

## Frequency and Etiology of Vulvovaginal Candidiasis in Women Referred to a Gynecological Center in Babol, Iran

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### Abstract

**Background:** Vulvovaginal candidiasis is the most common fungal disease in sexually active women of which *Candida albicans* is the primary etiologic agent.

**Materials and Methods:** This cross-sectional study was performed to determine the etiologic agents of vulvovaginal candidiasis amongst 2000 women who presented to the Gynecological Center of Babol Shahid Yahyanejad Educational Hospital from 2006-2007 with symptoms of vulvovaginal candidiasis.

**Results:** Discharge and pruritus were the most common symptoms in patients (80%). There were 42 out of 97 (43.3%) specimens which were positive for yeast. Of these, 80.95% belonged to *Candida albicans* and 14.29% were *Candida krusei*.

**Conclusion:** Discharge and pruritus were the most common symptoms of vulvovaginal candidiasis. In our study, *C. albicans* was the most common species isolated from the specimens.

**Keywords:** Vulvovaginal Candidiasis, *Candida albicans*

### Introduction

Mucosal candidiasis, especially vulvovaginal candidiasis, is the most common fungal disease in normal healthy women (1, 2). Approximately 75% of the female population suffer at least one episode during their lives (3-5). *C. albicans* is the causative agent in most cases of the gastrointestinal tract as well as the female lower reproductive tract (1, 3, 6). Pregnancy, diabetes mellitus and antibiotic treatment are the most common predisposing factors (1, 5). Some studies show that vulvovaginitis has increased in the past three decades (7, 8) due to antifungal resistance to the *Candida* species, a change in women's health quality and the failure to eradicate *Candida* species from the female genital tract (3, 4).

Also, some studies have shown an epidemiological change and increase in vaginal infections due to agents other than *C. albicans* (9). Thus this clinical sociodemographic survey was carried out to study the frequency of vulvovaginal candidiasis and find the relationship between this infection and suspected sociodemographic risk factors.

### Materials and Methods

This was a cross-sectional study of 2000 women who were referred to the Gynecological Center of Babol Shahid Yahyanejad Educational Hospital from 2006-2007. This study has been approved by the Ethical Committee of the Vice Chancellor of Research and Technology of Babol University and Medical Sciences. Informed consents were signed by all female participants who agreed to participate in this research study. In each case, sociodemographic findings were obtained clinically and mycologically.

Vaginal discharge specimens were collected from 97 out of 2000 female patients (15-45 years of age) who had clinical symptoms such as discharge and vulval pruritus. Laboratory diagnosis was based on microscopic examination of the specimens. Two slides were prepared from the vaginal discharge and stained with methylene blue. Additional swab samples were put into tubes containing 2 ml sabouraud dextrose broth. After transporting tubes to the mycology laboratory; samples were cultured in sabouraud dextrose agar and incubated at 37°C for 48 hours. The cultures were examined daily

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to observe for *Candida* colonies. *Candida* were detected by direct examination of the vesicle and germ tubes that were produced by *Candida albicans*, the carbohydrate absorbing method and specific methods which included the assimilation procedure.

*Candida* cultures were detected in specimens by carbohydrate assimilation, germ tube and vesicle formation (chlamydoconidia). A 20% concentration of eight different types of carbohydrates (glucose, maltose, sucrose, lactose, galactose, celobiose, terehalose and L. arabinose) were prepared.

### Statistical analysis

The mean, variance and percentage of covariates were computed. Statistical analysis was performed using SPSS version 15.0 (SPSS Inc., Chicago, IL) and a p value<0.05 was assumed to be significant.

### Results

Of the 97 patients, 79 (81.4%) had pruritus and 54(55.7%) had an abnormal discharge (Table 1). Yeast with or without pseudo-mycelium form were observed in 27 (27.84%) of the microscopic examinations. In 10 (10.31%) of the patients, neither *Candida* nor other organisms were detected in direct examination; although a mixture of two organisms (yeast and bacteria) were observed in 21.65% of the patients.

Yeast colonies were isolated from 42 (43.3%) patients with vulvovaginal infections by culturing the discharge on sabouraud dextrose agar plates (Table 2).

In this study *C. albicans* was isolated most frequently in 34 women (80.95%) followed by *C. krusei* as the second most frequent (14.29%) (Fig 1).

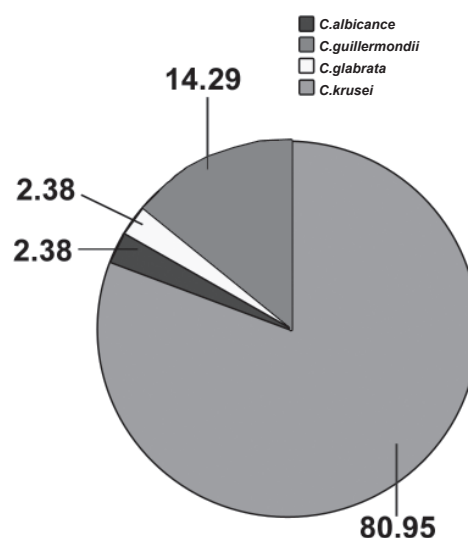


Fig 1: *Candida* species isolated from vulvovaginal candidiasis

Vulvovaginal candidiasis was not associated with any sociodemographic examined variables such as age and residence (Table 3).

