

Incidence of Trichomoniasis among Pregnant Women Attending Antenatal Care in Kano, Nigeria

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Abstract

Trichomoniasis poses a significant threat to the health and well-being of pregnant women. A cross sectional study was conducted among sixty (60) pregnant women attending the hospital. High Vaginal Swabs (HVS) were collected the pregnant women with their consent and examined for presence of *Trichomonas vaginalis* (*T. Vaginalis*) microscopically. From the result, *T. vaginalis* was detected in 2(3.3 %) of the pregnant women. The study indicated the incidence of Trichomoniasis among pregnant women aged 18-30 years in Murtala Muhammad Specialist Hospital. Predominantly among both urban and rural participants with primary and secondary level of education. Notably, majority of infections were observed in women at the first and second trimesters of pregnancy. Risk factors recorded were not critical in understanding the infection rates. Larger studies are essential to better understand the relationship between demographic factors and Trichomoniasis prevalence, which can inform public health policies and interventions.

Introduction

Trichomoniasis commonly affects women of childbearing age and has been linked to several adverse birth outcomes (Van Garwen et al., 2021). *Trichomonas vaginalis* is a protozoan parasite and it is the most prevalent non-viral sexually transmitted infection worldwide causing the curable sexually transmitted disease called trichomoniasis (Secor et al., 2014; Adegbaaju and Morenike, 2008). It has been recognized as a cosmopolitan parasite of genital tract of both male and female as reported by Jatau, et al. (2006) with an annual prevalence of about 180 million cases in the world (World Health Organisation, 2012). The majority of cases of trichomoniasis are localized in

regions of low income particularly in African countries where the prevalence rate ranges from 15 to 37% (Swygard, et al., 2004; Usanga et al., 2009; Okoko, 2011; Sam -wobo et al., 2012; and Chinedum, et al., 2014), due to lack of adequate resources for health care (WHO, 2012).

T. vaginalis is mainly transmitted through sexual contact but may also be transmitted through sharing of towels and under wears with infected individuals (Alcamo, 2000). Most cases of *T. vaginalis* remain undiagnosed as it is currently not a target of sexually transmitted infections control and besides, because of its asymptomatic nature in about half of infected men and women. The disease is reported as a major cause of pathology in



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obstetrics and gynecology (Hobbs et al., 2006). The symptoms of *T. vaginalis* which is commonly observed in women (Smith and Ramos, 2010) may include frothy greenish foul-smelling, vaginal discharge, postictal bleeding, frequency in micturition, dysuria and lower abdominal pains (CDC, 2006).

While trichomoniasis affects both genders, its health consequences are mainly observed in women. In women, *T. vaginalis* infections often show no symptoms, or symptoms may develop weeks, months, or even years after the initial infection. When symptoms do occur, trichomoniasis can lead to mild to moderate inflammation of the cervix, vagina, and urethra. The vaginal discharge may be abundant, unpleasantly odorous, and frothy. Women may also experience itching and discomfort during urination or sexual intercourse. Punctate hemorrhagic lesions in the genital epithelium can lead to colpitis macularis or strawberry cervix, which is a characteristic marker for trichomoniasis (Secor et al., 2014). If left untreated, *T. vaginalis* infections can linger for months or even years. *T. vaginalis* infection may persist for months to years.⁸ In addition to these manifestations, trichomoniasis during pregnancy has been associated with premature rupture of the amniotic sac and chorion, preterm labor, and delivery of a low birth weight infant (Mann et al., 2010). Women infected with human immuno deficiency virus (HIV) who are also infected with *T. vaginalis* have a higher risk of developing pelvic inflammatory disease (Moodley et al., 2002). *Trichomonas vaginalis* infections have also been linked to increased risks of other STDs, infection is associated with 1.5–2.7 times greater risks of HIV acquisition and transmission and up to a four-fold increase in HIV shedding.

Multiple sex partners, poor personal hygiene, low socio-economic status and underdevelopment are factors reported to be associated with high incidence of infection (Huppert, 2009). *Trichomonas vaginalis* is detected in vaginal prostatic or urethral secretions, semen and urine of infected individuals using different laboratory methods such as wet mount, various staining methods, culture, latex agglutination, Enzyme Linked Immunosorbent

Assay (ELISA) and more recently, Polymerase Chain Reaction (PCR) (Radonjic et al., 2006). The most common means of diagnosis still remains microscopic visualization of the vaginal fluid (Schwebke and Burgess, 2004). Direct examination of wet mount preparation of clinical specimen is the most rapid and least expensive technique for identifying *T. vaginalis*. This study aimed to determine the incidence of Trichomoniasis among pregnant women attending antenatal clinic at Murtala Muhammad Specialist Hospital in Kano, Northern Nigeria.

