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Original Research Article

Prevalence of vulvovaginal candidiasis in females in the reproductive age group

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ABSTRACT

Background: Vulvovaginal candidiasis (VVC) is a common infection among reproductive age group females. The objective of present study is to determine the prevalence of vulvovaginal candidiasis, its distribution and association of risk factors among reproductive age group females, attending the outpatient department of obstetrics and gynaecology of our Prime Medical Centre, Sharjah attached with Prime Hospital, Dubai, United Arab Emirates (UAE).
Methods: It was cross-sectional descriptive study over a period of six months. Patients who came to our outpatient department with complains of vaginal discharge and itching in reproductive age group were included in this study. Patients characteristics i.e. age, parity, risk factors like diabetes, pregnancy, use of oral contraceptive pills (OCPills) and intrauterine contraceptive device (IUCD) were noted. High vaginal swabs (HVS) were collected and sent for culture. Candida positive cases were noted, and results were analyzed.
Results: A total of 224 high vaginal swabs were collected. Prevalence of vulvovaginal candidiasis was found to be 31.6%. It was found more in 26-30 years age group and multiparous women. Previous history of candidiasis and diabetes were the commonest risk factors. Frequency of C. albicans was more (76.05%) than non-albicans candida (23.94%).
Conclusions: Present study concluded that vulvovaginal candidiasis is more prevalent in reproductive age group females, therefore a routine high vaginal swab culture must be performed in every woman presenting with vaginal discharge and itching for correct diagnosis. Women should be educated on clinical symptoms.

Keywords: High vaginal swab (HVS), Intrauterine contraceptive device (IUCD), Oral contraceptive pills (OC pills), Prevalence, Reproductive age, Vulvovaginal candidiasis (VVC)

INTRODUCTION

Vaginal discharge is the commonest reproductive tract infection in gynaecological outpatient department. Whereas an abnormal discharge there is an altered color, amount, associated with itching/malodour, which is caused by the alteration in the normal vaginal flora.[1] Vulvovaginal candidiasis refers to a disorder characterized by signs and symptoms of vulvovaginal inflammation in the presence of Candida species. It is the second most common cause of vaginitis symptoms (after bacterial vaginosis) and accounts for approximately one-third of vaginitis cases.[2] *Candida spp.* are part of the lower genital tract flora in 20%-50% of healthy asymptomatic women.[3] It occurs in 1-14% of all women of reproductive age throughout the world.[4] An estimated 75 % of women will experience at least one episode of vulvovaginal candidiasis during their lifetime.[5]

Vulvovaginal candidiasis is an important cause of morbidity in pregnancy which can cause abortion, candida chorioamnionitis, subsequent preterm delivery. It has been associated with considerable direct and indirect economic costs. Vulvovaginal candidiasis is caused by overgrowth of Candida yeast species in the vagina and is characterized by curd-like vaginal discharge, itching, and erythema.[6] *C. albicans* has been documented to be the major cause of VVC, but the proportion of non-albicans Candida species appears to be increasing in last few decades. Diagnosis of VVC based solely on patient history and genital examination is not possible because of the low specificity of symptoms and signs, since other causes mimic VVC, like leukorrhea and pruritus vulvae.[7] Therefore, to have a definitive diagnosis of VVC, cultural isolation and identification of *Candida spp.* are crucial.

The objective of present study is to determine the prevalence of vulvovaginal candidiasis among reproductive age group of pregnant and non-pregnant women, attending our outpatient department, to find out its distribution in different age groups and associated risk factors. It helps us to understand the magnitude of the problem in our region and to implement the necessary treatment modalities.

METHODS

A cross-sectional descriptive study was done over a period of 6 months from January 2017 to June 2017. The study population was selected from the patients who were attending the outpatient's department of gynecology and obstetrics of Prime Medical Centre, Sharjah, United Arab Emirates (UAE).

The study was conducted on total 224 patients of reproductive age group of 20 to 45 years after informed verbal consent, who came to our clinic with complains of vaginal discharge and itching. The purpose of present study was to determine the prevalence of vulvovaginal candidiasis, its distribution and association with risk factors in our region.

Inclusion criteria

- All married women of reproductive age group.

Exclusion criteria

- Unmarried women, menstruating women.

A detailed clinical history was taken from the patients age, parity, symptoms of vaginal discharge, itching and risk factors like diabetes, pregnancy, use of oral contraceptive pill (OC pill), Intrauterine copper device (IUCD) and previous history of candidiasis. Following a complete general examination, per abdomen and pelvic examination was performed. For the diagnosis of vulvovaginal candidiasis high vaginal swab (HVS) were taken under sterile precaution, labelled and sent to laboratory for culture. In candida positive cultures, candida albicans or non albicans species (*C. glabrata*, *C. tropicalis*, *C. krusei*) were differentiated and recorded. The results were statistically analyzed to determine prevalence and other factors.

