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## **Trichomoniasis: The Most Neglected Infection among Women in Isoko South, Delta State Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration between both authors. Author EEI designed, performed the laboratory study and wrote the manuscript. Author JCN assisted with data analysis, interpretation and enhancement of the manuscript for intellectual contents. Both authors read and approved the final manuscript.*

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### **ABSTRACT**

**Background:** Trichomoniasis, an infection caused by *Trichomonas vaginalis* is among the most neglected sexually transmitted disease in the world and it affects the vagina, cervix, urethra and paraurethral glands as well as the bladder in women.

**Objectives:** To determine the prevalence of trichomoniasis as well as its risk factors in Isoko South and increasing the knowledge of the distribution pattern of the infection.

**Materials and Methods:** Vaginal swabs and mid-stream early morning urine were collected in universal screw-capped sterile bottles and Evepon swab sticks respectively from 841 women aged 11-50 years in the study area. These specimens were transported to the Tropical Disease Research Unit laboratory, Delta State University, Abraka for parasitological examination.

**Results:** Of the 841 samples collected, 372 (44.23%) samples were infected with *Trichomonas*. Age-related prevalence of infection showed that respondents between aged 21-30 years had the highest (55.43%) prevalence while aged 41-50 years recorded the least prevalence of 31.52%. Based on sample type, Higher Vaginal Swab (HVS) specimen had the highest prevalence of

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11.18% as against 4.04% recorded for urine specimen. Relative to pregnancy conception, infection rate of 282 (46.38%) was recorded for non-pregnant women while the pregnant women accounted for 90(38.63%) of the prevalence. Occupational-related prevalence of infection revealed that students between had the highest prevalence (18.07%) of infection followed by traders (10.58%) and farmers (8.20%) with the least prevalence (7.37%) being observed amongst the civil servants. Analysis of the data showed a significant difference ( $p < 0.05$ ) in the prevalence of infection between pregnant and non-pregnant respondents and between respondents of different occupational groups.

**Conclusion:** Combating trichomoniasis in Isoko South/Delta State requires strategies that target the individual, risk groups and the community and these must include integration of these strategies into national Sexually Transmitted Infections (STI)/ Human Immunodeficiency Virus (HIV) control programmes.

**Keywords:** Prevalence; *Trichomonas vaginalis*; neglected; vaginal swab; urine; Oleh community; Delta State.

## 1. INTRODUCTION

Trichomoniasis is a neglected sexually transmitted disease in Isoko South, Delta State, Nigeria with no published data on its prevalence. Although workers elsewhere reported that trichomoniasis is the most common sexually transmitted parasitic disease worldwide [1,2]. Health workers and the public in Delta State appear to be non-chalant about the infection and its consequences. It is frequently encountered among women complaining of abnormal vaginal discharges and itching [2,3].

The infection is most common amongst sexually active adolescents especially where people do not practice safe sex method [4]. This infection caused by the parasitic protozoan *Trichomonas vaginalis* is the most common non-viral sexually transmitted disease in human urogenital tract, infecting both men and women [5,6,7]. Epidemiological surveys have shown that approximately, 180 million women are annually infected with trichomoniasis worldwide [4]. About 2-50% of African population are estimated to harbor this infection [8]. The etiological agent: (*T. vaginalis*) is site-specific and follows intra-vaginal or intra-urethral inoculation only for the infection [9,10]. However, the infection affects the vagina, cervix, urethra and paraurethral glands, fallopian tubes, pelvis as well as the bladder in women [9,11]. It causes among other problems, vaginitis, carcinoma of the cervix, urethritis, pelvic inflammation, cystitis and rarely pyelitis [12].

