

Prevalence of Vulvo-Vaginitis and Socio-Demographic Factors Among Women of Reproductive Age in Port Harcourt

Roseanne Adah Ikpeama¹, Clement Ugochukwu Nyenke¹, Chibuike Ohanu¹, Bridget Tamunonengiyeofori Walson¹, Evelyn Orevaoghene Onosakponome^{1*} 

¹Department of Medical Laboratory Science, PAMO University of Medical Sciences, Port Harcourt, Nigeria

How to cite:

Ikpeama et al. 2023. "Prevalence of Vulvo-Vaginitis and Socio-Demographic Factors Among Women of Reproductive Age in Port Harcourt". *Current Research in Interdisciplinary Studies* 2(5): 11 – 22. <https://doi.org/10.58614/cris252>

Received:

April 18, 2023

Accepted:

May 9, 2023

Published:

May 16, 2023

Corresponding author:

Onosakponome Evelyn

Orevaoghene

eonosakponome@pums.edu.ng

Abstract:

Background: Vaginal candidiasis is a fungal or yeast infection of the vagina. It is a common gynecological ailment affecting most women at a point in their life time. Candida infection of the genital tract is one of the common sexually transmitted diseases and the most singular cause of vaginal discharge.

Aim: The goal of this study is to determine the prevalence and association of vulvo-vaginitis and socio-demographic factors among women of reproductive age in Port Harcourt.

Methodology: The cross-sectional study had 450 randomly selected women of reproductive age attending Rivers State University Teaching Hospital. The participants were grouped into four; Out Patients, Pregnant women, HIV positive women and Healthy volunteers. Out of the 450 urine samples collected, 150 were collected from out patients, 100 were collected from pregnant women, 100 were collected from HIV positive women and 100 were collected from students (healthy volunteers). Out of 200 HVS samples collected, 50 samples were collected from each group. Via a well-structured questionnaire, data regarding socio-demographic factors (age, education, occupation and marital status) of candida infection were obtained. Urine samples were tested macroscopically, both urine and HVS were tested microscopically and by culturing.

Results: The results showed that there was no association ($p>0.05$) between candidiasis and age among women attending RSUTH. Similarly, there was no association ($p>0.05$) between candidiasis and other socio-demographic factors such as education status, employment status and marital status among the women attending RSUTH.

Conclusion: This study has revealed that age, educational status, employment status and marital status socio-demographic factors do not have any association with the spread of candidiasis among women living in Port Harcourt.

Keywords: candidiasis, infection, prevalence, vagina.

1. Introduction

Vaginal candidiasis is the medical term for a fungal or yeast infection of the vagina. Most women will at some point in their life face this common gynaecological ailment.

Genital tract candida infection is one of the most prevalent STDs and the sole known reason for vaginal discharge. 75% of all women have an episode of vaginal infection at some point in their lifetime [1]. Vaginal candidiasis is brought on by the most common species of *Candida albicans*, an adaptable pathogen that affects the genital system [2]. *Candida albicans*, a dimorphic yeast-like fungus, is widely found in the upper respiratory tract, skin, and female genital organ of healthy humans. Vaginal candidiasis, a common type of vaginitis, results in a white, curdy discharge with no odour in the female lower reproductive tract. It transforms into an opportunistic pathogen in patients with compromised immune systems as well as in some healthy individuals. However, in some cases, it could spread, weakening the immune system. The infection manifests as vulva pruritus, vulva irritation and pain, vaginal swelling with discharges, and dysuria. The illness is more common and severe in women with weakened immune systems during pregnancy because pregnancy is one of the factors that contribute to lowered immunity. Pregnancy-related anatomical, physiological, and immunological changes might alter a person's immune system's response to illnesses and increase susceptibility to infection. During pregnancy, levels of progesterone and oestrogen grow, especially in the third trimester [3]. Progesterone inhibits the anticandida activity of neutrophils, but oestrogen reduces the ability of vaginal epithelial cells to stop *Candida albicans* from growing on them.

