

Vaginal Candidiasis among Women in Sana'a City, Yemen

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Abstract:- Vaginal candidiasis is a fungal infection of the vagina. The high number of women suffer daily from vaginitis with different ages. This study was occupied to determine the incidence of *Candida species* isolated from vaginal candidiasis infection with the effectiveness of treatment and determined several factors related to vaginal candidiasis. Totally 250 specimen was collected from the vagina with Several predisposing factors, such as diabetes mellitus, using contraceptive, pregnancy,, broad-spectrum antibiotics, malnutrition, and kidney transplantation from different hospitals in Sana'a city, Yemen. All specimens were examined by microscope, culture and biochemical test to identify and differentiate between the *Candida species*. The minimum inhibitory concentration test was performed for positive cases. Of 250 samples inoculated and investigated, there were 63 /250 (25.2%) *Candida species* [43 (68.3%) *Candida albicans*, 13 (20.6%) *Candida tropicalis*, 4 (6.3%) *Candida glabrata* and 3 (4.8%) *Candida kefyr*]. The frequencies of the risk factors of vaginal candidiasis from positive isolate, including pregnancy 30/ 63 (33%), use of antibiotics 11/ 63 (17.5%), Malnutrition 7/63 (11%), diabetic 5/63 (8%), contraceptive 4/63 (6%), Diaphragm 3/63 (5%) and kidney transplantation 3/63 (4%). *Susceptibility test* explained the effect of several antifungal drugs on isolated *Candida species* where Nystatin had the highest effect, whereas Fluconazole had the lowest effect. *The rate incidence vaginal Candida albicans is higher than non-albicans Candida. In addition, all non-albicans Candida species are resistant to Fluconazole.*

Keywords:- Vaginal Candidiasis , risk factors, Antifungal, Sana'a city , Yemen.

I. INTRODUCTION

Vaginal Candidiasis is an infection of vagina by several types of *Candida species*, also often called Vulvovaginal candidiasis /candidosis. (Achkar and Fries, 2010; Eiderbrant, 2010; Ishida et al., 2013). The high number of women suffer daily from vaginitis around the word with different ages, which make women visit the Gynecologist many times (Das Neves et al., 2008; Ishida et al., 2013). Where the high number of affected women will suffer more than once of vaginal candidiasis episodes (Das Neves et al., 2008; Ishida et al., 2013). The symptoms of vulvovaginal candidiasis are different between women like

itching, burning sensation, redness and soreness (Moreira and Paula, 2006, Bello et al., 2012; Deorukhkar and Saini, 2013). The geographical location and population studies play an important role in the prevalence of vaginal candidiasis cases (Deorukhkar and Saini, 2013). Many studies have reported that *C. albicans* were the major species in vaginal candidiasis (Achar and Fries, 2010; Adib et al., 2011). Nevertheless, many recent studies have been explained the increase frequency of non-albicans spp. in infection such as *C. glabrata*, *C. krusei*, *C. parapsilosis*, *C. tropicalis* and *C. dubliniensis* in fungal cultures (Satana et al., 2010, Diba et al., 2012, Rad et al., 2012, Ishida et al., 2013; Ameri et al., 2015). Most of women complain of symptoms in spite of the treatment (Aghamirain et al., 2007; Samber et al., 2014). Therefore, the present study aims to determine incidence of *Candida species* isolated from vaginal candidiasis cases with the effectiveness of treatment and determined several factors related to vaginal candidiasis specimen in Sana'a city, Yemen.

II. MATERIALS AND METHODS

A. Collection and Transport the specimens

The present study was occupied from November 2015 to May 2016 in different hospitals (AL-Kuwait, AL-Thwrah, AL-Gumhorri and Matnah) in Sana'a City. In which 250-vaginitis specimen with different ages were collected and interviewed to know some information such as patients' history. Vaginal swabs were collected by the specialist. The samples were labeled with the patients' names and ages then transported and examined immediately in the lab (Narkwa, 2010; Ishida et al., 2013).

B. Direct Examination of the Specimens

The specimens were divided into two parts; the first one for slide smear examined under the microscope by the direct examination. The second part was processed for cultivation and culturing in appropriate selective media (Sabouraud Dextrose Agar Medium (SDAM) (Himedia, Mumbai) to isolate and identify the *Candida species* by several tests as the following:

➤ Microscopic examination

Specimens were investigated microscopically (wet preparation and Gram stain) to look for *Candida* cells (Gram positive and budding cells) ((Bhavan et al., 2010 and Lennox et al., 2013).

