Vulva candidiasis among HIV patients and Healthy female volunteers in Port Harcourt

ABSTRACT

Vulvo-rectal The most prevalent species of candida, Candida albicans, is the cause of candidiasis, a fungal infection of the vagina that affects the genital system as an adaptive and opportunistic pathogen.

This study examined the prevalence and risk factors of vulvo-vaginal candidiasis among HIV positive women and healthy volunteers in Port Harcourt. A total of 200 urine and HVS samples, 100 from each of the two groups, were collected. The samples were examined using culture, microscopy, and the germ tube identification method. The overall prevalence of Vulvo-vaginitis in HIV and healthy volunteers using urine and HVS was (32%), (34%), and (76%) and (54%) respectively. HIV recorded a higher of (76%) compared to that of healthy volunteers with (54%). There was no statistically significant difference in the two groups' prevalence ($p>0.05$). The age group of 15–25 years old had the highest prevalence of (33%), while the age group of 40–45 had the highest prevalence of 80% for HIV. HIV-positive workers and retirees had higher rates of vulvo-vaginitis in urine samples (21% and 75%, respectively) than did healthy workers and retirees (15% and 25%, respectively). Individuals with tertiary education had the highest prevalence of (32%) and (14%) in HIV and healthy volunteers respectively. It was also reported that married individuals who are HIV positive had a higher incidence of (50%) while for healthy volunteers, single individuals recorded a higher frequency of (29%). Prevalence of vulvo-vaginal candidiasis was greater in HIV patients in Port Harcourt. To help combat fungal infections, it is proposed that antifungal medications be added to antiretroviral medications prescribed to HIV patients.

Keywords: Vulvo-vaginal Cadidiasis, *Candida albicans*, Prevalence, High vaginal swab, Urine.

INTRODUCTION

Vaginal candidiasis also known as yeast infection is a common fungal infection that affects women's vagina. Candida infection of the genital tract is one of the common sexually transmitted diseases and the most singular cause of vaginal discharge [1] Vaginal candidiasis is caused by the extra growth of candida species of which Candida albicans is the most common which affects the genital tract as an adaptable pathogen [2]. Candida albicans is a dimorphic yeast-like fungus, commonly present in the upper respiratory, alimentary tract, female coital

organ and on the skin of healthy people. Vaginal candidiasis is a common type of vaginitis, a gynecological disorder manifests with an odorless curdy white discharge (cottage cheese) in the female lower reproductive tract. It becomes an opportunistic pathogen for immune compromised patients or even some healthy persons. However, certain condition can cause it to multiply, thereby weakening one's immune system. Several factors can increase the risk of developing a vaginal yeast infection including the use of antibiotics, pregnancy, weakened immune system, diabetes, hormonal changes and use of certain medications such as corticosteroids and oral contraceptives. The infection is characterized by vulva pruritus, irritation and soreness of the vulva and swelling of the vagina with abnormal vaginal discharges and dysuria. The ailment is more common and more severe in women with weakened immune system and pregnancy is one of the factors which contribute to a lowered immunity. Candida albicans accounts for nearly 80% of nosocomial fungi infections in general [3]. Some other species of candida includes; Candida tropicalis, Candida parapsilosis, Candida krusei, Candida rugosa, Candida dubliniensis and Candida glabrata (4). Infections caused by fungi are commonly known as mycoses. Vulvovaginal candidiasis VVC is most commonly encountered by women and some of them have had repeated cases of this infection which has been referred to as reoccurrence vulvo vaginal candidiasis. The objective of this study was to determine the prevalence and risk factors of vulvovaginitis among HIV patients and healthy volunteers in Port Harcourt.

Methods

Study Area

The study was carried out at Rivers State Teaching hospital (RSUTH) located at 5-8 Harley street, Old GRA. The hospital was established in 1925. In 2018 there was an establishment of a medical college at the Rivers State University. It is located within latitude $4^0$78N and $7^0$01 E.