Candidiasis frequently occurs during a healthy pregnancy without seriously endangering the foetus. Nevertheless, this infection may negatively affect pregnancy and, if left untreated, can lead to more miscarriages, neonatal congenital disorders, and pelvic inflammatory diseases that may reduce fertility in non-pregnant women. Glycogen levels in the vagina rise as a result of the opportunistic infection *Candida albicans*. Diabetes and the use of broad-spectrum antibiotics are other factors that are connected to *Candida albicans* and vaginitis. *Candida albicans* is the causative agent of around 80% of all nosocomial fungal infections [4].

Education has an effect on the occurrence of vulvovaginal candidiasis in connection to the prevalence of *Candida albicans*, claim Bitew and Abebaw [5]. Higher educated patients experienced less of an impact than uneducated ladies. According to Bitew and Abebaw's study [5], the prevalence of vulvovaginal candidiasis changed according to marital status. Divorced participants in the study were more likely to have vulvovaginal candidiasis (52.6%) than either non-married (41.5%) or married (37.4%) participants.

According to Uzoh et al.'s research [6], the prevalence of *Candida albicans* was highest in the age range of 20-29 years (38.5%) and lowest in the age group of 40-49 years. The study's overall prevalence of candidiasis was lowest in women over 36. According to Okonkwo and Umeanaeto [7], vulvo-vaginal candidiasis was uncommon in older pregnant women. They may not be able to have children, and as they age, menopause (the cessation of menstruation) occurs. Additionally, only a small proportion of women in this age range have the ability to get pregnant. Some research studies have identified the age range of 25 to 35 as having the highest frequency due to their propensity to be the most sexually active age group, which further supports the hypothesis that sexual activity may significantly contribute to the transmission of the disease [8]. Incidence of vaginal candidiasis was positively linked with profession, according to a study by [9].

This study aims to determine the sociodemographic traits of reproductive-age women in Port Harcourt as well as the prevalence of vulvo-vaginitis.

A fungal or yeast infection of the vagina is called vaginal candidiasis. It is a common gynaecological condition that most women will experience at some point in their lives. One of the most frequent STDs and the one and only known cause of vaginal discharge is genital tract candida infection. In their lifetime, 75% of all women experience a vaginal infection episode [1]. The most prevalent *Candida albicans* species, which affects the genital system as an adaptive pathogen, is the cause of vaginal candidiasis [2]. A dimorphic yeast-like fungus called *Candida albicans* is frequently found in the female coital organ, upper respiratory system, and skin of healthy humans. A frequent variety of vaginitis called vaginal candidiasis causes a white, curdy discharge in the female lower reproductive tract that has no odour. For patients with weakened immune systems or even for some healthy people, it develops into an opportunistic pathogen. But under some circumstances, it may proliferate, weakening one's immune system. Vulva pruritus, vulva irritation and pain, vaginal swelling with discharges, and dysuria are symptoms of the infection. Pregnancy is one of the elements that contribute to a reduced immunity, making the condition more prevalent and severe in women with compromised immune systems. Specific anatomical, physiological, and immunological changes brought on by pregnancy can make a person more susceptible to infection and modify their immune system's response to illnesses. Progesterone and oestrogen levels rise throughout pregnancy, particularly in the third trimester [3]. Neutrophil anticandida activity is inhibited by progesterone, whilst oestrogen decreases the ability of vaginal epithelial cells to prevent the growth of *Candida albicans* on them.

Candidiasis is typically present during a healthy pregnancy without posing a serious threat to the foetus. However, this infection may have a deleterious impact on pregnancy and, if ignored, can result in more abortions, neonatal congenital illnesses, and pelvic inflammatory diseases that might impair fertility in non-pregnant women. The opportunistic infection *Candida albicans* increases the amount of glycogen in the vagina. Additionally linked to *Candida albicans* and vaginitis include diabetes and use of broad-spectrum antibiotics. Nearly 80% of all nosocomial fungal infections are caused by *Candida albicans* [4].