Table1: Symptoms finding in women with vulvovaginitis

Organism	Main symptom (%)				Complications (%)					
	Pruritus	Abdominal pain	Discharge	Abnorml discharge	Pruiritus	Discharge	Abnorml discharge	Dysuria	Dyspareunia	Dysmenorrhia
<i>Candida</i>	100	0	0	0	83.3	33.3	33.3	66.7	33.3	33.3
<i>Candia &amp; Bacteria</i>	90.5	19	9.5	0	80.9	42.9	40	0	19	0
<i>Coccobacilli</i>	36	16	16	8	100	28	56	28	28	8
<i>Bacilli</i>	82.8	10.3	44.9	10.3	55.2	20.7	65.5	20.7	34.5	13.8
<i>Cocci</i>	66.7	0	66.7	0	100	100	0	0	0	0
<i>Nonobserved</i>	0	100	0	0	50	0	100	0	50	0

Table 2: Microorganisms detected in direct examination or cultured from vulvovaginitis specimens

Organisms	Direct exam (%)	Culture (%)
<i>Candida</i>	6 (6.19)	41 (42.27)
<i>Candida</i> and Bacteria	21 (21.65)	1 (1.03)
Other fungi	-	1 (1.03)
Bacteria	60 (61.85)	15 (15.46)
No growth / No observation	10 (10.31)	39 (40.21)
Total	97 (100)	97 (100)

Table 3: Sociodemographic findings in women with vulvovaginitis

Organism	Age ( $\pm$ SD)	( $\pm$ SD) No. of children	Reinfection (%)	Pregnancy prevention (%)			Residence	
				Condom	Hormonal	Other	Urban	Rural
<i>Candida</i>	31.5 $\pm$ 0.3	2 $\pm$ 0.63	16.7	0	33.3	66.7	50	50
<i>Candida &amp; Bacteria</i>	33.5 $\pm$ 9.7	1.55 $\pm$ 0.89	28.6	9.5	9.5	81	42.9	57.1
<i>Coccobacilli</i>	39 $\pm$ 8.66	2.73 $\pm$ 1.14	28	24	0	76	76	24
<i>Bacilli</i>	32.27 $\pm$ 8.7	1.79 $\pm$ 1.42	20.7	0	24.1	76.9	69	21
<i>Cocci</i>	34.5 $\pm$ 6.5	2.3 $\pm$ 1.24	0	0	33.3	66.7	33.3	66.7
Nonobserved	41.5 $\pm$ 1.5	3	50	0	0	100	50	50

## Discussion

Bacterial vaginosis, candidiasis and trichomoniasis are responsible for 90% of the cases of vaginal infections (8).

Although vulvovaginal candidiasis is the most common fungal disease in the world, little information is known about the distribution and etiology of candidiasis because microbiology tests are not routinely performed in laboratories (9). We studied the frequency of vulvovaginal candidiasis among women who were referred to our gynecological clinic. In our patients, discharge was the most common symptom. This complaint, as well as itching, burning and erythema were observed in other studies as the primary complaint (9, 10). Other studies have listed *C. albicans* as the most common causative agent in vulvovaginitis, with other species of *Candida* seen less frequently (3, 9, 11, 12).

In other studies, *C. albicans* was less common (2, 7). The numbers of *Candida* species in the present study were less than the results of Okungbowa and et al. (13), who isolated seven types of species. This difference may be due to fewer patients enrolled in the study or the level of social activities, drug abuse and sexual promiscuity.

Candidiasis is the most common vaginal infection in most countries (10, 14). Some studies noted that frequent use of chemotherapeutic agents have led to an increasing incidence of *Candida* infections as well as other vaginal infections (15). We found that more than 43% of discharge in women with vaginitis was due to a *Candida* infection. *Candida* is a common commensal and opportunistic pathogen (16), although all symptoms were not only due to candidiasis (12, 14, 17).

Although some research has suggested that vaginal infection was higher in women with a lower socio-economic status (18), but in the present study we didn't observe this difference. This may unintentionally be due to our patients' similar socio-economic status.

In the present study, *C. krusei* was the second most

common agent of vulvovaginal candidiasis; this finding was in agreement with other studies (12). This may be due to changes in patients' health quality and an increase in resistance to the azoles of antifungal agents (19). The results show that proper diagnosis of symptomatic cases should be done, since discharge and other symptoms of a vulvovaginal infection might be due to causes other than the *Candida* species.

## Conclusion

We concluded that discharge and pruritus were the most common symptoms of vulvovaginal candidiasis and *C. albicans* was the most common *Candida* species which caused vulvovaginal candidiasis.

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A group of heterocyclic ring compounds such as clotrimazole, and fluconazole. There is no conflict of interest in this article.

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