Materials and Methods

The research work was conducted at Murtala Muhammad Specialist Hospital in Kano, Northern Nigeria. Kano State is located in the North-west Nigeria located at latitude 11030N and longitude 8030E. It share borders with Kaduna state to the south- west, Bauchi state to the South-East, Jigawa state to the East, Katsina state to the North. It has a total area of 20,131 km² (7,777 sqm) and estimated population of 13.4 million (NPC, 2014).

Study Design

The study is a cross-sectional study, it was conducted from October, 2024 to November 2024. - Ethical approval for the study was obtained from Department of health, Kano Municipal Local Government based on the consent of Murtala Muhammad Specialist Hospital. The Study participants were pregnant women (at first, second and third trimester stages). Questionnaires were administered to the participants to record sociodemographic factors and risk factors of the disease. High Vaginal Swab specimen were collected from sixty (60) participants' and analysed by microscopy to determine the incidence of *T. vaginalis* among the pregnant women.

Specimen collection

High Vaginal Swab exudates were collected using a sterile swab stick with the aid of sterile speculum from pregnant women attending antenatal clinic in Murtala Muhammad Specialist Hospital (Olusola et al., 2010).

Specimen Analysis

Microscopic Identification of the Parasite

A drop of normal saline was placed on clean grease-free slide and the swab stick was rolled on the glass slide to make a smear, covered with a cover slip and then it was examined under the microscope using x10 and x40 objective lenses for the presence of *Trichomonas vaginalis*. The trophozoite of *Trichomonas vaginalis* which is about 8-15µm long, was seen with an ovoid rapid, jerky motility accomplished with Specimen collection (Mairiga et al., 2011).

Statistical Analysis

Data obtained was summarized using descriptive statistics. Chi-square analysis was used to test for statistical differences between the distributions of *Trichomonas vaginalis* and identify any associations with risk factors.

Results

Out of the 60 samples from pregnant women examined in Murtala Muhammad Specialist Hospital, 2(3.3%) were positive with *T. Vaginalis* while 58(96.7%) were negative. The result is shown in Table 1 below. According to the questionnaire distributed among the participants, pregnant women of the age group 18-30 were 41(68.3%), age 31-34 were 13 (21.7%) participants and age >35 has 6 (10 %) participants. Out of 60 participants 17(28.3%) were from the rural area while 43(71.7%) from urban area of the state. Seventeen participants 17(28%) had primary education, 30(50%) had secondary education while 13 (21.7%) had tertiary education. This is represented in Table 2.

Table 1: Incidence of Trichomoniasis among the Pregnant women

Laboratory	Frequency	Percentages
Negative	58	96.7
Positive	2	3.3
Total	60	100.0

According to the data obtained during the study, 24 (40%) participants were in first trimester, 22(36.7%) were in second trimester, 14 (23.3%) were in third trimester as shown in Table 3 below. These show

that majority of the participants were in first trimester stage. All the participants 60 (100%) had symptoms of the disease.

According to the possible risk factors as shown in Table 4: the participants with 4 sexual partners were 19(32%), participants with 3 sexual partners were 16(26%), participants with 2 sexual partners were 12(20%) and participants with one sexual partner were 13(22%). Out of 60 participants that always practice good hygiene were 29(48.3%), 12(20 %) never practice good hygiene and 19(31.7%) sometimes practice good hygiene. Out of the 60 participants 21(35%) do not use public toilets and does that use public toilets were 38(65%).

Table 2: Demographic factors Recorded among the Participants

Demographic Variable	Frequency	Percentages
Age (Years)		
18– 30	41	68.3
31– 34	13	21.7
≥35	6	10.0
Total	60	100.0
Area		
Rural	17	28.3
Urban	43	71.7
Total	60	100.0
Education		
Primary	17	28.3
Secondary	30	50.0
Tertiary	13	21.7
Total	60	100.0

Table 3: Gestation period and Symptoms of the Disease Recorded

	Frequency	Percentages
Gestation Period		
1st Trimester	24	40.0
2nd Trimester	22	36.7
3rd Trimester	14	23.3
Total	60	100.0
Symptom		
Yes	60	100.0
No	0	0.0
Total	60	100.0