RESULTS

A total of 224 high vaginal swabs were collected and reported in present study. HVS were analysed for both candida albicans and non albicans candida. Among them 31.69% (71/224) swabs were positive for Candida growth on culture and 68.30% (153/224) were negative for candida growth. So, the prevalence of vulvovaginal candidiasis was found to be 31.69% (Table 1).

Table 1: Prevalence of Vulvovaginal candidiasis in

Culture	Number of patients	Percentage
Positive	71	31.69
Negative	153	68.30
Total	224	100

Culture positive patients' clinical details were analysed, and results were given below (based on age group, parity, and risk factors) The highest number of positive cases were found to be in 26-30 years of age group (39%) followed by 31-35 years (30%) and 36-40 years (29%). Authors found in our observation that after 30 years, age wise prevalence of candidiasis was gradually declining. Lowest number of patients with candidiasis were belonged to the age group of above 40 years (14%) and lowest number in above 40 years (14%) (Table 2).

Table 2: Distribution of vulvovaginal candidiasis among different age groups.

			Candida		
Age (Years)			Positive	Negative	Total
	20-25	Count % within age group	2 (22.22%)	7 (77.78%)	9 (100%)
	26-30	Count % within age group	34 (39.08%)	53 (60.92%)	87 (100%)
	31-35	Count % within age group	16 (30.18%)	37 (69.82%)	53 (100%)
	36-40	Count % within age group	16 (29.62%)	38 (70.38%)	54 (100%)
	>40	Count % within age Group	3 (14.28%)	18 (85.72%)	21 (100%)

Prevalence of vulvovaginal candidiasis was found to be high in women who had a parity of more than 2 (40%) and lower in nulliparous (25.4%) (Table 3).

Table 3: Distribution of vulvovaginal candidiasis based on parity.

Parity	No. with candida positive culture n=71 (% prevalence)	Total no HVS culture n=224 (%)
Nullipara	14 (25.45)	55 (24.55)
1	25 (31.25)	80 (35.71)
2	24 (34.78)	69 (30.80)
More than 2	8 (40)	20 (8.92)

Previous candidiasis was the most common risk factor associated with VVC prevalence (66%) in this study, followed by diabetes (56%), IUCD (40%), OCPill (28%) and pregnancy (26%) (Table 4).

Table 4: Association between VVC and risk factors.

Risk factors	Candida positive culture n=71 (% prevalence)	Total no. of culture n=224 (%)
OC Pill	2 (28.57)	7 (3.12)
IUCD	2 (40)	5 (2.23)
Diabetes	13 (56.52)	23 (10.26)
Previous candidiasis	8 (66.66)	12 (5.35)
Pregnancy	5 (26.31)	19 (8.48)
None	41 (25.94)	158 (70.53)

Among the women who came with the symptoms of vaginal itching or vaginal discharge, authors found that few had vaginal erythema or curdy discharge on examination but a majority of women with these positive signs was diagnosed with vulvovaginal candidiasis on high vaginal swab culture.

Table 5: Association of observed clinical signs and diagnosis (positive predictive value) of vulvovaginal candidiasis.

Clinical examination (Vaginal signs observed erythema, curdy discharge)	Laboratory diagnosis (candida positive culture on HVS)	% diagnosed with vulvovaginal candidiasis
51	33	64.7%

The positive predictive values of these signs for predicting vulvovaginal candidiasis were high (Table 5).

Among the candida positive culture, C. albicans was the predominant species in both pregnant and non-pregnant patients (76%) followed by non-albicans candida (24%) (Table 6).

Table 6: Prevalence of C. albicans and non albicans candida.

Species	Non-pregnant	Pregnant	Total (%)
Candida albicans	49	5	54 (76.05)
Non albicans candida	17	0	17 (23.94)
Total	66	5	71 (100)

Candida glabrata was found to be most prevalent species out of non-albicans candida (Table 7).

Table 7: Frequency distribution of candida species in candida positive culture patients.