According to Bitew and Abebaw [5], education has an impact on the incidence of vulvovaginal candidiasis in relation to the prevalence of *Candida albicans*. Patients with higher education levels were less impacted than illiterate women. The study by Bitew and Abebaw [5] found that vulvovaginal candidiasis prevalence varied depending on marital status. Study participants who were divorced had a higher frequency of vulvovaginal candidiasis (52.6%) than those who were not married (41.5%) or who were married (37.4%).

The age group of 20-29 years had the highest prevalence of *Candida albicans* (38.5%) and the age group of 40-49 years had the lowest prevalence, according to the research of Uzoh et al. [6]. Women over 36 had the lowest overall prevalence of candidiasis in this study. There weren't many older pregnant women with vulvo-vaginal candidiasis, according to Okonkwo and Umeanaeto [7]. Therefore, it may be because they are past the childbearing age and experience menopause (the stop of menstruation) as they age.

In addition, only a small percentage of women in this age range are able to become pregnant. Some research studies have identified the age range of 25 to 35 as having the highest frequency due to their propensity to be the most sexually active age group, which further supports the hypothesis that sexual activity may significantly contribute to the transmission of the disease [8]. Incidence of vaginal candidiasis was positively linked with profession, according to a study by [9].

This study seeks to ascertain the sociodemographic characteristics of women in Port Harcourt who are of reproductive age as well as the prevalence of vulvo-vaginitis.

2. Materials And Methods

Area of Study

The study was carried out at the Rivers State University Teaching Hospital in Port-Harcourt, the capital of Rivers State in Nigeria. Nigeria's Port-Harcourt is the fifth most populous city there. The Rivers State Teaching Hospital (RSUTH), which is located at 5-8 Harley Street in Old GRA, Port Harcourt, Rivers State, Nigeria, receives a lot of patients from Port Harcourt's other institutions.

Study design

450 women between the ages of 15 and 55 participated in the study between January 2022 and June 2022. The four study groups included healthy volunteers, pregnant women, women with HIV, and outpatients. 150 outpatients, 100 pregnant women at the RSUTH prenatal clinic, 100 HIV-positive women at the RSUTH HIV clinic, and 100 students (healthy volunteers) at the PAMO University of Medical Sciences were among the 450 individuals whose urine was sampled. In total, 200 HVS samples—50 samples from each group—were collected from the various groups.

Participants were required to complete a detailed questionnaire about their personal traits.

Determination of Sample Size

Ethical Approva

The Rivers State University Teaching Hospital (RSUTH) Ethics Committees gave the approval for the conduct of the study. Participants provided written consent to take part in the study.

Eligibility Criteria

Inclusion criteria

Participants who gave their consent to enroll in the study; age groups within 15-55 years and women registered and attending River State University Teaching Hospital (RSUTH).

Exclusion criteria

All those who refused giving consent; all those who gave consent but were not eligible based on being below the age of 15 or above 55 years. Secondly, participants who were not registered with RSUTH were excluded from participating in the study.

Urine sample collection

A Sterile universal container was given to each patient, and they were asked to bring a clean-voided, midstream urine sample which they produced the next morning [10].

Collection of high vaginal swab

After participants received a full description of the sample procedure, high vaginal swabs (HVS) were taken from them. The samples were marked with randomly generated study participant IDs. Each study participant received a sterile swab stick and was told to recline in a lithotomic position to expose the vaginal walls. The fluid was then absorbed by gently spinning the swab stick around the posterior fornix after it had been inserted into the vagina.

Laboratory assay of *Candida albicans*

Sample analysis

Urinalysis and microscopy

Macroscopy

Urine samples were examined macroscopically for; colour; if it is amber or straw-like or pale amber; appearance; if it is turbid or clear or cloudy; abnormal constituent; such as presence of blood; urine biochemical dip strips were dipped into each urine and observed for changes in colour and matched as appropriate.

Microscopy

Each participant's 5ml of urine was measured into a small centrifuge tube and spun using a bucket centrifuge at 3,000 rpm for 5 minutes. The supernatant was then decanted, and the sediments were placed on clean, grease-free microscopic slides and properly covered with a cover slip before being examined under a light microscope at x10 and x40.

