

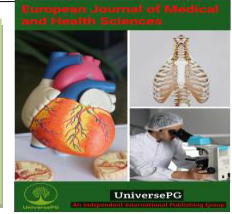


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## Prevalence of *Trichomonas vaginalis* among Pregnant Women Attending Ante-Natal Care in Kano, Nigeria

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### ABSTRACT

Trichomoniasis, caused by the protozoan parasite, *Trichomonas vaginalis*, is a common but curable sexually transmitted disease affecting millions around the world. The study was aimed to determine the prevalence of *T. vaginalis* among pregnant women attending ante-natal care at Yan-awaki maternity in Kano, Northern Nigeria. A cross sectional study was conducted among one hundred and eighty four (184) pregnant women attending the hospital. A total of 184 High Vaginal Swabs (HVS) were collected from the pregnant women with their consent and examined for presence of *T. vaginalis* microscopically. From the result, *T. vaginalis* was detected in 23 out of the 184 samples which accounted for 12.5% of the pregnant women. The pregnant women between the age category 26-30 years had the highest prevalence of 4.34 % while the least prevalence was recorded among pregnant women of age category above 40, though the difference in the prevalence among ages is not significant at  $p < 0.05$ . On the basis of gestation period, pregnant women in first trimester had the highest prevalence than that of second and third trimesters. It is concluded that Trichomoniasis is one of the infections of pregnant women.

**Keywords:** Pregnant women, Prevalence, *Trichomonas vaginalis*, Ante-natal care, and Trichomoniasis.

### INTRODUCTION

*Trichomonas vaginalis* is a flagellated protozoan parasite causing disease called Trichomoniasis, a sexually transmitted infection with worldwide distribution (Schwebke and Burgess, 2004). It has been recognized as a cosmopolitan parasite of male and female genital tract (Jatau *et al.*, 2006; Rahman *et al.*, 2019). It has been estimated that about 180 million women worldwide are infected with *T. vaginalis* annually. Though about 25-50% of Trichomoniasis in women is asymptomatic, the infection may lead to significant complications such as adverse pregnancy outcomes, pelvic inflammatory disease, and cervical

neoplasia in women and infertility in men. The infection is primarily transmitted through sexual contact and the incidence depends on the population screened and certain factors such as poor personal hygiene, multiple sex partners, low socio-economic status and under- development (Huppert, 2009; Sharif *et al.*, 2019).

The infection by *T. vaginalis* is reported as a major cause of pathology in obstetrics and gynecology (Hobbs *et al.*, 2006). It has also been reported that the disease causes discomfort and psychosocial distress in infected patients (Jatau *et al.*, 2006; Happy *et al.*, 2018). Complications of *T. vaginalis* that have been

reported among pregnant women and non-pregnant patients may include premature rupture of membranes, premature labor, low birth weight, post abortion infections, pelvic inflammatory disease, urinary tract infection and bronchitis, pneumonia and oral lesions (Soper, 2004), and infertility (Fichorova, 2009).

Although the disease has been seen as a risk factor for other sexually transmitted agents such as *Chlamydia trachomatis* and *Neisseria gonorrhoeae*, it has also been linked to one of the predisposing factors to HIV infection, acquired immune deficiency syndrome, and cervical cancers (McClelland *et al.*, 2007). The major symptoms of Trichomoniasis among women include; frothy greenish foul smelling vaginal discharge accompanied with vulvo-vaginal irritation, post coital bleeding, frequency in micturition, dysuria, and lower abdominal pains, preterm rupture of membranes, preterm delivery, low birth weight infants, and neonatal morbidity and mortality are symptoms associated with pregnancy (CDC, 2006; Johnson *et al.*, 2011). *T. vaginalis* can be detected in women in vagina, semen and urine 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; Shahen *et al.*, 2019). The most common means of diagnosis still remains microscopic visualization of the motile trichomonads in a saline preparation 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*.

Several factors such multiple sexual partners, poor personal hygiene, under development, and low socio-economic status have been reported to be associated with the high incidence of Trichomoniasis among female (Crosby *et al.*, 2003). A high prevalence of the infection is observed in both developed and developing societies such as 7.4 million new cases in the United States and 30 million new cases in sub-Saharan Africa per year (WHO, 2001). In Iran, the prevalence of *T. vaginalis* infection ranges from 2% to 8% (Edrissian *et al.*, 2007), 14.3% in India (Sugathan, 2016) and 20% in Nigeria (Olusola *et al.*, 2010). In developing countries such as Nigeria, there has been

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increasing prevalence of Trichomoniasis among pregnant women (Onyido *et al.*, 2006). Therefore, based on the public health significance of Trichomoniasis, the study was aimed to determine the prevalence of *T. vaginalis* among pregnant women attending ante-natal care at Yan-awaki maternity in Kano, Northern Nigeria.

