

## Trichomoniasis in Nigeria: a review.

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### Abstract

Sexually Transmitted Parasitic Diseases (STPDs) are infectious diseases that are transmitted *via* unprotected sex which could potentially predispose men and women to different reproductive health issues. The data presented in this report shows that, trichomoniasis caused by *Trichomonas vaginalis* (TV) remain the only reported sexually-transmitted parasitic disease in Nigeria. Also, of the 36 states in the country, only 26 states including the Federal Capital Territory (FCT), Abuja have partly evaluated the prevalence of the disease. Furthermore, the prevalence data on the burden of TV infections in Nigeria in form of Years Lived with Disability (YLD), the distribution of the infection in the six geopolitical zones and the prevalence over the years are presented. Notably, YLD for TV infection was highest in the South-South; while the factors possibly impacting on the burden of TV in Nigeria are highlighted.

**Keywords:** Sexually transmitted parasitic diseases (STPDs), Trichomoniasis, Nigeria.

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### Introduction

Sexually Transmitted Diseases (STDs) being transmitted by sex through different routes are amongst the commonest communicable diseases globally with more than 1 million new infection daily [1]. The burden of STDs largely occurs in developing countries [2]; with the most vulnerable, disproportionately affected by other health and social-economic issues. In developing countries, STDs are among the leading causes of Disability-Adjusted Life Years (DALYs) lost for women of reproductive age [3].

Parasitic STDs include trichomoniasis, amoebiasis and giardiasis [4,5]. Infection with Sexually Transmitted Parasitic Diseases (STPDs) has resulted in debilitation or anatomic deformities that make sex impossible as a result of direct damage to the male and female reproductive organs including impairing fertility *via* the inhibition of gamete production [6].

*Trichomonas vaginalis* is the most common STPDs in Nigeria; and studies on STPDs remain relatively scanty [7-10]. In addition, knowledge about *T. vaginalis* and trichomoniasis is hugely lacking; and this identified gap may have impacted on the burden of infection.

This review article thus present prevalence data for Nigeria by states; and highlight the gaps in information regarding various aspects of the disease. Further, the implication of the relatively lack of awareness about *T. vaginalis* infection were noted and discussed.

### Prevalence and Distribution of STPDs

In Nigeria, amongst the vast array of endemic parasitic diseases, only trichomoniasis is sexually transmitted. There are other parasites that could be transmitted *via* oral-anal and oral-genital routes and as such can elicit other forms of sexually transmitted diseases. Of the 36 states and Abuja, *T. vaginalis* studies could only be accessed for twenty-six (26) states (Table 1). These studies spanned through the different geo-political zones (South-East, South-South, South-West, North-West, North-East and North-North) of the country. In spite of this, there is still limited/lack of literature on the prevalence of *T. vaginalis* infection in some other states. From available data, the prevalence across the country ranged between 0-51.8%. Majority of these studies were carried out on pregnant women in the different geo-political zones, and samples were mostly vaginal swab (Table 1).

**Table 1.** Prevalence of trichomoniasis across zones and states.

Zone	State	Participants	Number tested	Prevalence (%)	Sample (s) used	References
South-East	Ebonyi	HIV/AIDS patients	970	36.6	Urine	[11]
	Anambra/Enugu	Male adolescents	361	25.2	Urine, urethral smears, semen	[12]

