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PREVALENCE OF VULVO-VAGINAL CANDIDIASIS AND TRICHOMONIASIS AMONG REPRODUCTIVE AGE WOMEN ATTENDING SELECTED PRIVATE HOSPITALS IN OWERRI, IMO STATE.

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ABSTRACT

Vulvovaginal candidiasis (VVC) and trichomoniasis are common genital infections among reproductive age women. A study was examining the incidence of vaginal candidiasis and trichomoniasis among young girls attending a selected hospital in Owerri. A hospital cross-sectional study recruited 150 women with genital discomforts after obtaining their informed written consent between February and April 2025 structured questionnaires were administered and high vaginal swabs (HVS) specimens were collected using standard aseptic procedures for laboratory examination. Identification of Candida involved direct microscopic examination using potassium hydroxide preparation, culture on Sabouraud Dextrose agar plates and germ tube testing while trichomoniasis was examined using saline wet mount microscopy. The result was analyzed using descriptive statistics to determine the prevalence of each infection, age specific distribution and occurrence of co-infection. Out of the 150 specimen, 148 (98.6%) participants examined with one or more vaginal infections, 83 (58.1%) were positive for vulvovaginal candidiasis while 60(41.9%) were positive trichomoniasis. The highest prevalence of vulvovaginal candidiasis was observed among women aged 21 – 25 age group, trichomoniasis as well recorded most prevalence among the same age group. Co-infection with both recorded in 86 (57.6%). The finding highlights the occurrence of vulvovaginal candidiasis and trichomoniasis among women of reproductive age. This study has showed that vulvovaginal candidiasis is a major cause of genital infection and trichomoniasis among the other as well and which revealed associated risk factors. Therefore, there is a need to intensify health education and community awareness programs on sexually transmitted infections particularly trichomoniasis.

Keyword: Vulvovaginal Candidiasis, Trichomoniasis, Reproductive Age Women, Co-infection, Prevalence, Owerri

Introduction

Vaginitis is the overall term for inflammation of the vagina which is severe health concern among women. Its general symptoms include vulvovaginal itching, burning, irritation, dyspareunia, odor or abnormal vaginal discharge. Bacterial vaginosis, vulvovaginal candidiasis and trichomoniasis are major infectious causes of vaginits (Geer and Klega, 2025).

Vulvovaginal candidiasis is a common prevalent illness that is mostly affecting hospitalizing and immunosuppressed individuals. Its physical signs include genital pain, decreased sexual desire and psychological suffering (Bhoslae *et al.,* 2025). Candidiasis is a fungal infection caused by *Candida albicans. Candida albicans* is polymorphic opportunistic fungi and is the most common cause of fungal infection worldwide. (Jeanmonod, *et al.,* 2024). Most sexually transmitted diseases are predominantly problematic in women. Clinical manifestation commonly presents with thick, white curd-like vaginal discharge, vulvovaginal itching (Pruritus), irritation, burning and discomfort can occur in adolescents' girls and non-pregnant women with reduced immunity, vaginitis and fungal infection (Bhoslae *et al.,* 2025). It is reported that 70% of women experience at least on episode of vulvovaginal candidiasis (VVC) during their lifetime while an estimated 8% of women experience recurrent vulvovaginal candidiasis (Denning *et al.,* 2018). It is commonly treated antifungals medications administered either topically (intravaginally) or orally, dependent on the severity (Geer and Klega, 2025).

Trichomoniasis is a global non-viral sexually transmitted infection (STI). It is caused by the flagellated protozoan parasite *Trichomonas vaginalis*. According World Health Organization, approximately 156.3 million new cases per year of *T. vaginalis* infection occurred globally among individuals aged 15 - 49 years in 2020 (WHO, 2024). This makes trichomoniasis more common than, gonorrhea, and syphilis infections separately. making it the most common non-viral sexually transmitted infection (STI) (WHO, 2025). Trichomoniasis is often presented by yellowish green, frothy vaginal discharge while speculum examination may reveal cervical erythema and punctate hemorrhages. Research how shown its disproportionate burden among people of African descent and populace experiencing socioeconomic shortcoming, strengthening the need for increased

research (Bassey *et al.,* 2022). Trichomoniasis is treated with oral metronidazole or tinidazole (Geer and Klega, 2025).