Participants' samples from swab sticks were examined under a light microscope at x10 and x40 after being emulsified on a clean, grease-free microscope slide and cover slip.

Culture of Specimens

Culture of Urine and HVS

Yeast and fungus species were isolated and grown on Sabouraud dextrose agar (SDA). In order to promote fungus growth, the pH was around 5.6.

Various petri-dishes containing sabouraud dextrose agar were used to inoculate urine and HVS specimens. The petri-dishes were incubated at 37 °C for 48 hours, after which the culture plate was examined for growth of candida species on Sabouraud

dextrose agar. Sterile wire loops were used to inoculate the urine and HVS specimens [11].

Germ Tube Test

Short, non-septate hyphal outgrowths known as germ tubes are capable of producing new spores. They are about three to four times the original cell's length and half its width. At the place where it connects to the yeast cell, the germ tube develops a brief lateral expansion (septum) or any constriction along the tube. The germ tube test can be used to swiftly and accurately identify *Candida albicans*, which makes up around 90% of the yeast recovered from clinical samples. A tiny portion of an isolated yeast colony was scraped off a growth plate, suspended in 0.5 ml of human serum, and cultured at 37 °C for two to three hours. Germ tubes were found in the yeast suspension that had been placed on a clean, grease-free microscope glass slide and covered with a clean cover slip during light microscopy examinations at magnifications of x10 and x40. Within three hours, only *Candida albicans* developed germination tubes.

Gram Staining

Gramme staining was used to identify yeast cells.

A colony from a culture plate was emulsified in regular saline before being allowed to air dry and being smeared onto a spotless, grease-free microscopic glass slide. After being transported to the staining rack, the slide was submerged in crystal violet for a minute. It was carefully rinsed off the extra stain. The mordant, lugol's iodine, was then flooded onto the slide for a full minute. Gram-positive yeast cells were revealed to be oval in shape and purple in colour under the microscope.

Quality Assurance

Positive and negative controls were added to ensure accuracy.

Statistical Analysis

The surveys' accuracy and thoroughness were examined. SPSS, a statistical programme created especially for social scientists, was used to assess the data. A percentage was used to represent prevalence. Using Pearson's chi-square test, the relationship between study variables and demographic factors was examined. A p value with a 95% confidence interval of less than 0.05 was considered statistically significant.

3. Results

Figure 1. Age related prevalence of Candidiasis among study groups (Urine)

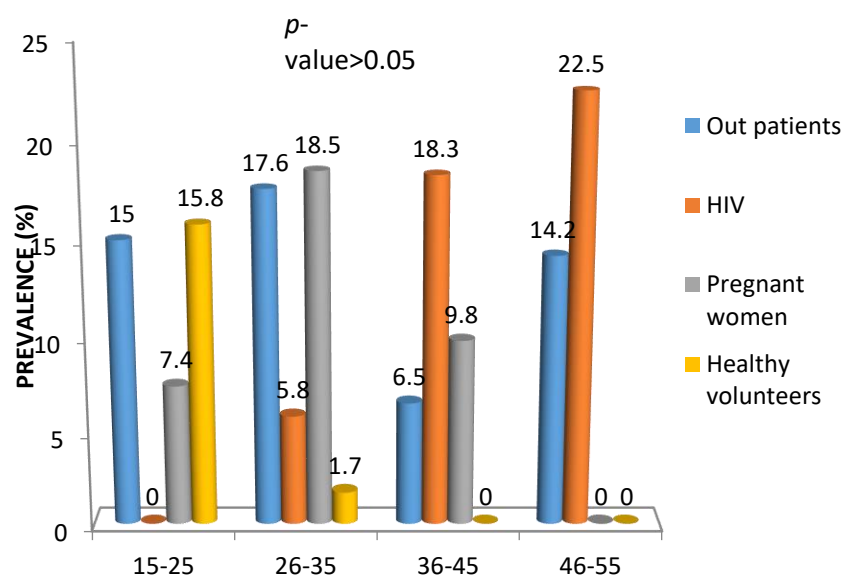


Figure 1 shows prevalence of vulvo-vaginal candidiasis among the study groups based on age in urine. There was no significant association ($p\text{-value} > 0.05$) between age and vulvo-vaginal candidiasis among the women.