	Ebonyi	HIV-seropositive women	250	24.4	Urine, HVS	[13]
	Abia	Women	600	18.67	Urine, HVS	[7]
	Anambra	Women between 20 years and above	200	17.5	HVS	[14]
	Abia	Pregnant women	200	13	HVS	[15]
	Anambra	Rural women	100	15	HVS	[16]
	Anambra	Women	1440	21.53	Urine, HVS	[17]
	Anambra	Females	100	2.3	Blood, HVS	[18]
	Ebonyi	Pregnant women	688	12.9	Vaginal swab	[19]
	Ebonyi	Antenatal patients	200	27.5	HVS	[20]
	Ebonyi	Single and married pregnant women	1025	12.3	Vaginal swab	[21]
	Imo	Female/adult out patients	1241	10.2	HVS	[22]
	Imo	Males	178	3.4	US	[22]
	Imo	Males and females	5883	1.3	US	[22]
South-South	Edo	Pregnant women	150	0	Urine	[23]
	Cross-River	Pregnant women	562	5.2	HVS	[24]
	Bayelsa	Females patients with vaginal complaints	1240	6.5	HVS, ECS	[25]
	Edo	Pregnant/non-pregnant women	300	2.8	HVS	[26]
	Akwa-Ibom	Pregnant women	260	17.7	HVS	[10]
	Rivers	Women attending antenatal, gynaecology, family planning and sexually transmitted disease clinics	220	4.5	HVS	[27]
	Rivers	Women from urban and sub-urban areas	1431	0.63	HVS	[28]
	Edo	Adolescent girls in secondary schools	272	9.2	HVS	[29]
	Akwa-Ibom	HIV-seropositive people	150	16.2	HVS, urine	[30]
	Akwa-Ibom	Pregnant women	560	44.5	HVS, ECS	[31]
	Delta	Women at Effurun	100	6	HVS	[32]
	Delta	Secondary school girls, teachers, undergraduates and petty traders	240	22.5	Urine, HVS	[33]
	South-West	Ogun	HIV-infected and non-infected women	100	5	Urine, HVS
Osun		Female patients	310	8.1	HVS, ECS, US	[35]
Oyo		Pregnant women	100	6	HVS	[36]
Osun		Pregnant women	100	2	HVS	[37]
Ogun		Pregnant women	300	10.3	HVS	[38]
Ogun		Pregnant women	200	20	HVS, Urine	[39]

	Lagos	Pregnant women	198	18.7	HVS	[40]
	Ibadan	ARFH attendees	200	1.5	Blood, HVS, ECS	[41]
	Oyo	Pregnancy ante-natal patients	150	25.3	HVS	[42]
	Lagos	Women (outpatients)	544	3.3	HVS	[43]
	Ondo	Seropositive and sero negative pregnant women	240	50 and 22	HVS	[44]
	Ondo	Seropositive and sero negative males and females	100	0 and 6	Urine and HVS	[45]
	Ibadan	Sexual partners of women with confirmed diagnosis of TV	44	45.5	Urethral swab	[46]
	Ogun	Female students Babcock University	200	12.5	HVS	[47]
	Lagos	Patients with virginal discharge	200	74.5	HVS	[48]
	Ogun	University male female students in redemption camp	60	1.67 and 3.3	urine	[43]
North-West	Kaduna	Pregnant women	120	19.2	HVS, Blood	[49]
	Kebbi	Female patients	220	4.1	Urine, HVS	[50]
	Jigawa	Female patients	150	1.3	HVS	[51]
	Kano	Females with abnormal vaginal discharges	2000	1.5	ECS, HVS	[52]
	Kaduna	Females living in Palladan	150	13.67	HVS	[53]
	Kaduna	HIV-seropositive antenatal clients	102	5.9	HVS	[54]
North-East	Borno	Female IDPs	200	20.5	HVS	[8]
	Borno	Pregnant women	919	10.99	HVS	[55]
	Adamawa	Health males, females, antenatal women, and sick males and females without any history of Trichomoniasis	1520	2.6	Blood and genital swab	[56]
North-Central	Plateau	HIV-1 infected women	168	51.8	HVS	[57]
	Nasarawa	Pregnant women	960	7.5	Urine, HVS	[58]
	Nasarawa	Female patients	200	8.5	Vaginal discharge	[59]
	Kwara	Pregnant women	250	20	HVS, Urine	[60]
	Plateau	Female	150	4	HVS	[61]
	FCT, Abuja	Primary school pupils	402	3.73	Urine, stool	[62]
	Kwara	Pregnant women	230	4.7		[63]
	Kwara	HIV-seropositive antenatal clients	160	5.6	ECS, HVS	[64]
	Benue	Females patients	200	10.5	HVS, Urine	[65]
	Benue	Male and female patients	400	12	Urine	[66]