In Owerri, studies on vulvovaginal candidiasis infections among girls at a clinical setting are been reported (Nwachukwu *et al.,* 2020; Dike-Ndudim *et al.,* 2021) whereas a study; Emedoh *et al.,* 2025 investigated sexually transmitted and reproductive tract infections using molecular diagnostic methods. This study addressed age specific prevalence, hospital - based information and examine both vaginal candidiasis and trichomoniasis simultaneously among the same study population. This study aims at examining the incidence of vaginal candidiasis and trichomoniasis among young girls attending a selected hospital in Owerri.

Methods

Study Settings

This study was conducted at the Microbiology Laboratory at Imo State University, Imo state, Nigeria.

Study Design and Population

This study adopted a cross-sectional study involving young and adult women of reproductive age (16 -30 years) who presented with genital complaints at three private hospitals in Owerri municipal, Imo State between February and April 2025. Inclusion criteria were between age 16 - 30 years, with clinical manifestation of vaginal discomfort, and not pregnant. Participants were excluded pregnant women, currently taking antibiotics drugs, diabetic, menstruating at the time of sample collection or outside the specified age range. The participants were educated on the causes and preventive measures of vaginal infections, as well as benefits and procedure of the study. They were also provided with information on common gynecological disorders that may affect women of reproductive age including abortion-related complications and pelvic inflammatory disease (PID). This Health education with the assistance of medical laboratory scientists in the laboratory department. participants were recruited from the women who signed consent form and waited for the specimen to be collected. Data were obtained through pretested structured questionnaire was used to get information on age, marital status, occupation and education status.

Sample Collection

A total of one hundred and fifty (150) high vaginal swab (HVS) samples were obtained from female patients attending the laboratory units of three private hospitals. The specimens were collected by a qualified medical laboratory scientist by inserting a sterile speculum was gently inserted into the vagina after which a sterile and cotton wool swab introduced and rotated on the vaginal wall to obtain vaginal discharge. Following collection, each specimen was appropriately properly packaged, labelled and transported immediately to medical microbiology laboratory of Imo State University for cultural and microbiological analysis.

Microscopic Examination of Specimen

Ten percent (10%) Potassium hydroxide (KOH) wet mounts were prepared from each high vaginal swab specimen swab and examined under a microscope using the 40× objective lens. The examination was carried out to detect the presence of pseudo-hyphae and/or budding yeast cells inductive of possible Candida (Berkow *et al.,* 2001).

Culture

Each High Vaginal Swab (HVs) specimen was inoculated onto Sabouraud Dextrose agar (SDA) using a sterile wire loop. As described by Cheesbrough, 2011, the inoculated plates were streaked to obtain discrete colonies and incubate aerobically at 37ºC for 72 hours. Yeast cells were identified using characteristic colonial morphology of Candida on SDA, and Germ-tube test, as described by Berkow *et al.,* 2001.

Germ Tube Test

Germ tube test is performed to determine the presence of suspected *Candida* species in the positive cultures that is the presumptive identification of *candida albicans.* A small portion of the suspected candida colony was taken from the plate and transferred into an Eppendorf microtube containing 5mL bovine fetal serum. The suspension is incubated for approximately 30 minutes – 3hours at 37ºC. A drop of serum-yeast suspension was placed on the clean microscope slides and observed under an optical microscope for the presence or absence of germ tubes formation.

Cultural and identification of *Trichomonas vaginalis*

Specimens were examined for the presence of *trichomonas vaginalis* using direct wet microscopy. For direct microscopic examination, a drop of normal saline was placed on a clean microscope slide, and a portion of the vaginal specimen was emulsified in it. The preparation was covered with a coverslip and examined under the x10 and x40 objective for the presence of actively motile *trichomonas vaginalis* trophozoites.

Ethical Clearance and Informed Consent

With a letter of introduction was obtained from the Department of Microbiology of Imo state University, formal consent was sought and obtained from the ethical approval committee of various private hospitals, Owerri to use the hospital. Ethical approval and institutional authorization were obtained before commencement of data collection. Informed consent was obtained from all eligible participants before their inclusion in the study. Participants were assured of the confidentiality and anonymity of the information provided. All data were organized and analyzed using Microsoft excel.