These infections are asymptomatic and rare in males but occur mostly in females. Trichomoniasis in men is less clinically obvious

but when infected, organism is found in the anterior urethra, external genitalia, prostate, epididymis and in semen [13]. Symptoms range from none to urethritis complicated by prostatitis, epididymitis, urethral stricture disease and infertility [14]. The common symptoms include a smelly yellow-green, watery vaginal discharge, which tend to be frothy, vulval itchy genitals, dysuria or offensive odour, and thighs, swollen labia, painful during sexual intercourse or urination [15,16]. About 10-50% of women are asymptomatic to this infection [9,16]. However, asymptomatic infections can suddenly become symptomatic due to emotional stress, general lowered resistance or changes in pH of the vagina i.e if the normal acidity of the vagina is shifted from a semi acidic pH (3.8 - 4.2) to a much more basic one (5.0 - 6.0) that is conducive to *T. vaginalis* growth [17]. Trichomoniasis often leads to vaginitis and acute inflammatory disease of the genital mucosa. Trichomoniasis during pregnancy is associated with preterm delivery, low birth weight, and increase infant mortality [18,19]. This infection also predisposes individuals to cervical cancer and is an important factor in amplifying the transmission of Human Immunodeficiency Virus (HIV) [2,20,21]. Increasing prevalence of trichomoniasis has been reported in many states of Nigeria including Ebonyi, Lagos and Anambra State [1,22,23].

The incidence of trichomoniasis depends on the population screened or examined. Certain factors such as poor personal hygiene, multiple sex partners, low socio-economic status and underdevelopment are documented to be associated with high incidence of infection [24]. Data on this infection are scarce and better understanding of health seeking behaviour is

necessary to designed STIs intervention. The aims and objectives of this study is to assess the prevalence of sexually transmitted infection especially trichomoniasis in Isoko South, Delta State Nigeria and increasing the knowledge of the distribution of these infections, the links between infection and the development and also to create awareness of this disease among the people.

## 2. MATERIALS AND METHODS

### 2.1 Description of Study Area

This present study was carried out in Oleh and it's environment which is made up of several other villages with an estimated population of over eighty thousand (80, 000) in 2006 census. The study was carried out in Government General Hospitals Oleh, Delta State. The town is a semi-urban settlement that share boundary with other villages such as Ozoro, Irri, Olomoro, Emede, and Owhe predominantly dominated by the Isoko language speaking tribe. It has two type of climate i.e. the rainy and the dry season with a characteristic tropical rain forest. The occupations of the inhabitants are trading, farming and other professional work with their health need being provided by the Government General Hospital.

### 2.2 Collection of Samples

Early morning urine and vaginal swab samples were collected from 841 female respondents aged 11-50 years between the months of December 2013 and March, 2014. A total of 841 urine/vaginal swabs were collected from the subjects, and questionnaires were administered to them to collect data on their age, marital status, pregnancy as well as employment status.

Urine samples were collected with Stermacon sterilized plastic bottles while vaginal swabs were collected using sterile Evepon swab sticks. The samples were brought to the Department of Animal and Environmental Biology: Tropical Disease Research Unit laboratory and analysed within 3 hours of collection.

### 2.3 Examination of Urine Samples

The urine samples were examined in Tropical Disease Research Unit laboratory using the centrifugation method. 10 ml of urine was

placed in centrifugation tubes and centrifuged for 5 minutes at 1000 rpm and a drop of the sediment was examined microscopically for *T. vaginalis*.

### 2.4 Examination of Vaginal Swabs Sample

Wet preparation of a small sample of discharge was collected on a slide; a drop of fresh physiological saline was then added and covered with a cover glass. The preparation was examined microscopically using X10 and X40 objective with condenser iris sufficiently to give good contrast.

### 2.5 Identification of Parasites

Wet mount preparation was made from vaginal swab samples and viewed with the light microscope to observe motile flagellated form of *T. vaginalis*. *T. vaginalis* flagellates are round to oval in shape and a little larger than pus cell. Carefully focusing was done to detect the flagellates with X40 objective lens.

### 2.6 Statistical Analysis

The data obtained from samples were analysed statistically using *chi*-square with significant difference set at 5% level.