Nasarawa	Female patients	100	12	HVS	[67]
Nasarawa	Male and female patients	1050	15.71	Urine, HVS	[68]
FCT, Abuja	Male and female patients	286	15	Blood, ECS, HVS, Urine, Urethral swabs, Urethral discharge	[69]
Nasarawa	Female students of Bingham University	200	4.5	Low vaginal swabs	[70]
Plateau	HIV positive and negative patients	700	17	HVS	[71]

HVS: High Vaginal Swab; ECS: Endocervical Swap; US: Urethral Sample; HIV: Human Immunodeficiency Virus; AIDS: Acquired Immune Deficiency Syndrome.

The prevalence of *T. vaginalis* infection is relatively higher in sexually active women [9]. In males, *T. vaginalis* infection is generally trivial or asymptomatic. Asymptomatic carriers can serve as vectors for the disease, making it important to treat male partners. The parasite resides in the female's lower genital tract and the male urethra and prostate.

Reports from Nigeria suggest that, trichomoniasis could be higher in urban areas than in the rural communities [72,73]. For example, in a study carried out by [74], a higher prevalence of *T. vaginalis* was documented for subjects that resided in urban areas (57.70%) than those that lived in rural communities (39.16%). Also, prevalence was highest amongst the sexually active group of age 11-45 years old [7].

Amongst pregnant women, *T. vaginalis* is generally high [9,39]. In Zaria, pregnant women between ages 16 to 25 were reported to be *T. vaginalis* positive with prevalence of 53.57% [43]. In Lagos, South-West, Nigeria, *T. vaginalis* prevalence of 1.8% was recorded for pregnant women between 21 to 30 years old. Similarly, in Abeokuta, South-West Nigeria, pregnant women between the age 20 and 30 had prevalence of 21.3%. Meanwhile in Anambra, South-East Nigeria, non-pregnant women had higher rate of infection (17.8%) than pregnant ones (16.7%) [14]. Furthermore, a study in Maiduguri showed a high rate of 20.8% infection among non-pregnant women [8].

In relation to marital status, a prevalence of 2.9% was recorded among Lagos married women compared to 0.4% prevalence in unmarried women [43]. Amadi and Nwagbo [7] reported 19.72% for single women in Abia, South-East, Nigeria with 21.6% and 11% among Abeokuta and Maiduguri married women respectively [8,38].

Data have shown that HIV could escalate infection with *T. vaginalis* [61,75,76]. Isiaka-Lawal et al. [64] observed that 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 [77].

Available data had revealed an increased risk of *T. vaginalis* infection in persons with poor personal hygiene and low socio-economic status [78]. Levels of education have been linked to prevalence rate. For instance, non-formal educated women had

an infection rate of 22.3% while tertiary educated women had only 1.0% [8]. Also, Usanga et al. [24] reported that women with primary school education had 6.4% prevalence rate. In addition, poverty, unemployment, violence against women and children [17,24], and young age could raise the risk associated with acquiring *T. vaginalis* infection [63,79].

## Diagnosis

Diagnostic methods available for trichomoniasis are wet mount preparation, staining methods, culture in laboratory medium, and molecular methods. Historically, detection of the parasite is made possible by examination of urine and High Vaginal Swab (HVS) in a drop of saline or trichomonas diluents for the characteristic wobbling and rotating motion. Amadi and Nwagbo [7] reported that either urine sample or vaginal swab is insufficient for proper diagnosis of *T. vaginalis* infection and have suggested that for better results both urine and vaginal swab should be used. Diagnosis of trichomoniasis has relied mostly on wet mount demonstration and staining of the parasite in the laboratory with success rate of between 20 and 80% [80]. A combination of cultural method with microscopic wet mount demonstration is now the acceptable procedure for effective diagnosis [81].