The hospital is a general hospital and recieves referrals from other hospitals in Port Harcourt and outside Port Harcourt.

3.2 *Sample collection and Testing*

Clean voided, midstream urine samples were collected from a total of 200 women. 100 urine samples from HIV positive females attending Rivers state teaching hospital (RSUTH) and 100 urine samples were obtained from healthy volunteers who presented with no clinical symptoms.

A total of 200 HVS samples were obtained from study participants, 100 HVS samples from each subgroup.

Microscopy of specimens

Urine samples and HVS were observed microscopically for presence of yeast cells. 5mls of urine of each partcipant were measured into a small centrifuge tube and were spun using a bucket centrifuge, the samples were spun at 3,000 rpm for 5minutes after which supernatant was decanted and sediments were placed on a clean greeze-free microscopic slides and covered properly with a cover slip and examined under the microscope at x10 and x40 of the light microscope.

Swab sticks containing participant's HVS samples were examined microscopically by emulsifying it on a clean grease-free microscopic slide and cover slip and examined it at x10 and x40 of the light microscope.

Culture of specimens

Sabouraud dextrose agar (SDA) was used for the isolation and cultivation of fungi species and yeast. The pH was approximately 5.6 in order to enhance the growth of fungi.

Urine and HVS specimens were inoculated into petri-dishes containing sabouraud media using sterile wire loops which were sterilized by using the blue flame of a bunsen burner till the tip of the wire-loop became red-hot, allowed to cool and used to inoculate urine and HVS samples into various petri-dishes containing sabouraud dextrose agar and were incubated at 37˚c for 48hours and culture plate was examined for growth of candida species on Sabourauddexrose agar.

Gram staining technique

A smear was made on a clean grease free microscopic glass- slide, slide was taken to the staining rack and flooded with crystal violet for 1 minute, excess stain was rinsed off carefully, slide was flooded with lugol's iodine which is the mordant for 1 minute, stain was rinsed off carefully, the decolourizer (acetone) was added for 30 seconds and rinsed off, slide was flooded

with the counter stain safranin for 1 minute and was carefully rinsed, slide was kept to properly air-dry and was examined using the oil immersion x100 objective lens of the microscope. A purple coloured (gram positive) oval shaped organism was observed under the microscope, indicative of yeast cells.

Germ tube test

A small portion of the yeast was inoculated into human serum in a test tube and incubated at 37˚c for 3 hours. A drop of serum- yeast suspension was then examined under the microscope using x10 and x40 objective lens.

Demographic Data collection

The data of the women were obtained from a properly filled questionnaires which were given to each of them. The questionnaire entailed questions as regards the study and participant's socio-demographics, such as (age, educational level, marital status, trimester in pregnancy, e.t.c) and clinical presentations such as (burning sensations, discharge and irritations). Patients were assigned study identification numbers which was used throughout the study. The identification numbers were generated using the initials of the group of participants and a chronological number according to how the patient's data were collected.

3.4 *Ethical consideration*

Ethical approval for the study was obtained from the ethical committees of Rivers state University Teaching Hospital (RSUTH) and also from the ethical committee of Pamo University of Medical Sciences. Written consent to participate in the study were obtained from participants.

3.5 *Statistical Analysis*

Statistical package for social sciences (SPSS) was used in analyzing the data. Statistical significance of data was determined at $p < 0.05$

Results

The overall prevalence and socio-demographics related to the prevalence in the study population are shown in Table 1. This table displays the general prevalence as well as sociodemographic factors that are associated with the prevalence in the study population. HIV tested higher (76%), out of 200 participants (100 per group), than healthy volunteers (54%), on the HVS test. In a urine test, the prevalence of HIV-positive people was 32%, while that of healthy volunteers was 34%. There was no statistically significant difference in the two groups' prevalence (P>0.05). The highest HIV prevalence was found in age groups 40–45 (80%), while the highest prevalence was found in age groups 15–25 (33%)

Regarding occupational-related prevalence, the highest prevalence of HIV-positive cases was found in retired and unemployed individuals, with rates of 75% and 52% in urine and HVS tests, respectively. Among healthy volunteers, the highest prevalence was found in unemployed individuals (57%), followed by students (36%) in the HVS test. Individuals with tertiary education had the highest prevalence of 32% and 14% in HIV-positive cases and healthy volunteers, respectively. Additionally, the study found that married individuals who are HIV-positive had a higher prevalence rate of 50%. Among healthy volunteers, it was observed that single individuals had a higher prevalence rate (29%) of HVS.