## 3. RESULTS

Of the 841 samples examined in this study, 372 (44.23%) respondents were infected with trichomoniasis. The findings of the study further revealed that 94 (11.18%) respondents had *T. vaginalis* in their vagina but not in their urine samples, while 34 (4.04%) respondents had *Trichomoniasis* in their urine samples. Of the 372 (44.23%) infected with trichomoniasis, only 244 (29.01%) had *T. vaginalis* in both their urine samples and vaginal swabs (Table 1). Analysis of the data showed that the difference in the prevalence of trichomoniasis between urine samples and vaginal swabs was statistically significant ( $p < 0.05$ ).

Microscopic examination of direct wet smear of the vaginal swabs and urine deposits showed that 244 (29.01%) respondents were infected with trichomoniasis. Considering urine and higher virginal swab (HVS) samples, the age group of 21-30 had the highest prevalence for this infection. Closely followed by age bracket 4-20,

31-40 and 41-50 which had an infection rate of 58 (26.24%), 42 (22.46%) and 20 (21.74%) respectively (Table 1). The least prevalence of infection 34 (4.04%) was recorded for urine samples compared to 94 (11.18%) observed in the HVS samples. Age 41-50 had the least prevalence of trichomoniasis for urine (2.17%) samples and HVS (7.61%) samples respectively. The overall age-related prevalence of urine and HVS infection showed that the highest prevalence of infection 189 (55.43%) was amongst the age group 21-30 years. The least prevalence of infection 29 (31.52%) was recorded amongst the age group 41-50 years. Based on age of respondents, the order of prevalence was 55.43%, 39.82%, 35.29% and 31.52% as shown in Table 1. The difference in the prevalence of infection between the different age-groups was statistically significant ( $p < 0.05$ ).

Table 2 summarizes prevalence of trichomoniasis amongst pregnant and non-pregnant women in Isoko South. Out of the 233 pregnant women examined in the study, 90(38.63%) were infected with trichomoniasis while 282(46.38%) of 608 non-pregnant women were also infected with trichomoniasis leaving the age group of 21-30 with the highest prevalence of 60.0%. As shown, the highest prevalence of infection (46.38%) was observed amongst non-pregnant respondents aged 21-30 years, while the least prevalence of infection 26.67% was observed amongst pregnant women aged 41-50 years, followed by pregnant women aged 41-50 years (32.47%). Table 2 further revealed that non-pregnant women had the highest prevalence (46.38%) against 38.63% recorded for pregnant women.

The prevalence of trichomoniasis based on respondent occupation showed that the highest prevalence of infection (31.38%) was amongst students aged between 21-30 years, while the least prevalence of infection (1.60%) was also amongst students aged 31-40 years. Although there was disproportion in the sample populations, traders was next on the prevalence rank followed by farmers and civil servants being the least infected with an infection rate of 89 (10.58%), 69 (8.20%) and 62 (7.37%) respectively. Fig. 1 and Table 3 present the occupational-related prevalence of infection. Based on this, students had the highest prevalence (40.84%) followed by traders with 23.92%, while civil servants and farmers recorded 16.67% and 18.55% respectively.

#### 4. DISCUSSION

The findings of this study show that trichomoniasis is prevalent in Delta State particularly Oleh and its environs. Even though, scanty or no previous data on the prevalence of this infection in Delta State exists, clinicians in different locations of the state frequently report its prevalence in their bench work. However, the state Ministry of has given little or no responsiveness to this sexually transmitted infection. The prevalence values of 44.43% of trichomoniasis observed in this study seem to be the highest recorded in recent times. This value (44.43%) is higher than the observations of 4.5% made by Olorode et al. [6] 4.98% by Abdurehman et al. [3] 10.99% by Mairiga et al. [12] 12.90% by Okonkwo et al. [19] 15.0% by Onyido et al. [2] and 17.50% by Iwueze et al. [23] The disparity between prevalence values obtained between this study and previous research might be due to promiscuous life pattern exhibited by the subjects examined and the geographical location of respondents. The high prevalence of 39.82%, 55.43%, 35.29% and 31.52% obtained for 11-20, 21-30, 31-40 and 41-50 age group respectively is an indication that trichomoniasis is neglected in Isoko South with no health attention being given to this population. This observation is similar to previous workers [4,25,26] who reported that although trichomoniasis is highly prevalent in Owerri, Imo State, adequate attention has not been given to its control and eradication by government and health workers. Trichomoniasis is among the most prevalent sexually transmitted parasitic infection worldwide [27]. Yet it appears to be highly neglected [28].