New molecular diagnostic tests with improved sensitivity have been developed in response to the increasing recognition by stakeholders of the importance of this wide-spread STI. Thus the detection of *T. vaginalis*, including rapid antigen detection and nucleic acid amplification tests, has significantly improved the quality of diagnostics for trichomoniasis, particularly in women [82]. In America, Guillermo et al. [83] reported 97% sensitivity for molecular amplification diagnostic methods, as against 70 and 36% sensitivities for culture and wet preparations respectively. Also, studies of genetic typing of the parasites have been reported to be more sensitive than other methods [84,85]. However, in Nigeria there is no report of the application molecular diagnosis tools on *T. vaginalis* infection, which may influence the prevalence data as presently reported from less reliable tests.

## DALYs and Infection Burden

Evaluation of the disease burden is essential in determining the cost-effectiveness of control so as to ensure that control

programmes are focused appropriately. Disability Adjusted Life Year (DALYs) is the trending metric measurement to assess disease burden [86]. DALYs include years of life lost due to mortality (YLLs) and years lived with disability (YLDs). Most *T. vaginalis* survey is mainly on women, but reports of infection burden measured in DALYs are unavailable. Here we have estimated value of YLD based on available prevalence data and morbidity of the infection [87]. YLD due to TV in this review was estimated using the formula below [88].

$$YLD = P \times DW$$

Where, *P*=number of prevalent cases, *DW*=Disability Weight.

Here, prevalence was used rather than incidence [88], because in Nigeria, surveys are widely reported in prevalence (Table 2). *DW* (0.027) of infection which is represented on a scale of 0-1 (0=perfect health; 1=death), was adopted [89]. YLDs due to TV, according to the geopolitical zones are shown in Table 2. This review shows that the YLD from *T. vaginalis* prevalence data in Nigeria ranged from 21 to 63 with the highest and least disease burden recorded in South-South and North-West respectively.

**Table 2.** *T. vaginalis* mean prevalence and estimated YLD according to geopolitical zones (1984-2017).

Region	Mean ± SD (%)	YLD /10 000
South-East	16.12 ± 9.9	44
South-South	23.3 ± 16.3	63
South-West	17.3 ± 20.2	47
North-West	7.6 ± 7.3	21
North-East	11.4 ± 9.0	31
North-Central	12.5 ± 12.4	34

## Control

Control and elimination may depend largely on extensive proper sex education, especially for the adolescent and youths [7,8]. Also suggested are adequate treatment of both spouses, implementation of effective screening programmes and treatment at no cost [8]. For improved health, adequate personal hygiene, avoidance of promiscuity, improved education of women on safe sex and the need to know partners' STI status are advocated [14,77]. It is recommended that routine STIs screening in sexually active patients especially among the young and singles should be incorporated into hospital care [41]. This is needed to prevent transmission of the parasite, because some infected women and most infected men show no signs of the disease like liquid discharge from the vagina or penis, irritation while urinating and genital itching. So this YLD information is vital to focusing efforts on getting women tested and treated Based on the results from this study, trichomoniasis control in Nigeria should especially be of high priority in the South-South.

## Conclusion

Data available in this review have clearly outlined the prevalence of trichomoniasis in Nigeria, with the South-South having the highest disease burden. The dearth of information and very poor awareness of this STDs among the populace may have impacted on the burden of infection. Thus, increased awareness on the parasite and the disease at all levels is highly recommended. Also, ensuring that health workers include *T. vaginalis* as part of a routine procedure in the course of screening for STDs is thus advocated. Furthermore, providing better sensitive methods for diagnosis is the way to go as this would ensure near-accurate information on the prevalence of the disease in any given area in Nigeria.

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