Figure 2. Age related prevalence of Candidiasis among study populations (High vaginal swab)

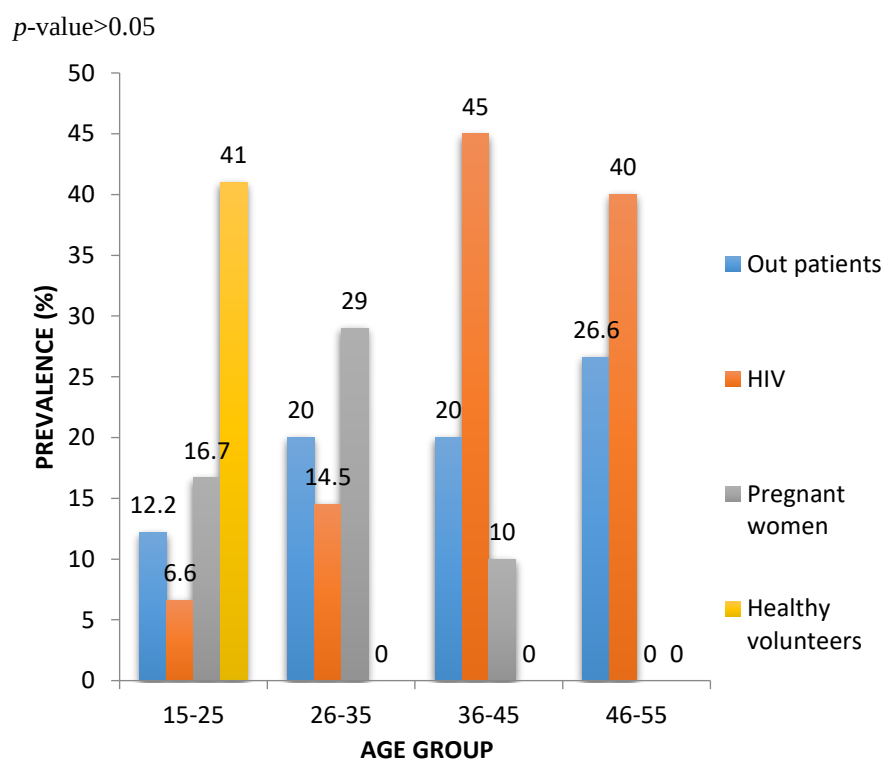


Figure 2 shows prevalence of vulvo-vaginal candidiasis among the study groups based on age in HVS. There was no significant association ($p\text{-value}>0.05$) between age and vulvo-vaginal candidiasis among the women.

Figure 3. Prevalence of Candidiasis based on occupational status of study subgroups (Urine)