## MATERIALS AND METHODS

**Ethical Approval** - The ethical approval for the study was obtained from Department of health, Kano Municipal Local Government based on the consent of Yan-awaki maternity ethical committee

**Study Area** - The study was conducted at Yan-awaki Maternity in Kano, Northern Nigeria. Kano State is located in the North-west Nigeria located at latitude 11<sup>0</sup>30N and longitude 8<sup>0</sup>30E. 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 km<sup>2</sup> (7,777 sqm) and estimated population of 13.4 million (NPC, 2014).

**Sample Size Determination** - The sample size for the study was determined from a standard formula for the calculation of minimum sample size (Nasir *et al.*, 2018). Sample size was given by the formula;

$$N = (Z_{1-\alpha})^2(p)(1-p)/d^2$$

Where N = minimum sample size,  $Z_{1-\alpha}$  = value of standard normal deviate which at 95% confidence interval has found to be 1.96, P = the best estimate of prevalence obtained from literature review (14.1%) and d = difference between the true population rate and sample that can be tolerated, this is the absolute precision (in percentage) on either side of the population.

$N = (1.96)^2 \times (0.143) \times (1-0.143)/(0.05)^2 = 184.3$  as the minimum number of samples for the study. Therefore, a total of 184 samples were used in the study.

**Study Population** - A total of 184 pregnant women were used as a subject in this study. The subjects are attending ante-natal care at Yan-awaki maternity in Kano, Northern Nigeria from March to August, 2017.

A simple structured questionnaire was administered to the subjects to obtain demographic data such as residential area, age, education level, gestation period and education level.

**Samples Collection and Examination** - During sample collection, High Vaginal Swab was collected from the consenting subject. Vaginal exudates were collected using a sterile swab stick with the aid of a sterile speculum (Olusola *et al.*, 2010). Wet preparation of the vaginal exudates collected were made using a drop of normal saline on a microscope slide covered with a cover slip and immediately examined microscopically using  $\times 10$  and  $\times 40$  objective lenses (Cheesbrough, 2000). The parasite *T. vaginalis* was identified morphologically by its shape, size, characteristic jerking and twisting movement (Sugathan, 2016).

**Statistical Analysis** - Statistical analysis Package for Social Science (SPSS) version 10.0 was used for statistical analysis of the data generated. Chi square was used to compare between two or more variables. Statistical significance was considered at  $p$ -value  $< 0.05$ .

## RESULTS

**Demographic Distribution of the Subjects** - The demographic distribution of the study subjects is presented in **Table 1**. A total number of 184 subjects participated in the study. The subjects were categorized on the basis of their age categories, socio-economic status, resident, education level and gestation age of the pregnancy.

**Prevalence of *T. vaginalis*** - The prevalence of *T. vaginalis* among pregnant women coming for antenatal at the study center is presented in **Table 2** below. The results showed that out of the total of 184 subjects, 23 subjects were found positive for *T. vaginalis* which accounted for 12.5% of the subjects. Prevalence of *T. vaginalis* among pregnant women showed that higher incidence was found among subjects of age category 26-30 (4.34%). Rural dwellers occupy a large percentage prevalence of *T. vaginalis* occurrence (7.07%) when compared to urban dwellers (5.43%).

**Table 1:** Demographic Distribution of the Study Subjects

Variables	Frequency (n)	Percentage (%)
Age (years)		
Less than 20	28	15.2
21-25	37	22.3
26-30	48	27.2
31-35	29	19.6
36-40	22	13.0
41-Above	05	02.7
Resident		
Rural	56	30.4
Urban	128	69.6
Socio-economic status		
Employed	33	17.9
Unemployed	151	82.1
Gestation age		
1 <sup>st</sup> trimester	45	24.5
2 <sup>nd</sup> trimester	86	46.7
3 <sup>rd</sup> trimester	53	28.8
Educational level		
Primary level	39	21.2
Secondary level	78	42.2
Tertiary level	27	14.7
None	40	21.7

On the basis of socio-economic status, most of the subjects positive for *T. vaginalis* were unemployed (9.79%). Prevalence of *T. vaginalis* among pregnant women based on the age of gestation period showed higher prevalence among subjects in 1<sup>st</sup> trimester (7.07%). The educational level of the subjects showed higher prevalence among subjects without formal education for which accounted for 4.89%.

## DISCUSSION

Infection with *T. vaginalis* causes Trichomoniasis which is one of the most prevalent non-viral sexually transmitted diseases in the world (Secor *et al.*, 2014). Prevalence rate of the infection is reported high in developing countries and also among high-risk groups in developed countries (Schwebke and Burgess, 2004; Uddin *et al.*, 2014).