RESULT

The socio-demographic characteristics of the study sample are presented in Table 1. Most of the women were aged between 20 and 29 years, with mostly with secondary and tertiary education. More than 50% were unemployed.

Table 1: Socio-demographic Characteristics of the Reproductive age women

Variables	Number of participants
Age (years)	
16 – 20	51(34)
21 – 25	44(29.3)
25 – 30	55(36.6)

Marital Status	
Single	70 (46.7)
Married	80 (53.3)
Educational level	
Illiterate	21(14)
Primary level	31(20.6)
Secondary level	45(30)
University level	53(35.3)
Occupation	
Not employed	76(50.6)
Employed	74(49.3)

Overall, the prevalence of the vaginal candidiasis and trichomoniasis among the young women in selected private hospitals showed that Vulvovaginal candidiasis had prevalence of 58.1% followed by the 41.9% of trichomoniasis as seen in Table 2.

Table 2: Overall, The Prevalence of the Vulvovaginal Candidiasis and Trichomoniasis among the Reproductive age women in Selected Private Hospitals

Indicator	Positive (n*)	Prevalence (%)	Negative (n*)	Prevalence (%)
Trichomoniasis	60	41.9	90	57.3
Vulvovaginal candidiasis	83	58.1	67	42.6
Total	143		157	

The age specific prevalence of vulvovaginal candidiasis is presented in the table 3. The 20 – 25-year age group recorded the highest prevalence (63.6.5%), followed by the 26 – 30 age group (30.9%). The 16 – 19-year age group had the lowest prevalence 27.4 %.

Table 3: Age-Specific Prevalence of Vulvovaginal Candidiasis among Women of reproductive age

Age (years)	Total examined	vulvovaginal candidiasis positive	Prevalence of candidiasis positive (%)
16 – 20	51	14	27.4
21 – 25	44	28	63.6
26 – 30	55	17	30.9
Total	150	59	39.3

The age specific prevalence of trichomoniasis is presented in the table 4. The 20 – 25-year age group recorded the highest prevalence (29.5.3%), followed by the 26 – 30 age group (20%). The 16 – 19-year age group had the lowest prevalence 5.8 %.

Table 4: Age-Specific Prevalence of Trichomoniasis among Women of reproductive age

Age (Years)	Total Examined	Trichomoniasis Positive	Prevalence Of Trichomoniasis Positive (%)
16 – 20	51	3	5.8
21 – 25	44	13	29.5
26 – 30	55	11	20
Total	150	27	18

Age-specific prevalence of co-infection with vulvovaginal candidiasis and trichomonasis as seen in table 5. The 20 – 25-year age group record the highest co-infection prevalence of 93.3%, followed by the 26 – 30 year age group with 50.9% and 16 – 19-year age group recorded the lowest prevalence of 33.3%.

Table 5: Co-Infection Age-Specific Prevalence of vulvovaginal candidiasis and Trichomoniasis among Women of reproductive age

Age (Years)	Total Examined	Combined vulvovaginal candidiasis and Trichomoniasis Positive	Co-infection Prevalence (%)
16 – 20	51	17	33.3
21 – 25	44	41	93.3
26 – 30	55	28	50.9
Total	150	86	57.3

DISCUSSION

This study aimed to determine the co-infection prevalence for vulvovaginal candidiasis and trichomoniasis among women of reproductive age with genital infections at three selected private hospitals in Owerri, Imo State. For the development of targeted intervention, it worthy to note that, majority of the participants were young woman (16 and 30 years), had attained only primary education and having no employment and had first sexual intercourse before 20 years of age. These sociodemographic characteristics may increase their vulnerability to sexually transmitted infections (STIs) including HIV.

The socio-demographic characteristics of the study participants were presented in Table 1. Most of the women were aged between 20-29 years, and the majority had secondary and tertiary education. More than 50% of the participant were unemployed. Candida-positive cultures were observed predominantly among women aged 20 –30 years. Demographic factors may interact with behavioral factors to determine risk of *T. vaginalis* infection. Similarly, Ramjee *et al.,* (2015) reported that older age, low socio-economic are predictors of trichomoniasis among African women. Other factors including, the use of hormonal contraceptives, visiting bars and being HIV positive has also been identified as potential risk factor for *T. vaginalis* infection (De Waaij *et al.,* 2017).