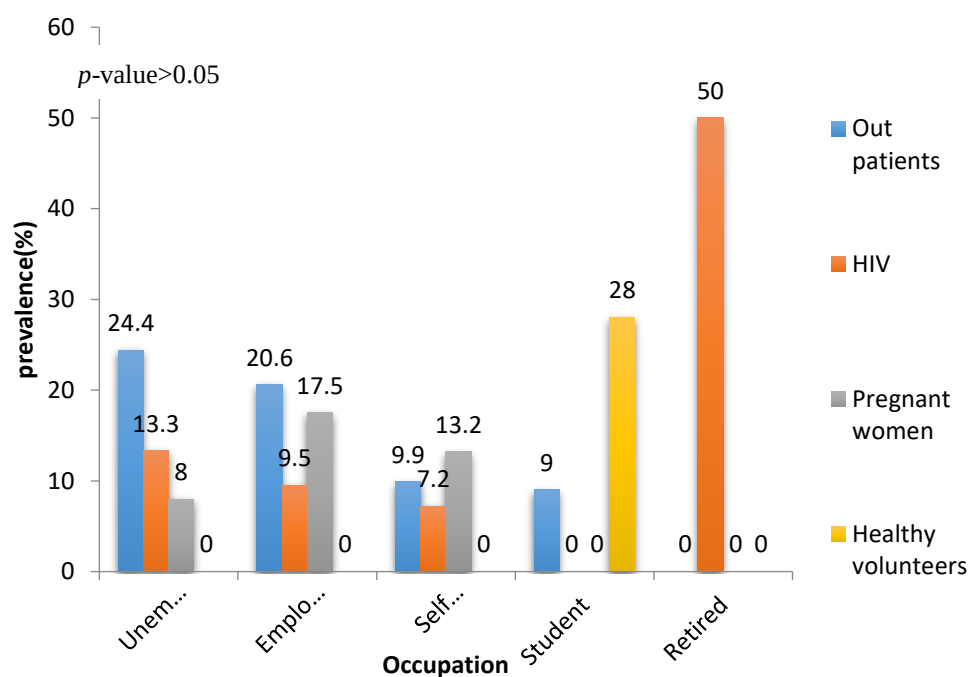


Figure 3 shows prevalence of vulvo-vaginal candidiasis among the study groups based on employment status in urine. There was no significant association ($p\text{-value}>0.05$) between occupation and vulvo-vaginal candidiasis among the women.

Figure 4. Prevalence of Candidiasis based on occupational status of study subgroups (High vaginal swab)

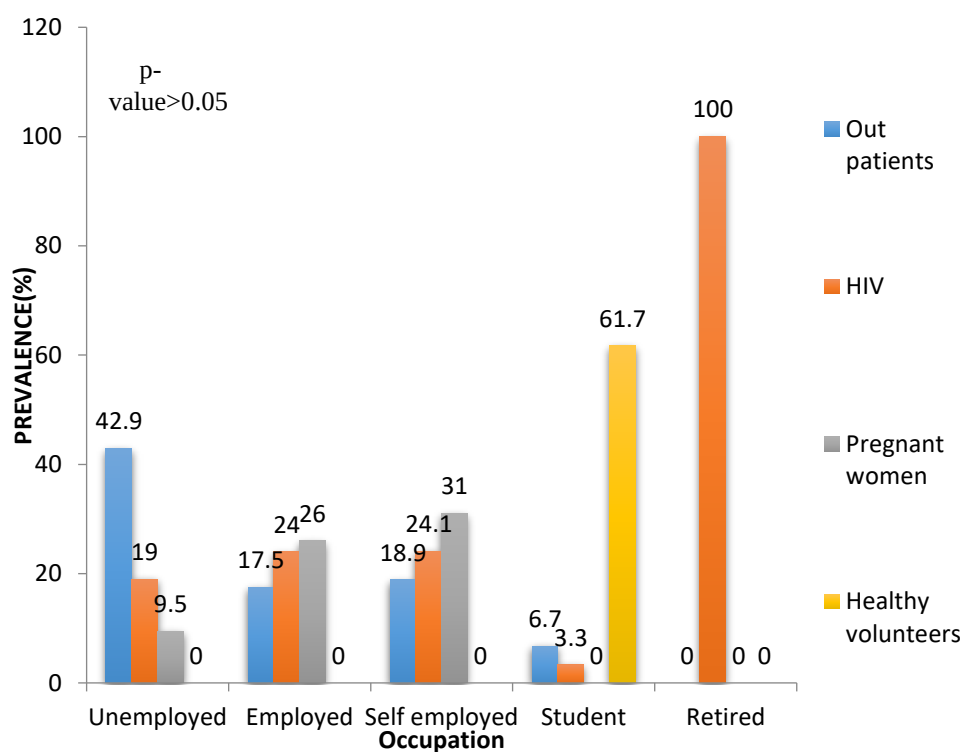


Figure 4 shows prevalence of vulvo-vaginal candidiasis among the study groups based on employment status in HVS. There was no significant association (p -value >0.05) between occupation and vulvo-vaginal candidiasis among the women.