The prevalence of infection (44.23%) among the survey subjects is higher, when compared to the 10.75% and 26.72% observed by Nmorsi et al. [7] and Njoku et al. [25] However, the results obtained in the present study is lower than that determined by Bakare [29] who reported a prevalence of 45.50% in Ibadan. The higher prevalence of *T. vaginalis* infection among non-pregnant women (46.38%) than pregnant women (38.63%) in this study is probably because *T. vaginalis* is cosmopolitan and also because sexual intercourse is the major means of transmission of the infection and non-pregnant women appears to be more sexually active than others.

**Table 1. Age-related prevalence of trichomoniasis amongst women in Isoko South**

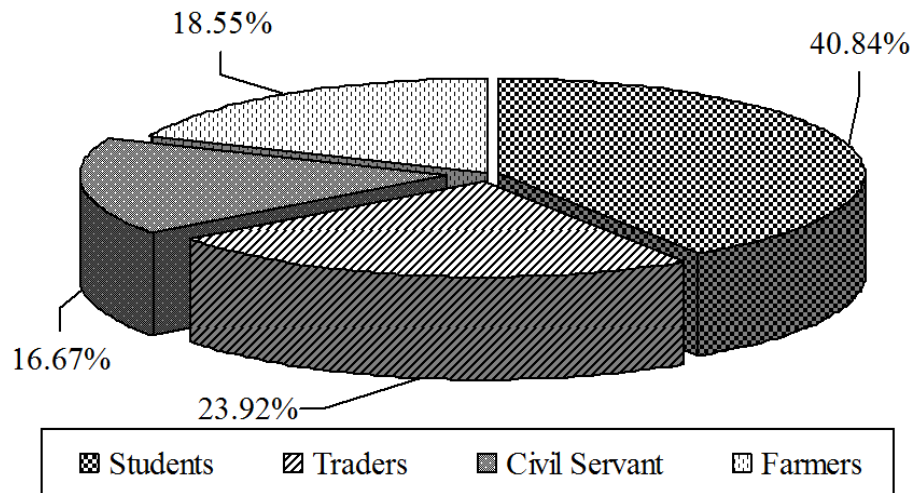
Age group	No. Examined	No. infected	Prevalence of infection according to specimen (%)		
			Urine only	HVS only	Both (Urine and HVS)
11-20	221	88 (39.82)	7 (3.17)	23 (10.41)	58 (26.24)
21-30	341	189 (55.43)	17 (4.99)	48 (14.08)	124 (36.36)
31-40	187	66 (35.29)	8 (4.27)	16 (8.56)	42 (22.46)
41-50	92	29 (31.52)	2 (2.17)	7 (7.61)	20 (21.74)
Total	841	372(44.23)	34 (4.04)	94 (11.18)	244 (29.01)

**Table 2. Prevalence of trichomoniasis amongst pregnant and non-pregnant women in Isoko South**

Age group	Pregnant		Non-pregnant	
	No. Examined	No. infected (%)	No. Examined	No. infected (%)
11-20	59	21 (35.60)	162	67 (41.36)
21-30	106	48 (45.28)	235	141 (60.00)
31-40	53	17 (32.07)	134	49 (36.57)
41-50	15	4 (26.67)	77	25 (32.47)
Total	233	90 (38.63)	608	282 (46.38)