Candida species	Number of patients (N=71)	Percentage
C. albicans	54	76.05
C. glabrata	11	15.49
C. tropicalis	5	7.04
C. krusei	1	1.40

DISCUSSION

The prevalence of vulvovaginal candidiasis is difficult to determine because the clinical diagnosis is often based on symptoms and not confirmed by microscopic examination or culture (as many as one-half of clinically diagnosed women may have another condition).[8] The prevalence rate of vulvovaginal candidiasis in present study correlates very closely with the study done by Kalia N et al. (31%).[9] Studies have reported the prevalence of VVC as 25%, 24% and 18.5%.[10-12] The prevalence rate is lower than the study done by EA Ugwa (84.5%) in North-West Nigeria.[13] Low socioeconomic status, improper hygiene, less education, and African ethnicity are the probable factors for high prevalence in that area. In surveys, the prevalence of vulvovaginal candidiasis is highest among women in their reproductive years. The prevalence increases with age up to menopause and is higher in African-American women than in other ethnic groups. The disorder is uncommon in postmenopausal women, unless they are taking estrogen therapy. It is also uncommon in prepubertal girls, in whom it is frequently over diagnosed. This study found the highest numbers of VVC were in 26-30 years age group (39.08%) followed by 31-35 years with 30.18%, which is almost similar to the study reported by EA Ugwa and Yadav K et al.[13,14] EA Ugwa reported highest prevalence in 26-35 years age group (53%). Yadav K et al, found the highest numbers of VVC were in 21-25 years age group (40.44%) followed by 26-30 years with 32.58%.[13,14] The age group contains women who are younger and are sexually active have low vaginal defense mechanisms against Candida species.[15] A 26-35 years age group women are mostly multiparous and use contraception which also favours candidiasis. In present study women above 40 years age group had least infection. (14%) Advancement in age, on

the other hand, reduces the effect of estrogen hormone in women, which could lead to lower infection rates as women advance in age. Most women aged over 40 years are less or not sexually active. In relation to parity, 19.71% nulliparous women and 80.28% of multiparous women were positive for candida. This finding may be due to higher sexual activity, poor personal hygiene and more use of contraceptive devices in multiparous women. Previous candidiasis was the most common risk factor associated with VVC prevalence (66%) in this study, followed by diabetes (56%). This study has also shown that VVC is associated with usage of IUCD (40%) and OCPill (28%) and pregnancy (26%). This finding is similar to some studies. Kanagal et al, 2014 highlights 60% of pregnant women with vaginal candidiasis had risk factors like diabetes, previous candidiasis infection, use of antibiotics, oral contraceptive pills and intra uterine contraceptive devices which was statistically significant.[16] Study done by EA Ugwa has also shown that VVC is associated with usage of the oral contraceptive pills and intrauterine contraceptive devices(28.9%).[13] Increased glucose levels in the genital tissue enhance yeast adhesion and growth, and vaginal epithelial cells have a greater propensity to bind to *C. albicans* in women with diabetes than in those without diabetes (Bohannon, 1998).[17]

Vaginal discharge, itching, and erythema, while quite common, were insufficient to diagnose vulvovaginal candidiasis in the absence of laboratory confirmation. Authors found a positive association between having clinically diagnosed and laboratory diagnosed vulvovaginal candidiasis. Positive predictive value was high 64.7%. In the study done by Yadav K et al, reported the highest number of VVC was observed in those of the respondents who had symptoms of vaginal candidiasis and was found to be statistically significant (p=0.001).[14] A similar study was conducted by Kanagal et al, 2014 reported 82% of candida positive women were symptomatic and the remaining 18% were asymptomatic which was statistically significant (p<0.01), was in accordance with the present study.[16]

Candida albicans was the predominant species in 76 % of patients followed by non albicans in 24% of patients. (*C. glabrata*15.49%, *C. tropicalis 7*.04%, *C. krusei* 1.40%). *C. albicans* was found to be the single most prevalent species in pregnancy. The results of this study were similar to study done by Yadav K et al. Among all candida isolates, *C. albicans* was found to be predominant organism to cause candidiasis followed by *C. glabarata*. (64% *C. albicans*, 36% non albicans candida).[14] During pregnancy, which is listed as a risk factor, vagina is more sensitive, and the infections occur significantly more often. The high incidence of vaginitis in pregnant women is related to levels of estrogens, which is in turn considered the primary factor for the observed Vulvovaginal candidiasis was more prevalent in women (Sobel, 2012) Candida albicans is both the most frequent colonizer and responsible for most cases of VVC (Singh, 2003).[5,18] Nevertheless, over the last decades there have been reports demonstrating an increment in the frequency of cases caused by non albicans species with Candida glabrata consistently being the leading species (Ray et al., 2007; Ringdahl, 2000).[19,20]

CONCLUSION

Present study concluded that vulvovaginal candidiasis is more prevalent in reproductive age group women. There was significant association between risk factors like previous candidiasis, diabetes, contraceptive user and pregnancy, therefore routine HVS must be performed in all patients including pregnant for correct diagnosis and treatment. Appropriate treatment should be given to all women to prevent complications associated with VVC. All women should be educated about symptoms and personal hygiene to solve the problem of vulvovaginal candidiasis.

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