to expose the posterior fornix of the vagina; Samples were collected by a trained female laboratory assistant. Samples collected were transported to a laboratory immediately for processing. For candidiasis, the swab samples were inoculated in a Sabouraud Dextrose Ager (SDA) medium. Where delay was inevitable, HVS specimens were preserved in a Stuart transport medium (STM) and processed in the laboratory within 60 minutes of collection. About 3mls of venous blood was also collected into an EDTA container for serological testing of HIV and Syphilis infections using Determine kit produced by Alere diagnostic and Global strips adapted from: Edelstein, P (2014).

2.3. Identification of *trichomonas vaginalis*

Wet mounts of all swab samples collected were made in sterile normal saline on a clean glass slides, covered with a cover slide and examined under the low power objective lens of (10x) and high power (40x) magnifications for presence of motile Trichomonads. A smear of the secretion was also made on a slide; this was air-dried and fixed in absolute methanol for about 60 seconds. Diluted Giemsa stain was poured on the smear and allowed to stain for 10 minutes after which it was washed, air dried and examined under microscope with oil immersion (X100) magnification for presence of Trichomonads. Similar procedure was done in dictating Candidiasis. This was done by a trained female laboratory assistant of Mimllings Medical Diagnostic Laboratory, Jalingo. Those diagnosed with *Trichomonas vaginalis* infection were treated free of charge with 500mg metronidazole tabs twice daily for a period of seven days. They were advised to abstain from sexual intercourse for seven days. Same prescriptions were written for their partners.

2.4. Data management

All data were entered into the computer and analyzed using SPSS Statistical Package 22.0 Descriptive statistics were computed for all relevant data. All significance was accepted at $p < 0.05$.

2.5. Ethics consideration

Ethical clearance was obtained from the Institution regulatory body of the research settings according to their requirements, an introductory letter for approval was obtained from the school authority, informed consent form was developed, reviewed and a final copy was used for this document.

3. Results

The overall prevalence of Trichomoniasis among the general population was 13% (Table 1). The co-infection rates with HIV, syphilis, and Candidiasis was measured. All the HIV-infected participants (4) had *T. vaginalis* infection while 70% (7/10) of the study population that had syphilis had *T. vaginalis* infection. Both diseases (HIV and Syphilis) had a very strong association with *T. vaginalis* infection among the study population (both p-values= 0.000). Candidiasis on the other hand lacks significant association with *T. vaginalis* infection (p=1.000). Table 2, summarizes the relationship that exists between *T. vaginalis* infection rates and sexually transmitted/transmittable diseases.

The signs/symptoms (abdominal pain, vaginal itching, vaginal discharge, and burning sensation) were measured with the correlation rates with laboratory diagnosis (modified microscopy). Abdominal pain and burning sensation gave strong associations with *T. vaginalis* infection (p values were 0.001 and 0.005 respectively). However, the reverse was the case for vaginal itching and discharge (both p-values were 1.000). Details are contained in Table 3.

Table 1 Prevalence of Trichomoniasis among the Study Population

Trichomoniasis	Percentage (%)
Positive	13
Negative	87
Total	100

Table 2 Correlation between Trichomoniasis and Sexually Transmitted/Transmittable Diseases

Variables	Positive (n) (%)	Negative (n) (%)	p-value
HIV status			0.000
Positive	4 (100)	0 (0)	
Negative	9 (9.4)	87 (90.6)	
Syphilis			0.000
Positive	7 (70)	3 (30.0)	
Negative	6 (6.7)	84 (93.3)	
Candidiasis			1.000
Positive	1 (8.3)	11 (91.7)	
Negative	12 (13.6)	76 (86.4)	

Table 3 Correlation between Signs/Symptoms and Trichomoniasis among the Study Population

Variables	Positive (n) (%)	Negative (n) (%)	p-value
Abdominal pain			0.001
Yes	13 (21.7)	47 (78.3)	
No	0 (0.)	40 (100)	
Vaginal itching			1.000
Yes	11 (13.8)	69 (86.2)	
No	2 (10.0)	18 (90.0)	
Vaginal discharge			1.000
Yes	11 (13.8)	69 (86.2)	