➤ *Cultivation and Identification of Candida Isolates*

- The samples were inoculated on Sabouraud Dextrose Agar (SDA) with and without Chloramphenicol (250mg / liter) and incubated at 37°C for 24 h. The growth was confirmed by observing the different characteristics of *Candida* (Saranya *et al.*, 2013).
- *Candida species* isolated were investigated by germ tube test. In which the purity colonies were added to 0.5 ml human serum and incubated at 37°C for 2 hr. After that samples were examined microscopically to detect the type of *Candida* species (Albicans or Non-Albicans) (Al-Ghnam and Al-Dabbagh, 2012).
- Identification of *Candida species* isolated (especially the Non- Albicans *Candida*) by Sugar assimilation Test, where colony suspension and basal carbohydrate – free medium (II) of molten agar were prepared and mixed. After that, discs with 1% sugar (glucose, D- galactose, maltose, sucrose, lactose, raffinose, xylose and trehalose) were placed on inoculated media and incubated for five days at 37°C. Presence of growth around the disc indicates the ability of *Candida* to assimilate the sugar (Jayalakshmi *et al.*, 2014).

C. *Sensitivity Test*

This test was performed with all the isolated *Candida species* using disc diffusion method. The commercially available antifungal discs were used and measured the zones of inhibition (sensitive, Moderate and resistant) after 24 hours of incubation at 37°C. The antifungal discs used were Ketoconazole (10µg/disk), Clotrimazole (50µg/disk), Miconazole (10µg/disk), Itraconazole (50µg/disk), Voriconazole (10µg/disk), Fluconazole (100 µg / disk), Amphotericin B (50µg/disk) and Nystatin (100U/disk)(Sarany *et al.*, 2014).

D. *Statistical analysis*

It was used by using 20 SPSS. Percentage and Chi – square test were used to evaluate the degree of the significance with 95% confidence (p < 0.05).

III. RESULTS

Of 250 samples inoculated and investigated, there were 63 /250 (25.2%) *Candida species* (43 *Candida albicans* and 20 Non - Albicans *Candida species* as shown at **table1**. This result was supported by **Abuquah (2012)** in Iran, concluded that *Candida albicans* (48.7%) was the most frequent isolation, in India **Babin *et al.*, (2013)** reported the predominant species was *Candida species* (35.5%).

<i>Candida species</i>	Positive case number	Percentage
<i>Candida albicans</i>	43	68.3%
<i>Candida tropicalis</i>	13	20.6%
<i>Candida glabrata</i>	4	6.3%
<i>Candida kefyr</i>	3	4.8%

Table 1. Types of *Candida species* isolated from vaginitis

Vaginal candidiasis had the highest prevalence within range age (26-35) years (71.4%) whereas the lowest prevalence of vaginal candidiasis within range age (16-25) years (9.5%) as shown at **table2**. This is result supported by **Babin *et al.*, 2013** that vaginal candidiasis occurs more frequently in the age group (26- 35) and followed by 18-25 years age group which explained the highest incidence of vaginal candidiasis in 20-35 years old were more vulnerable to vaginal candidiasis. The study revealed most of the vaginal candidiasis was the first time infection 52 /63 (82.5 %), whereas re-infection was 11 /63 (17.5%). Women who had the first time infection and the recurrent infection complained of itching 54 (85.7%), burning 61 (96.8%) and discharge 55 (87.3%).

Age groups	Positive case number	Percentage
16-25	1	9.5%
26-35	45	71.4%
36-46	17	27%
Total	63	107.7%

Table 2:- Prevalence of *Candida* infection according to age

The study explained the frequencies of the risk factors of vaginal candidiasis from positive isolates, including pregnancy 30/ 63 (33%), use of antibiotics 11/63 (17.5%), Malnutrition 7/63 (11%), diabetic 5/63 (8%), contraceptive 4/63 (6%), Diaphragm 3/63 (5%) and kidney transplantation 3/63 (4%). This high percentage of pregnancies due to biological changes like increase of glycogen and estrogen hormones, which make good media for growth *Candida species* (Al-Ahmadey and Mohamed, 2014). This result agreed with **Agbakoba *et al.*, (2008)**, **Abu Baker, (2012)** and **Babin *et al.*, (2013)** who showed that *Candida species* were more frequent during the pregnant women than non – pregnant women. The study explained the effect of several antifungal drugs on isolated *Candida species* where Nystatin had the highest effect, whereas Fluconazole had the lowest effect as shown in **table 3**. This result agreed with **Mahmoudabad *et al.*, (2010)**. *Candida species* are sensitive to Nystatin that inhibits sterol synthesis in the cytoplasmic membrane. Whereas most of *Candida species* showed higher resistance to Fluconazole related to using as a prophylactic agent in hospitals. (**Babin *et al.*, 2013;** **Deorukhkar and Saini, 2013**).

Antifungal	Number of effected <i>Candida albicans</i>	Number of effected Non- albicans <i>Candida</i>
Nystatin	43	17
Miconazole	29	11
Amphotericin B	8	10
Clotrimazole	10	5
Itraconazole	6	4
Voriconazole	5	2
Fluconazole	4	0

Table3:- Effectiveness of several antifungals on *Candida spp.*

IV. CONCLUSIONS

Vaginal candidiasis is predominant during pregnancy. Different factors like (Age, pregnancy, diabetic, contraceptive and use of antibiotics) play an important role in prevalence vaginal candidiasis around the world. In Yemen, *Candida albicans* is a higher incidence than Non-albicans *Candida*. In addition, both of which were resistant to fluconazole related to using as a prophylactic agent in hospitals.

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