Table 1. Prevalence of candidiasis based on marital status of studied groups

Factors	N.E		N.P(%)							
			O.P		HIV		PTW		HVC	
	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS
Marital status										
Single	202	89	35(17)	18(20)	7(3.5)	10(11)	0(0)	0(0)	34(16)	37(41)
Married	248	111	28(11)	16(14)	25(10)	28(25)	46(18)	35(31)	0(0)	0(0)
Overall	450	200	63(14)	34(17)	32(7)	38(19)	46(10)	35(17)	34(7)	37(18)

NE= Number examined NP= Number positive OP= out patients HIV = Hiv patients PTW = pregnant women HVC= Healthy volunteer HVS= high vaginal swab Urine $\chi^2 = 0.247$ $p > 0.05$ HVS $\chi^2 = 0.085$ $p > 0.05$

Table 2 shows prevalence of vulvo-vaginal candidiasis among the study groups based on educational status. There was no significant association (p -value >0.05) between occupation and vulvo-vaginal candidiasis among the women.

Table 2. Prevalence of Candidiasis based on Level of Education of studied groups

Factors	N.E		N.P(%)							
			O.P		HIV		PTW		HVC	
	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS	Urine	HVS
Edu status										
Secondary	68	25	8(11)	6(24)	7(10)	10(40)	6(8)	5(20)	0(0)	0(0)
Tertiary	382	175	55(14)	28(16)	25(6)	28(16)	40(10)	30(17)	34(8)	37(21)
Overall	450	200	63(14)	34(17)	32(7)	38(19)	46(10)	35(17)	34(7)	37(18)

NE= Number examined NP= Number positive OP= out patients HIV = Hiv patients PTW = pregnant women HVC= Healthy volunteer HVS= high vagina swab Urine $\chi^2 = 2.161$ $p > 0.05$ HVS $\chi^2 = 2.041$ $p > 0.05$

4. Discussion

This study used urine and HVS to determine the prevalence, which was highest in women between the ages of 15 and 25 and 26 to 35 and lowest in those between the ages of 36 and 55. This is in line with the findings of Sampson and George (2021), who discovered that individuals approaching menopause (36 years and older) had the lowest incidence of *Candida albicans* and those in childbearing age had the highest prevalence, which they linked to increasing sexual activity. However, it's possible that a person with oral candidiasis could spread sexually transmitted yeast during oral sex, or that trauma could make it easier for yeast to invade the vaginal mucosa. Age groups 20 to 29 years old had the highest prevalence of *Candida albicans* (38.5%), while 40 to 49 years old had the lowest frequency; these results are comparable with those of a study by Uzoh et al., [6]. The lowest incidence of candidiasis was found in women above the age of 36 in this study. According to studies by Okonkwo and Umeanaeto [7], vulvo-vaginal candidiasis is infrequent in expectant women of advanced maternal age. Since women gradually approach menopause (the cessation of menstruation) as they age, it is probable that they are past the prime of their lives to have children. In their 40s, they might also be less sexually active. This finding supports the hypothesis that sexual activity plays a substantial role in the transmission of the disease [8] since individuals between the ages of 25 and 35 are often those who engage in sexual activity at the highest rates. Age has no bearing on the amount of *Candida* overgrowth.

In employed individuals in the out-patient group, the prevalence was (20.6%) and (17.5%) for urine and HVS respectively, for HIV patients the prevalence was (9.5%) and (24%) respectively for urine and HVS and for pregnant women the prevalence was (17.5) and (26%) for urine and HVS respectively. Participants of the retired category had the lowest prevalence of candidiasis in this study. There was no connection between occupation and vulvo-vaginal candidiasis. This could be as a result of minimal exposure to environments capable of causing candidiasis. This

outcome is in agreement with the work of Namkinga et al. [9], following that during active service, there are high chances of exposure to environments and conditions that can cause candidiasis.

