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ORIGINAL ARTICLE/ARTICLE ORIGINAL

# Vulvovaginal candidiasis: Etiology, symptomatology and risk factors

## *Les candidoses vulvovaginales : étiologies, symptômes et facteurs de risque*

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**KEYWORDS**
*Candida*;
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Risk factors;
Tunisia

**Summary**
*Objective*. — To determine epidemiological, clinical and mycological characteristics of vulvovaginal candidiasis (VVC) in Tunisian population and to evaluate predisposing factors.
*Patients and methods*. — In this retrospective study, 2160 vaginal swabs were performed over 2 years (January 2014—December 2015). It was carried out at the laboratory of Parasitology and Mycology, Rabta Hospital in Tunisia. After swab collecting, direct examination and culture on Sabouraud Chloramphenicol and Sabouraud Chloramphenicol Actidione media were implemented to research yeasts. Then identifying of yeast species was through chlamydosporulation test and auxanogram. For each patient, a questionnaire was filled noting age, medical and surgical history, symptoms and risk factors. Statistical analysis of data was performed on SPSS 16 using Khi$^2$ test, $P < 0.05$ was considered significant.
*Results*. — Direct examination was positive showed spore and/or pseudohypha in 24.72%. *Candida albicans* was isolated most frequently (76.61%) followed by *Candida glabrata* (17.18%). The maximum frequency of Candida-positive cultures was in 25—34 years old age group. Leucorrhea was the most common symptom (72.25%) followed by vulvar prurits (63.23%), dyspareunia (32.25%) and urinary burning (24.92%). Only pregnancy was correlated positively with VVC.
*Conclusion*. — It appears from our study that VVC is relatively common in Tunisia. His diagnosis results from confrontation of anamnestic, clinical and mycological data. The knowledge of risk factors and their correction would be necessary to prevent the occurrence of VVC, especially in its recurrent form.


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**MOTS CLÉS**
*Candida* ;
Candidose vulvovaginale ;
Facteurs de risque ;
Tunisie

**Résumé**
*Objectif*. — Déterminer les caractéristiques épidémiologiques, cliniques et mycologiques des candidoses vulvovaginales (CVV) dans une population tunisienne et d'évaluer les facteurs prédisposants.
*Patients et méthodes*. — Dans cette étude rétrospective, 2160 prélèvements vaginaux étaient effectués durant une période de 2 ans (janvier 2014—décembre 2015). Elle a été réalisée au laboratoire de parasitologie et mycologie, hôpital la Rabta en Tunisie. Pour chaque prélèvement, un examen direct et une culture sur milieu Sabouraud chloramphénicol et Sabouraud chloramphénicol actidione ont été réalisés. L'identification d'espèce de levure a été faite par le test de chlamydosporulation et l'auxanogramme. Un questionnaire a été rempli précisant l'âge, les antécédents médicaux et chirurgicaux, les symptômes et les facteurs de risque. L'analyse statistique était réalisée par SPSS 16 utilisant le test de Khi$^2$, $p < 0{,}05$ était considéré significatif.
*Résultats*. — Dans 24,72 % des cas, l'examen direct était positif montrant des levures et/ou pseudofilaments. *Candida albicans* a été l'espèce la plus fréquemment isolée (76,61 %), suivie par *Candida glabrata* (17,18 %). La tranche d'âge la plus touchée était entre 25 et 34 ans. La leucorrhée était le symptôme le plus fréquent (72,25 %) suivi de prurit vulvaire (63,23 %), dyspareunie (32,25 %) et brûlure mictionnelle (24,92 %). Seule la grossesse était corrélée avec la genèse des CVV.
*Conclusion*. — La CVV est relativement fréquente en Tunisie. Son diagnostic résulte de la confrontation des données anamnestiques, cliniques et mycologiques. La connaissance des facteurs de risque et leur correction serait nécessaire pour prévenir l'apparition de la CVV, particulièrement dans sa forme récurrente.


## Introduction

Vulvovaginal candidiasis (VVC) is the second most common cause of vaginal infections after bacterial vaginosis [1]. During the childbearing years, 75% of women experience at least one episode of VVC, and 40—50% of these women experience a second episode [2].

The most common clinical manifestations of VVC are pruritus, hyperemia, vaginal discomfort, leucorrhea, burning, soreness, dyspareunia, vaginal and vulvar erythema. The most common predisposing host factors are uncontrolled diabetes mellitus, immunosuppression, pregnancy, and hormone replacement therapy [3]. *Candida albicans* constitute 90% of yeasts isolated from the vagina [2]. However, episodes due to non-*albicans* species of *Candida* appear to be increasing in immunodeficient as well as immunocompetent women. The most commonly implicated non-*albicans* species include *Candida glabrata*, *Candida tropicalis*, *Candida krusei* and *Candida parapsilosis*. Because of the different susceptibility of *Candida* species to antifungal agents and the resistance in non-*albicans Candida* species to azoles, the identification of diverse species of *Candida* in the laboratory seems imperative [4,5]. The aim of this study was to determine the epidemiological, clinical and mycological characteristics of VVC in Tunisian population and to evaluate predisposing factors.

## Materials and methods

It was a retrospective study carried out over a period of two years (January 2014—December 2015) in the laboratory of Parasitology and Mycology, Rabta Hospital, Tunisia, Tunis. In this study, 2160 vaginal swabs were performed for women essentially with clinical signs of VVC or in systematic control of pregnancy.

For each patient, an individual information sheet was filled noting the age, medical and surgical history, symptoms and risk factors (pregnancy, oral contraceptive, intrauterine device, antibiotics, use of antiseptics, tight clothing, diabetes and HIV).

For each vulvar or vaginal swab, were carried direct microscopic examination after adding a few drops of saline water to the swab and culture on Sabouraud Chloramphenicol medium with and without Actidione. The cultures were incubated at 27 °C for 48 hours. Direct examination is positive if it shows yeast or yeast with pseudohypha. After culture, isolates were identified by chlamydosporulation test on AT (middle Agar Tween 80) and PCB (bile potato carrot). Non-*albicans Candida* species were confirmed by assimilation of sugars test (Auxacolor® 2, BioRad). Positive cases of VVC were retained on the basis of culture positivity.

Statistical analysis of data was performed on SPSS (Statistical Package for the Social; release16.0) using Khi$^2$ test ($\chi^2$) and $P < 0.05$ was considered significant.

## Results

In 32.87% of cases, culture was positive (710/2160). For these 710 cases, requests of vaginal swabs came mostly from versatile clinics of Tunis (53.9%) and the center of maternity and neonatology of Tunis (28.2%).

The median age of the 710 women with VVC was 33 years (12—90), 47.81% of women are aged between 25 and 34 years (Fig. 1).

Direct examination was negative in 75.27% of cases (1626) and positive in 24.72% of cases (534), so its sensibility was 73.23% (Table 1).

The most isolated yeasts were *C. albicans* in 76.61% of cases (544), followed by *C. glabrata* in 17.18% of cases (122) (Table 2).