No	2 (10.0)	18 (90.0)	
Burning sensation			0.005
Yes	11 (23.9)	36 (76.1)	
No	2 (3.7)	52 (96.3)	

4. Discussion

The result of this research shows that the prevalence of Trichomoniasis among women of reproductive age in Jalingo is 13%, which was obviously higher than a report of Kashibu *et al.*, (2018) at specialist hospital Jalingo, which reported that the prevalence of Trichomoniasis for Taraba state was 4.4%. According to WHO *T. vaginalis* range from 1.60 to 11.70% (Rowley *et al.*, 2019) and higher in other reported provinces such as rural Uganda and South Africa which was 23.8 and 18.0%, respectively, (Zhang *et al.*, 2018). The prevalence of vaginal *T. vaginalis* infection was estimated to be 11-25% among African study populations (Laga *et al.*, 1993).

The co-infection rate was measured with HIV, syphilis, and Candidiasis (Sexually transmitted/transmittable diseases). All the HIV-infected participants had *T. vaginalis* infection while 70% of the study population that had syphilis had *T. vaginalis* infection. Both diseases (HIV and Syphilis) had a very strong association with *T. vaginalis* infection among the study population. Candidiasis on the other hand lacks significant association with *T. vaginalis* infection. Researchers have shown that HIV could escalate infection with *T. vaginalis* (Okojokwu *et al.*, 2015). According to Isiaka-Lawal *et al.*, (2014), the prevalence of Trichomoniasis was higher in HIV infected women than their uninfected counterparts in north-central Nigeria, while in Lagos, a prevalence of 35.8% were noted in HIV positives (Oyetunde and Chelsea 2016).

Our study measured these signs/symptoms (abdominal pain, vaginal itching, vaginal discharge and burning sensation) and their correlation rates with laboratory diagnosis (modified microscopy). Abdominal pain and burning sensation gave strong associations with *T. vaginalis* infection. However, the reverse was the case for vaginal itching and discharge. A greater percentage of *T. vaginalis*-positive women came to the laboratory because they had related uncomfortable symptoms. This is problematic since some women in this area are unaware of the importance of having regular gynecological examinations unless symptoms appear. Hence, general surveillance for sexually transmitted diseases, an effective way to prevent *T. vaginalis* infection, is needed.

5. Conclusion

On the basis of this study, we conclude that the overall prevalence of Trichomoniasis among the women of reproductive age attended to at Mimllins Medical Diagnostic Laboratory Jalingo was 13%, in the period, November 2022 to March 2023. Our results have improved our understanding of the prevention of *T. vaginalis* and its co-infection in Jalingo North-Central Nigeria.

To effectively reduce the occurrence of *T. vaginalis* infection in this area, different measures have been adopted which depend on different customs and demographic characteristics, such as raising the standard of living as well as women's educational level and promoting reproductive hygiene habits.

Recommendations

- While this study does not provide grounds for universal screening of women of reproductive age for *T. vaginalis* infection as a tool of reducing HIV, Syphilis, and Candidiasis acquisition, campaign to create better sexual health awareness among them should be done.
- Better methods of detection of *T. vaginalis* infection like culture and polymerase chain reaction should be provided in our health facilities to help prompt detection and treatment in symptomatic patients.
- Sex education is also paramount among persons of reproductive age in the area studied and even the larger society.

Compliance with ethical standards

Acknowledgement

I express my profound gratitude to the management of Mimllins Medical Diagnostic Laboratory Jalingo for allowing me use their facility and for their scientific contribution to my work and Mr. Omote Victor who assisted me in every way possible to analyze and interpreted my data, I am very grateful, may almighty God bless you all.

Disclosure of ethical conflict of interest

There was no conflict-of-interest experience by the authors.

Statement of ethical approval

Before the research was carried out all relevant bodies gave their approval and the authors have adhered and followed the accepted ethical terms and conditions throughout the research period.

Statement of informed consents

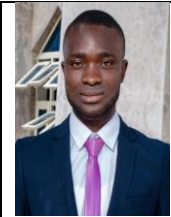
All respondent was consented before they were involved in the study.

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I am an entrepreneur, a researcher and a teacher.