A total of 60 woman (40%) tested positive for trichomoniasis, with vulvovaginal candidiasis being the most frequently reported among those positive results. Similarly, 83 woman (55%) tested positive for vulvovaginal candidiasis. This finding is contract to Oparaugo *et al.,* 2022 reported 1 (0.5%) participant had trichomoniasis and bacterial vaginosis. The age-specific prevalence of vulvovaginal candidiasis and trichomoniasis among young girls is presented in Table 3. The findings indicate that the 20 - 25-year age group recorded highest prevalence of vulvovaginal candidiasis (63.6%). This finding agreed with, Nwachukwu, *et al.,* 2020 had record the highest prevalence at 29.17%. Oparaugo *et al.,* 2022 reported women 21 – 25-year age group had the highest frequency (57.1%) from Lagos state. Idowu *et al.,* (2022) revealed that age group from 26 -30 had highest prevalence of 45.0% in Oyo state. In contrast, Dike Ndudim e *et al.,* (2021) reported 20 – 30 age group had highest frequency 33.3% in Owerri. This relatively high prevalence of vaginal candidiasis among women in this study may be due to a combination of habits such as poor personal hygiene, high sexual activities, the use of contraceptives, and High antibiotic abuse (Dike-ndudim *et al.,* 2021).

In this study, Age specific prevalence of trichomoniasis was reported, it showed that this high prevalence for trichomoniasis within 20 - 25% at 29.5%. The prevalence of *T. vaginalis* (44 positive cases) is consistent with findings reported by Oparaugo *et al.,* 2022 from Lagos. The prevalence of trichomoniasis has been reported in Idakwo *et al.,* 2022 (Kogi state) and Okonko *et al.,* 2012 (Oyo state). Trichomoniasis had high prevalence from ages of 20 – 25 year which was agreement with Idakwo *et al.,* 2022 which reported a high prevalence in age groups of 21 – 30 years. In contrast to this finding Oparaugo *et al.,* 2022 reported its high prevalence within the age group of 31 – 35 years and Tine *et al.,* 2019 reported that its age group is 31 – 45 years are at higher risk of *T. vaginalis* infection. *T. vaginalis* is transmitted by sexual contact and its habitat is the human genital and urinary tract. Due to being a classic Sexually Transmitted Disease (STD), one would assume that women with risk factors for STDs would have a higher prevalence of *T. vaginalis*. Higher numbers of lifetime sexual partners, for example, is a known risk factor for STDs.

Co-infection prevalence of vulvovaginal candidiasis and trichomoniasis among women of reproduction age. In this study, the 20 -25-year age group recorded highest prevalence of co-infection for vulvovaginal candidiasis and 41(63.6%), followed by 26 – 30-year age group at 28(50.9%) and 16 – 19-year age is the least with 17(33.3%).

Conclusion

This study has provided information on the comparative prevalence on Vulvovaginal candidiasis and Trichomoniasis, age-specific prevalence. It is therefore important to invest in intensive health education which includes abstinence from sex and community awareness programme on sexually transmitted infections including trichomoniasis in these areas. The highest prevalence of candida infection was among respondents age 20-30 years. *C. albicans* was the commonest pattern of species in the area. The findings also revealed the that majority of the respondents without symptoms of vaginal discharge tested positive for candida infection.

Recommendation

The prevalence of vaginal candidiasis among women has been a fast growing and serious burden in our environment which can result in a lot of future health challenges. Emergence of *C. albicans* and non-albicans species among clinical specimens are crucial concern in medical mycology. For better management of fungal infections like vaginal candidiasis this study thus recommend that medical practitioners through their various channels of engagement such as workshop and

conferences should emphasis on laboratory diagnosis of Candida infection for precise identification of fungal isolates prior to commencement of treatment. Also, health education and awareness for routine screening are highly recommended for women of reproductive age to aid early Candida diagnosis and treatment.

Targeting prevention efforts to decrease the ongoing sexual transmission of *T. vaginalis* infection may require increased screening efforts. Because most women were asymptomatic, enhanced screening efforts could lead to increased awareness about this infection and to treatment and reduction of transmission.

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