Table 4: Risk Factors Recorded among the Participants

Possible Risk Factors	Frequency	Percentages
No. of Sexual Partners		
1	13	22
2	12	20
3	16	26
4	19	32
Total	60	100.0
Practice Good Hygiene		
Always	29	48.3
Never	12	20.0
Sometime	19	31.7
Total	60	100.0
Public Toilet		
No	21	35.0
Yes	39	65.0
Total	60	100.0

Table 5 show the relationship between Demographics factors and incident of Trichomoniasis: all the positive specimen were from participants age 18 -30years. Fifty percent of the positive 1(50%) was from rural area and 1(50%) was from urban area. Also, 1(50%) of the positive had primary level education while 1 (50%) had secondary education. Statistically the study

showing no significant association between the observed Demographic Factors and incident of Trichomoniasis Infection. Table 6 below presents the relationship between the gestation period and the incidence of Trichomoniasis among the participants. The incidence reveals that 1(50%) of the positives was from participant at first trimester and 1(50%) was from a participant at second trimester stage. The χ^2 value of 0.635 and a p-value of > 0.999 indicate no significant association between the gestation period and the incidence of Trichomoniasis.

Table 7 presents the statistical analysis of the relationship between risk factors and the incidence of Trichomoniasis. Specifically, 1(50%) of the positives practice good hygiene always, while 1(50%) of the positives never practicing good hygiene. Regarding the use of public toilets, the incidence shows 1(50%) of the use public toilet, while 1(50%) of the positives do not use public toilet. The results Indicates Chi-squared (χ^2) Significant at P-value ≤ 0.05 . The χ^2 value of 1.587 and a p-value of 0.688 indicate no significant association between the practice of good hygiene and the incidence of Trichomoniasis. This suggests that practicing good hygiene may not be a significant protective factor against Trichomoniasis.

Table 5: Statistical presentation for the Determination of Relationship between demographic factors and incidence of Trichomoniasis among the participants

Demographic Variables	No. Tested	Lab Result		χ^2	df	<i>P-value</i>
		Negative	Positive			
Age (Years)						
18-30	41	39	2	0.959	2	>0.999
31- 34	13	13	0			
≥35	6	6	0			
Total	60	58	2			
Area						
Rural	17	16	1	-	-	>0.999
Urban	43	42	1			
Total	60	58	2			
Education						
Primary	17	16	1	0.791	2	>0.999
Secondary	30	29	1			
Tertiary	13	13	0			
Total	60	58	2			

Key: Chi-squared (χ^2) Significant at P-value ≤ 0.05

Table 6: Statistical Presentations for the Determination of Relationship between Gestation Period and incidence of Trichomoniasis

Gestation Period	Lab Result		Total
	Negative	Positive	
1st Trimester	23	1	24
2nd Trimester	21	1	22
3rd Trimester	14	0	14
Total	60	2	60
$\chi^2 = 0.635$	df = 2		P-value = >0.999

Key: Chi-squared (χ^2) Significant at P-value ≤ 0.05

Table 7: Statistical Analysis Presentation for Determination of Relationship between the Risk factors (good hygiene practice and use of public toilets) and incidence of the disease

Risk Factors	No. Tested	Lab Result		χ^2	df	P-value
		Negative	Positive			
Practice Good Hygiene						
Always	29	28	1	1.587	2	0.688
Never	12	11	1			
Sometime	19	19	0			
Total	60	58	2			
Public Toilet						
No	21	20	1	-	-	>0.999
Yes	39	38	1			
Total	60	58	2			

Key: Chi-squared (χ^2) Significant at P-value ≤ 0.05

Discussion

This study recorded 3.3% incidence of Trichomoniasis among pregnant women attending the antenatal clinic at Murtala Muhammad Specialist Hospital. This result is lower than the result (4%) recorded by Okojokwu *et al.* (2015) in a research carried out among pregnant women in Plateau State. The incidence in this study is however lower than 13.3% reported by Obiukwu (2010) in Anambra, 17.7% reported by Okpara *et al.* (2009) in Uyo, 20.0% in Abeokuta by Ojuronbe *et al.* (2010), 18.7% reported by Jatau *et al.* (2006) in Zaria a. The finding is also lower than the findings of Obiukwu *et al.* (2010), who observed a prevalence of 16.3% among 300 females studied at Umunze Community in Orumba Local Government Area of Anambra State, Nigeria. Similarly the finding is lower than that of Ulogu *et al.* (2007), who observed a Prevalence of 21.53%. Incidence recorded in this study is lower compared to the global incidence of 10-30% (World Health

Organization, 2019). However, it is essential to note that the incidence of Trichomoniasis can vary depending on the population, geographical location, and diagnostic methods used.