Table 1 Prevalence of vulvo candidiasis based on socio-demographic factors among the study population.

Factors/parameters	NE Urine HVS	Number positives (%)			
		HIV		Healthy volunteers	
		Urine	HVS	Urine	HVS

HIV	100	100	32(32)	76(76)		
HVC	100	100	34(34)	54(54)		
Overall	200	200	66(33)	130(65)		
Age group						
15- 25	90	90	9(10)	12(13.3)	18(15.6)	30(33)
26-35	55	55	11(20)	16(29)	9(3.6)	12(21)
36-45	40	40	7 (17.5)	36(90)	7(7.5) 7(17.5)	
46-55	15	15	5(33)	12(80)	0(0)	5(33)
Occupation						
Unemployed	21	21	6(28)	11(52)	7 (33) 12(57)	
Employed	57	57	12(21)	28(49)	9 (15) 10(17)	
Selfemployed	58	58	11(19)	28(48)	6 (27) 10(17)	
Student	60	60	0(0)	7(11)	11 (18) 22(36)	
Retired	4	4	3(75)	2(50)	1 (25) 0(0)	
Educational Status						
Primary	0	0	0(0)	0(0)	0(0)	0(0)
Secondary	25	25	7(28)	5(20)	2(8)	2(8)
Tertiary	175	175	25(14)	56(32)	32(18)	52(14)
Marital Status						
Single	89	89	7(7.8)	20(22)	15(16)	26(29)
Married	111	111	25(22)	56(50)	19(17)	28(25)

Abbreviations: NE= Number examined, HIV= immunocompromised individuals, HVC= Healthy volunteers, HVS= High vaginal swab. (P>0.05)

Table 2Shows the risk factors affecting the transmission of vulvo-candidiasis in this study.

HIV individuals who wash their vagina had a higher occurrence of (40.9%) of vulvo-vaginitis than the healthy volunteers (29%), P<0.05. Sexually active HIV positives recorded a prevalence

rate of 44.7% while the healthy volunteers had 21.8% as the prevalence but there was no statistical difference (>0.05)

Risk factors	NE	NP Urine		NP HVS		
		HVC	HIV	HVC	HIV	P
Knowledge on candida						
YES	148 (74)	20 (13.5)	13 (8.8)	39 (26.3)	48 (32)	0.793
NO	52 (26)	14 (27)	19 (36.5)	15 (28.8)	28 (53.8)	
Wash vagina with						
Water only	186 (93)	26 (14)	29 (15.6)	54 (29)	76 (40.9)	0.047
water and soap	8 (4)	5 (62.5)	2 (25)	0 (0)	0 (0)	
water and antiseptics	6 (3)	3 (50)	1 (16.6)	0 (0)	0 (0)	
Tight underwears						
Reg	19 (9.5)	4 (21)	10 (52.6)	14 (73.6)	16 (84.2)	0.031
Occ	58 (29)	12 (20.7)	22 (37)	9 (15.5)	36 (68.0)	
Rarely	123 (61.5)	18 (14.6)	0 (0)	31 (25.2)	24 (19.5)	
Sexually active						
YES	170 (85)	20 (11.8)	32 (18.8)	37 (21.8)	76 (44.7)	0.597
NO	30 (15)	14 (46.6)	0 (0)	17 (56.7)	0 (0)	
UTI screening on self						
Reg	68 (34)	6 (8.8)	7 (10.3)	15 (22.0)	14 (20.5)	0.789
Occ	46 (23)	8 (17.4)	7 (15.2)	17 (36.9)	26 (56.2)	
Rarely	86 (43)	20 (23.3)	18 (20.9)	22 (25.6)	36 (41.9)	