This study also showed the prevalence of candidiasis among single and married individuals. Among the singles were the healthy volunteers which showed a prevalence of (16.8%) and (41.6%) in urine and HVS respectively. This could be attributed to excessive anti-biotic intake, excessive sugar intake, increased sexual activity and use of air tight underwear. The married category had a higher prevalence (25.2% in HVS) in HIV positive women and pregnant women (31.5% in HVS). HIV positive individuals are susceptible to opportunistic infections such as candidiasis because of their immunocompromised system. Pregnant women become immunocompromised when they become pregnant and also the increased oestrogen content in the acidity of the vagina due to rich glycogen content of the vaginal mucosa. This provides supply of utilizable sugar that favors the growth of *Candida albicans* during pregnancy. According to the work of Bitew and Abebaw [5] corresponds with this outcome. There was no association between marital status and prevalence of candidiasis in this study.

5. Conclusion

This study has demonstrated that age, employment status, educational status and marital status do not have any link with the prevalence of candidiasis among women in Port Harcourt.

References

- [1] Ezeigbo O.R, F.C. Anolue & I.A. Nnadozie. (2015). Vaginal candidiasis infection among pregnant women. British Journal of Medicine & Medical research 9(3); 1-6,2015.
- [2] Hofs, S., Mogavero, S., & Hube, B. (2016). Interaction of *Candida albicans* with host cells; virulence factors, host defence, escape strategies and the microbiota. Journal of microbiology, 54(3), 149-169.
- [3] Soma-Pillay, P., Nelson-Piercy, C., Tolppanen, H., Mebazaa, A. (2016). Physiological changes in pregnancy. Cardiovasc J Afr. 2016 Mar-Apr;27(2):89-94. doi: 10.5830/CVJA-2016-021.
- [4] Negri, M., Silva, S., Henriques, M., & Oliveira, R. (2012). Insights into *Candida tropicalis* nosocomial infections and virulence factors. European journal of clinical microbiology & infectious diseases, 31(7), 139-161.
- [5] Bitew, A., & Abebaw, Y. (2018). Vulvovaginal candidiasis: species distribution of *Candida* and their antifungal susceptibility pattern. BMC Womens Health. 2018 Jun 15;18(1):94. doi: 10.1186/s12905-018-0607-z.
- [6] Uzoh, C. V., Iheukwumere, I. H., Umezurike, K. C., & Onyewenjo, S. C. (2017). Prevalence of *Candida albicans* among women attending federal medical centre Asaba, Delta State, Nigeria. International Journal of Biochemistry and Biotechnology, 6(1), 735-739.
- [7] Okonkwo, N. J., & Umeanaeto, P. U. (2010). Prevalence of vaginal candidiasis among pregnant women in Nnewi Town of Anambra State, Nigeria. African research review, 4(4).
- [8] Ononge, S.O., Jumbo, G. T. A., Egah, D. Z., Banwat, E. B., & Akaa, P. D. (2010). Symptomatic vulvovaginal candidiasis and genital colonization by *Candida* species in Nigeria. J Public Health Epidermol, 2(6), 147-151.

- [9] Namkinga, L. A., Matee, M. I. N., Kivaisi A. K., and Moshiro, C. (2005). Prevalence And Risk Factors For Vaginal Candidiasis Among Women Seeking Primary Care For Genital Infections In Dar Es Salaam, Tanzania. *East African Medical Journal* Vol. 82 No. 3.
- [10] Onosakponome, E. O., Ezeanyagu, O. C., Ejinaka, O. R., Obeta, M. U. and Agbalaka, P. I. (2022). Impact of Water Sources on Schistosomiasis Transmission and Urine Indicators. *African Journal of Health Sciences*, 35(6), 697-704
- [11] Onosakponome E. O., Adedokun, A. A. and Dick, A. A. (2020). Monitoring the Presence of Bacteria, Fungi and Parasitic Pathogens Associated with Swimming Pools in Port Harcourt Metropolis. *South Asian Journal of Research in Microbiology*, 7(4), 31-38.