

Prevalence of *Trichomonas vaginalis* infections amongst female students' of tertiary institutions in Ogun State, Nigeria

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Abstract

Trichomonas vaginalis is a parasitic protozoan and the causative agent responsible for vaginal trichomoniasis in women. Trichomoniasis is a sexually transmitted disease with significant public health impacts with vaginitis, cervicitis, urethritis, and pelvic inflammatory disease. TV also affects birth outcomes and is known to be associated with human immune deficiency virus transmission and its acquisition. A cross-sectional study was undertaken; it involves 250 female undergraduate students assessed for *Trichomonas vaginalis* infection. Fifteen milliliters of early morning urine samples were collected with a sterile disposable universal bottle, the trophozoites presence observed within 10 min of samples collection. The urine samples were centrifuged at 25 °C for 13 min at 1,500 rpm. Wet-mount microscopy examination performed using a drop of vortex sediments from the urine samples for their appearances, if bloody or cloudy and also screened for the presence of trophozoites of *Trichomonas vaginalis*. 56 (22.4%) were within the age bracket of 17 – 21 years, 124 (49.9%) were of the age range of 22 – 26 years, 42 (16.8%) were in the age group of 27 – 31 years, and 28 (11.2%) were 31 years and above. The rate of infections was significantly varied by age group, with the highest being in sexually active young women aged between 22–26 years 10 (80.7%) and the lowest in the age group 31 years (7.1%). It concluded that *Trichomonas vaginalis* control should be a public health authorities concern that can manage multiple health inequalities noted in some less privileged towns and villages in Nigeria.

Keywords: Cross-sectional; Pelvic inflammatory; *Trichomonas vaginalis*; Trophozoites; Urine samples

1. Introduction

Trichomonas vaginalis (TV) is a parasitic protozoan and the causative agent responsible for vaginal trichomoniasis in women. Trichomoniasis is a sexually transmitted disease with significant public health impacts with vaginitis, cervicitis, urethritis, and pelvic inflammatory disease. TV also affects birth outcomes and is known to be associated with human immune deficiency virus transmission and its acquisition [1].

T. vaginalis infections are not self-limiting and produce non-ulcerative inflammation of the genital epithelium that can progress to necrosis and haemorrhage [2, 3].

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T. vaginalis is recorded to be more prevalent than other infectious STIs such as: - Chlamydia trachomatis, Neisseria gonorrhoea, and syphilis altogether. The worldwide estimation of *Trichomonas vaginalis* prevalence is 8.1% for women and men, 1.0% [4]. New data on the annual incidence of *Trichomonas vaginalis* estimated to be over 170 million cases globally [5].

WHO, reported that about nine million new cases are recorded in North America yearly [5], and asymptomatic incidences are estimated to be 50%. Burstein et al. also claim that 10% to 50% of *T. vaginalis* infections in women are asymptomatic [6], and the men's rate is probably higher. The profound symptoms known with the clinical diagnosis of *T. vaginalis* include discharge of a yellowish-green frothy, dyspareunia, pruritus, and dysuria [7].

From available data in Nigeria, the prevalence across the country ranged between 0- 51.8%. Most of these studies were on pregnant women in different geo-political zones, and samples were vaginal swabs [8]. This disease occurs during the reproductive years. It is uncommonly for clinical manifestations of this infection reported before menarche or after menopause. The incubation period is 4 to 28 days in about 50% of infected individuals [9].

Trichomoniasis is often asymptomatic in men; more than half of the infected women manifest as vaginitis, cervicitis, urethritis and irritation with frothy malodorous discharge [9]. The impacts outcomes of these infections are especially significant during pregnancy. Indeed, infected pregnant women may develop complications such as preterm birth and low birth weight infants [10].

Mann et al. reported an association between mothers infected with *T. vaginalis* and intellectual disability in their children [11]. One rare case is the transmission of *T. vaginalis* infection onto a newborn child [12], where it causes vaginal and respiratory tract infections in newborns [13, 14].

Some reports from Nigeria indicated that *T. vaginalis* is higher in peri-urban areas than in the villages [15, 16]. As exemplified by Obiajuru and Ogbulie [17], in their study, a high prevalence of *T. vaginalis* was found for participants who lived in urban areas at 57.70%, and those from villages accounted for 39.16%. Also, prevalence was highest amongst the sexually active group aged 11-45 years [18]. This study assessed the prevalence of *Trichomonas vaginalis* amongst female students of tertiary institutions in Ogun State, Nigeria.

2. Material and methods

A cross-sectional study was undertaken at Ogun State Polytechnic of Health and Allied-Sciences and Tai Solarin University of Education between June 2023 and July 2023. It involves 250 female undergraduate students assessed for *Trichomonas vaginalis* infection. The inclusion criteria were consenting female students who were sexually active.

Ethical approvals obtained from the institution's ethics review committee, and an informed consent-form, was given to each participant.

2.1. Study population

Two hundred and fifty female students randomly sampled with consent from two tertiary institutions in Ogun State, i.e, one hundred and twenty-five from each institution.

The urine samples were for analyses from Ogun State Polytechnic of Health and Allied-Sciences and Tai Solarin University of Education students.