Abbreviations: NE= Number examined, NP= Number positive, HIV= immunocompromised individuals, HVC= Healthy volunteers, HVS= High vaginal swab

DISCUSSION

The study found that the prevalence of candidiasis in urine was 33 percent among the four subgroups, while the prevalence in HVS was 65 percent. Among study individuals who tested positive for HIV, the prevalence of vulvo vaginal candidiasis was 32% in urine and 76% in HVS.

The prevalence in urine was 34% and in HVS 54% of participants who were in good health. The study conducted in Ogun state by Samson et al. (2020) revealed a prevalence of 50%, although HIV women exhibited the greatest overall prevalence of 32% in urine and 76% in HVS. HIV patients have a high rate of infection, which may be caused by their weakened immune systems, which leave them more vulnerable to opportunistic infections. The results of this investigation supported earlier findings that vulvo-candidiasis is substantially more common in HIV-positive individuals than in non-immune impaired people [6, 7]. In this investigation, the prevalence of candidiasis in both subgroups was not statistically significant, $P > 0.05$ and this agrees with the work done by Ikpeama et al 2023 socio-demographic[8].

HIV participants aged 40 and up had a higher prevalence of 80%. This could be because they have a compromised immune system compared to the other subgroup, or it could be because those who are positive and in this age group likely have higher viral loads, which could exacerbate their compromised immune systems and lead to infection. However, among healthy persons, the age range of 15 to 25 had the highest prevalence. Because they tend to be the most sexually active age group, some study works have identified the 25–35 age range as having the highest frequency. This supports the theory that sexual activity may have a significant role in the disease's transmission [9]. This study does not find any statistically significant correlation between age and candidiasis.

One potential risk factor that puts a person at risk for candidiasis is cleanliness practices. This study found that among healthy volunteers, participants who cleaned their vagina with soap had a prevalence of 62.5%. Direct application of soap to the vagina can alter its usual pH balance. It is difficult for pathogenic bacteria or fungi to infect the vagina because of its naturally acidic pH. However, the use of soaps, antiseptics, gels, and other chemicals for douching disturbs the

vagina's normal flora, or good bacteria, and may lead to an imbalance in pH that can result in infections from opportunistic fungi and pathogenic bacteria, including candidiasis. According to this study, there is a statistically significant correlation ($P<0.05$) between the prevalence of candidiasis infection and washing the vagina with soap and antiseptic. Additionally, the prevalence of wearing airtight underwear was found to be 84.2% among HIV patients. This finding may be explained by the fact that wearing airtight underwear for extended periods of time changes the vagina's temperature, which can encourage the growth of candida species and result in vulvo-vaginal candidiasis. According to research conducted by Ikpeama et al 2023 risk factors and Ahmad et al. (2016), wearing airtight underwear for an extended period of time can cause the vagina's natural temperature to be disrupted, as well as create moisture or heat in the genital areas and make it easier for bacterial and yeast infections to occur[10,11]. According to this study, there is a statistically. Based on lifestyle risk factors, the prevalence of candidiasis revealed that individuals who regularly engage in unprotected sex had a significantly higher infection rate. This may be the consequence of the infection spreading through intercourse or from an infected partner who may also have oral candidiasis. The correlation between the prevalence of candidiasis and unprotected sex was statistically significant. $P < 0.05$.

Conclusion

The prevalence of vulvo-candidiasis from this study and some other previous studies shows a higher prevalence among HIV participants when compared to immunocompetent individuals and this could be due to reduced immune system unable to fight against opportunistic infections.

Therefore, there is a need for Government to create agencies and conduct awareness programmes on some sexually transmitted infections, testing and counselling. This will enable women know their health status and seek early treatment which also helps in early detection and treatment of some opportunistic infections such as candidiasis

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