Incidence recorded by this study is the same (3.3%) with studies reported by Adeoye and Akande (2007) in Lagos. It is higher than prevalence of 2.8% reported by Uneke *et al.* (2005) in Ebonyi state South-eastern Nigeria and a study findings reported by Akinbo *et al.* (2017) in Benin City.

The incidence indicated that the disease was found among the youngest age group (18-30 years). This suggests that younger pregnant women may be more susceptible to infections due to factors like higher sexual activity or lower awareness about STIs. The finding is contrary to the result reported by stemmer *et al.* (2018), where highest detection rate was recorded among 47-53 years ages women.

The demographic analysis revealed significant variations in incidence based on age groups. Notably, the incidence was found in the

participants between 18-30 years. This suggests that younger pregnant women may be at greater risk, possibly due to factors such as higher sexual activity or lack of awareness about STIs. The finding is contrary to the result reported by stemmer et al. (2018), where highest detection rate was recorded among 47-53 years ages women. The infection was found among pregnant women at first and second trimester. This may reflect increased vulnerability during early pregnancy, emphasizing the need for screening and education at prenatal visits.

Regarding the distribution of the incidence between rural (50%) and urban (50%) settings suggests that Trichomoniasis is not confined to one geographical area, highlighting a widespread issue that necessitates further public health attention across different communities. Furthermore, the educational background of the participants, with equal representation from primary and secondary education levels (50% each), suggests that education alone may not significantly influence the incidence of Trichomoniasis. This lack of a statistically significant association (could be related to the small sample size) might indicate that other underlying factors, such as healthcare accessibility and sexual health education, are more impactful in managing and preventing infections.

In Table 7, the analysis reveals a 50% incidence of Trichomoniasis among participants who reported always practicing good hygiene, with another 50% never practicing it. The χ^2 value of 1.587 and a p-value of 0.688 suggest that there is no significant association between good hygiene practices and the incidence of the disease. These results highlight a critical concern: merely maintaining good hygiene may not be sufficient to prevent Trichomoniasis, especially if other risk factors are not addressed. The equal distribution of those using public toilets (50% positive and 50% negative) raises additional questions about environmental risk factors contributing to transmission. The findings indicate that practicing good hygiene and using public toilets may not be significant risk factors for Trichomoniasis infection. However, the study's results should be interpreted with caution, as the

sample size may not be representative of the larger population.

The results of this study highlight the need for comprehensive health education and awareness programs to prevent Trichomoniasis infection. The findings also underscore the importance of routine screening and treatment for Trichomoniasis, particularly among young adults and pregnant women. Furthermore, the study's results suggest that Trichomoniasis infection can occur at any stage of pregnancy, emphasizing the need for early detection and treatment to prevent adverse pregnancy outcomes.

Overall, the analyses presented in Tables 5, 6, and 7 highlight a lack of statistically significant associations between demographic factors, gestational age, hygiene practices, and the incidence of Trichomoniasis. This underscores the complexity of STI transmission dynamics and points to the need for comprehensive public health strategies that include education, accessible healthcare services, and community engagement to effectively reduce the risk and incidence of Trichomoniasis. Further research may be necessary to explore additional risk factors that could provide insights into prevention strategies tailored for specific populations.

Conclusion

Based on the finding of this study, the incidence of *T. vaginalis* among pregnant women was found to be 2(3.3%). The study indicated the incidence of Trichomoniasis among pregnant women aged 18-30 in Murtala Muhammad Specialist Hospital. Predominantly among both urban and rural participants with primary and secondary level of education. Notably, majority of infections were observed in women during their first and second trimesters. Risk factors recorded were not critical in understanding the infection rates. This finding suggests that public health interventions should focus on comprehensive sexual health education that addresses both hygiene and safe sexual practices, rather than solely emphasizing cleanliness.

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Conflict of Interest

The authors declare that they have no conflict of interest regarding the publication of this paper.

Author Contributions

FMS: Conceptualization of the research idea, data collection, and conduct of the laboratory experiments. SLI: Study supervision, methodological guidance, critical review of the manuscript, and mentorship throughout the research process. AH: Manuscript revision and intellectual input into the final version of the manuscript. RAI: Data management, statistical analysis. MSR: Preparation of tables and figures. All authors read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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