**Table 2:** Prevalence of *T. vaginalis*

Variables	No. of samples (n)	Positive samples (n)	Negative samples (n)	Prevalence (%)	P-value
<b>Age (years)</b>					0.4479*
Less than 20	28	03	25	1.64	
21-25	37	05	32	2.71	
26- 30	48	08	40	4.34	
31- 35	29	04	25	2.17	
36- 40	22	03	19	1.64	
41-Above	05	00	05	0.00	
<b>Resident</b>					0.00315**
Rural	56	13	43	7.07	
Urban	128	10	118	5.43	
<b>Socio-economic status</b>					0.5658*
Employed	33	05	27	2.71	
Unemployed	151	18	133	9.79	
<b>Gestation age</b>					0.00042**
1 <sup>st</sup> trimester	45	13	32	7.07	
2 <sup>nd</sup> trimester	86	08	78	4.34	
3 <sup>rd</sup> trimester	53	02	51	1.09	
<b>Educational level</b>					0.04599**
Primary level	39	07	32	3.81	
Secondary level	78	05	73	2.71	
Tertiary level	27	02	25	1.09	
None	40	09	31	4.89	

**Key:** \* = result not significant ( $p < 0.05$ ); \*\* = result is significant ( $p < 0.05$ )

Initially, Trichomoniasis is consider as inconsequential infection but lately, it has attracted more attention because of its co-factor role in spread of Human Immunodeficiency Virus (HIV) and other sexually transmitted infections (STIs), adverse pregnancy outcomes, predisposition to cervical and prostate cancer, premature rupture of the placental membrane, and other compelling public health concern (Moodley et al., 2004; Islam et al., 2020).

In the present study, the prevalence of *T. vaginalis* was found to be 12.5%. Several studies were conducted on prevalence of *T. vaginalis* worldwide (Edrissian et al., 2007; Sugathan, 2016). *T. vaginalis* infection prevalence ranges from 5% to 10% in healthy women populations while it could be as high as 50% in prostitutes and female prisoners.

The prevalence of 12.5% of *T. vaginalis* in this study could be considered slightly higher than the normal range. The prevalence observed in this study is higher than that of Jombo et al. (2006) that reported 2.7% in Jos, Uneke et al. (2006) that observed 2.8% in Abakaliki and 3.3% reported in Lagos by Adeoye and Akande (2007).

However, this result is lower than that of Obiukwu et al. (2010) 13.3% in Anambra, and that of Akerele et al. (2002) who recorded 15.0% in Benin City Nigeria, 17.7% in Uyo (Okpara et al., 2009), 18.7% in Zaria (Jatau et al., 2006), and 24.7% in Tanzania. The prevalence of *T. vaginalis* with regards to age in this study varies and it reflect similar trend to other sexually transmitted infections such as bacterial vaginosis, gonorrhoea and Chlamydia infection.

Highest prevalence was found among women within age category 26-30 years and 2-25 years with percentage prevalence of 4.34% and 2.71 respectively and the result is not significant ( $p < 0.05$ ). This finding was in conformity with the study conducted by Olusola *et al.* (2010) but contrary to that of Akinbo *et al.* (2017) who found highest prevalence of *T. vaginalis* among pregnant women of age category 36-40 year. Finding from this study supported the fact that age is a risk factor for sexually transmitted infection in sexually active women around this age group (21-30 years). Variation in prevalence *T. vaginalis* in relation to age could be explained by many factors, like health behavior of the women, their ability to present to a physician, availability of treatment in case of infection, and their awareness and knowledge of the disease (Olusola *et al.*, 2010).

Residential area of the subject plays an important role in the prevalence of *T. vaginalis*, finding of the present study demonstrated that highest prevalence was found among rural dwellers (7.07%) while 5.435% among urban dwellers (result is significant at  $p < 0.05$ ). This finding was in conformity with the study conducted by Jatau *et al.* (2006). Based on socio-economics, those without employment are more infected with the parasite than the employed ones; this is due to the fact high prevalence of *T. vaginalis* is associated with factors such as poor personal hygiene, multiple sex partners, and low socio-economic status and under-development (Huppert, 2009).

Based on the finding of the present study, it was found that the gestation age have significant influence on the prevalence of *T. vaginalis* among pregnant women with those in the first trimester presenting with the highest prevalence (7.07%), followed by the second trimester (4.34%) while the third trimester recorded the least incidence (1.09%), the result is significant at  $p < 0.05$ . The finding justifies the studies conducted by Obiajuru and Ogbulie (2005) and Usanga *et al.* (2009). Educational status significantly affected the prevalence of Trichomoniasis among pregnant women as highest prevalent was found among women that does not have formal education or lower level of education. This finding is consistent with the report of Okpara *et al.* (2009). Lack of education is associated with poor personal hygiene and an increased risk of *T.*

*vaginalis* infection has been demonstrated in persons with poor personal hygiene and low socioeconomic status.

## CONCLUSION:

Based on the finding of this study, the prevalence of *T. vaginalis* among pregnant women was found to be 12.5%. Age, socio-economic status, residential area, Gestational age and educational status significantly affected the prevalence of Trichomoniasis among pregnant women. Rural dwellers occupy large percentage prevalence of *T. vaginalis* occurrence when compared to urban dwellers. On the basis of socio-economic status, most of the subjects positive for *T. vaginalis* were unemployed. Prevalence of *T. vaginalis* among pregnant women based on the age of gestation period showed higher prevalence among subjects in 1<sup>st</sup> trimester. The educational level of the subjects showed higher prevalence among subjects without formal education. It is recommended that routine screening for *T. vaginalis* infection among pregnant women should be encouraged.

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## CONFLICT OF INTEREST:

The authors declare no conflict of interest

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