2.2. Sample collection

Fifteen milliliters of early morning urine samples were collected with a sterile disposable universal bottle as described by Karlowsky et al., [19]. A total of two hundred fifty urine samples were collected using disposable sterile-universal bottles for the samples. At each occasion of sample collection from both institutions, the trophozoites presence observed within 10 min of samples collection.

2.3. Urine microscopy examination

The urine samples were centrifuged at 25°C for 13 min at 1,500 rpm. Wet-mount microscopy examination performed using a drop of vortex sediments from the urine samples for their appearances, if bloody or cloudy and also screened for the presence of trophozoites of *Trichomonas vaginalis*.

3. Results

The study assessed the prevalence of *Trichomonas vaginalis* as one of the primary agents of urinary tract infections among the female students of both study areas.

3.1. Age distribution of the participants

Table 1 The participants age distribution

| Age distribution | Frequency | Percentage (%) |
|------------------|-----------|----------------|
| 17 - 21 | 56 | 22.4 |
| 22 - 26 | 124 | 49.9 |
| 27 - 31 | 42 | 16.8 |
| 31+ | 28 | 11.2 |
| TOTAL | 250 | 100 |

The age distribution showed that 56 (22.4%) of the samples collected were within the age bracket of 17 – 21 years, 124 (49.9%) of the subjects were of the age range of 22 – 26 years, 42 (16.8%) participants were in the age group of 27 – 31 years, and 28 (11.2%) of the samples were of the age limit of 31 years and above.

3.2. Urine microscopy analysis

Table 2 Prevalence of *Trichomonas vaginalis* infection by age groups in the study areas

| Age distribution | No. examined | No. infected | Percentage |
|------------------|--------------|--------------|------------|
| 17 - 21 | 56 | 3 | 5.36 |
| 22 - 26 | 124 | 10 | 80.65 |
| 27 - 31 | 42 | 4 | 9.5 |
| 31+ | 28 | 2 | 7.1 |
| TOTAL | 250 | 19 | 7.6 |

Table 2 shows the prevalence of infection with *Trichomonas vaginalis* in age groups and using wet mount diagnostic method. The rate of infections was significantly varied by age group, with the highest being in sexually active young women aged between 22–26 years 10(80.7%) and the lowest in the age group 31 years (7.1%).

4. Discussion

Trichomonas vaginalis infects the genital tracts; it inhabits the female lower part of the genital tract but the urethra and prostate of the male, replicating by binary fission. *Trichomonas vaginalis*, is only transmitted in human- beings through sexual coitus. The infection may be dormant for some time in women but only about ten days in males [20]. Wet mount microscopy has been used for many decades to diagnose *Trichomonas vaginalis*. The diagnosis is cheap, easy to read and interpret, commonly employed for immediate attention, although not sensitive for men. Its sensitivities range from 50–70% depending on the expertise-of-the reader and read within 10 min of collection [21].

Trichomonas vaginalis found to occur more often in the presence of women with a newly identified species of *Mycoplasma* or *Candidatus, Mycoplasma girardi* [22, 23]. Brotman et al. found that *Trichomonas vaginalis* was associated with vaginal microbiota consisting of low proportions of lactobacilli and high proportions of *Mycoplasma*, *Parvimonas*, *Sneathia*, and other anaerobes [24].

In the current study Wet-smear preparation detected infections with *T. vaginalis* (7.6%). And studies conducted in Brazil indicated that the prevalence of *T. vaginalis* infection was 2.6% to 20%12 in women evaluated in primary healthcare centres at various zones of the nation. Demographic and environmental factors- age, behaviour, educational

level, personal hygiene, sanitation, and diagnostic methods are; factors responsible to various positivity rates in different study areas, [25].

A review by Hezarjaribi et al., they found that the prevalence of trichomoniasis in Iranian women's average age was 24.5 years [26]. And this agreed with our findings with an average age of 24 years. And a study conducted in Maiduguri showed a high rate of 20.8% infection among non-pregnant women [27]. Higher prevalence in young adults may be due to sexual behaviour, limited knowledge about STIs, and possible vaginal microbiota, resulting in physiological changes that may facilitate the establishment and proliferation of the protozoa in young ones[28].

In pregnant women, infection with *T. vaginalis* is generally considered high; in a study carried in Zaria, pregnant women between ages 16 - 25 reported positive for *T. vaginalis* and have a prevalence of 53.57% [29]. In a similar study conducted in Abeokuta, Nigeria, pregnant women between the ages of 20 and 30 had a Prevalence of 21.3%.

5. Conclusion

Trichomonas vaginalis is considered one of the most known sexually transmitted infections (STIs) in Nigeria, and drugs of choice are cheap and readily available. The incidence of this infection varies from one area to another depending on the degree of personal and community patients as well as sexual practices.

It concluded that *Trichomonas vaginalis* control should be a public health authorities concern that can manage multiple health inequalities noted in some less privileged towns and villages in Nigeria.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest is declared by the authors.

Statement of ethical approval

Ethical approvals obtained from the institution's ethics review committee, and an informed consent-form, was given to each participant.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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