**Table 3. Prevalence of trichomoniasis based on occupation of subjects examined**

Age group	Infected students (%)	Infected traders (%)	Infected civil servants (%)	Infected farmers (%)
11-20	42(19.00)	29(13.12)	2(0.90)	15(6.79)
21-30	107(31.38)	43(12.61)	29(8.50)	10(2.92)
31-40	3(1.60)	10(5.35)	22(11.76)	31(16.58)
41-50	0(0.00)	7(7.61)	9(9.78)	13(14.13)
Total	152(18.07)	89(10.58)	62(7.37)	69(8.20)



**Fig. 1. Occupational-related prevalence of trichomoniasis**

The public health implications of trichomoniasis have been eloquently discussed by previous workers [7,26,29]. In view of the high prevalence of trichomoniasis observed in this study,

residents and visitors to Oleh should avoid having casual sex with unknown sex partners. The use of protective condoms to reduce the risk of infection should be encouraged [4,26]. The

higher prevalence of 55.43% infection observed amongst the younger age group (21-30) than the older groups 31-50 years corroborates the findings of previous workers [23] who reported 47.20% and state that trichomoniasis is more prevalent amongst the more sexually active young people.

Generally, increase in the rate of sexually transmitted diseases in Nigeria has been blamed on increased poverty, unemployment and violence amongst women and children amongst other factors. The findings of this study further support this fact as indicated in Fig. 1 which shows that students (40.84%) and traders (23.92%) were most infected compared to civil servants and farmers who had 16.67% and 18.55% respectively. The high prevalence observed amongst students and traders may be due to existence of promiscuity or communal use of public toilets. Higher prevalence of trichomoniasis observed amongst traders than civil servants in this study corroborates the findings of workers [30]. Amongst the subjects examined, trading and farming appears to be a leading occupation. Although the means of transmission of trichomoniasis were not investigated in this study, however, the unhygienic and deplorable conditions of toilet seats in plaza/markets and school hostels without proper maintenance may have contributed to the high prevalence and spread of this infection among traders and student. The observation of higher prevalence of trichomoniasis among non-pregnant women in this study may be due to the fact that they are sexually active and they have more than one sex partner. It is well known that the risk of vaginal infection and all STDs is increased in women with multiple sex partners. This may probably be why there is higher prevalence (46.38%) among non-pregnant women. This variable may be due to the imbalance between the number of women who go for medical check-up and number of pregnant women who attend antenatal hospital days in this study. Ante-natal women should also be encourage to use external contraceptives (condoms) while having sex with their husbands, since it is possible that their husbands may engage in extra marital sex relationship to satisfy their sexual desires and return to have sex with their pregnant wives. By so doing the men may be infected and transmit same to their pregnant wives thereby endangering their unborn babies. The high prevalence of trichomoniasis amongst pregnant women in Isoko South constitutes

major health risks to the unborn babies. Maternity homes and ante-natal clinics in the area should incorporate diagnosis of trichomoniasis in the routine checkup of pregnant women to ensure a timely detection of infection and adequate treatment as a measure to prevent neo-natal infection.

Microscopic examination of direct wet smears of vaginal swabs and urine deposits revealed higher prevalence of trichomoniasis than examination of single specimen in agreement with Obiajuru [31]. This shows that examination of urine sample alone or vaginal swab alone is insufficient for the diagnosis of *T. vaginalis* infection. Therefore both urine sample and vaginal and/or urethral smears should be examined in the diagnosis of trichomoniasis.

## 5. CONCLUSION

Ministry of Health should sponsor public health education to enlighten the people on the health implications of the infection and encourage regular medical checkup which will help in discouraging the spread of trichomoniasis in this settings. The control of trichomoniasis in Isoko South/Delta State requires strategies that target the individual, risk groups and the community and these strategies to eradicate or reduce its prevalence need to be integrated into national STI/HIV control programmes.

## CONSENT AND ETHICAL CONSIDERATION

The Management of Government General Hospitals Oleh, Delta State gave ethical clearance. Informed consent was sought and obtained from individuals examined.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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