



## Detection of *Candida albicans* in Females Urinary Tract Infection by using Microscopical and Cultural Methods of Urine Samples in Kirkuk City - Iraq

Burhan A. Mohammed<sup>1\*</sup>, Bare L. Mohammed<sup>2</sup>, Mohammed Bahram Khorsheed<sup>3</sup>

<sup>1</sup>. Iraq/Northern Technical University /Kirkuk Technical College/ Medical Lab. Techniques Dep.

<sup>2</sup>. Iraq/University of Kirkuk / College of Science/Dep. of Biology.

<sup>3</sup>. Iraq/University of Kirkuk / College of Education for pure Sciences/Dep. of Biology.

\*Corresponding Author: Burhan A. Mohammed

### Abstract

Background: Candiduria is an infectious condition worldwide distribution as a primary infection of human urogenital tract caused by *Candida albicans* predominantly. Increasing of urinary tract infections with *Candida* species has led to antifungal resistant conditions as a common problem of women specifically among pregnant women. This study is an attempt to show the incidence of *Candida albicans* among women attending gynecology clinical in Kirkuk General Hospital in Kirkuk city, by microscopically technique and urine inoculation into Sabouraud Dextrose Agar. Methods & Materials: In this study, one hundred and seventy-four midstream urine samples from women patients of gynecology clinical in Kirkuk General Hospital were collected. All the subjects were clinically assessed for studying *C. albicans* infection, and then inoculated on Sabouraud Dextrose Agar. Results: The highest percentage of infection of *C. albicans* was 38(52.8%) of the positive patients and in relation to the patients pregnancy status, *C. albicans* infection revealed a prevalence of 36(53.7%) higher than 2(40%) for the non-pregnant patients with abnormal general urine examination in age group 27-36 years respectively. Conclusions: The study revealed that the prevalence of Candidal urinary tract infections (UTIs) among the younger reproductive age of the pregnant women was higher than that of non-pregnant women and the *Candida albicans* was the most common *Candida* species causative agent of the urinary tract Candidiasis.

**Keywords:** *C. albicans*, Microscopical, Culture Methods, UTI.

### Introduction

There were more than 200 *Candida* species, but only about 20 species regarded as important pathogens for humans [1]. Candiduria plays an important role in UTIs [2]. The most pathogenic of these species is *Candida albicans* which ranks the first causes of Candiduria among them. It causes a wide variety of disease; urinary tract candidiasis is one of the common of these diseases [1].

A community-acquired urinary tract infection which may occur in symptomatic or asymptomatic forms caused by the incidence of fungi or bacteria into the cells of the urinary tract system is the common problem worldwide [3]. Fungi are important constituents of the microbial population may contribute as a fungal uropathogens in UTIs.

It is usually present as a part of the normal flora in the mouth, vagina, skin and alimentary canal of the healthy individual [4]. *Candida albicans* is the major frequently isolated invasive fungal pathogen in humans, with the majority of infections being localized to the urinary tract of the patient [5].

*Candida* infections mainly occur opportunistically as a result of alteration of the host under some conditions exchangeable such as reduced immunity, prolonged use of drugs, pregnancy, diabetes and malnutrition which aid to accelerate the fungus proliferates creating pathogenic *Candida* and causes Candidiasis UTIs in the host [6]. Through lifestyles, *C. albicans* utilizes a special protein called adhesions to adherence to the other cells of the host, which is an

essential factor for colonization, attachment and preventing being washed away, and is one of the virulence factors as well as the shape flexibility, as in switching between yeast and capable of causing UTIs [7]. The major common isolated species was *C. albicans*, as well as non-albicans species, *C. tropicalis*, *C. glabrata*, *C. krusei*, and *C. parapsilosis*, were also emerging as an important causes agent of Candidal infections [8].

Candiduria is the most predominant leading fungal agents of urinary tract infections, particularly among women patients. Candida species are the causative agents of about 10-15% of all nosocomial UTI patients [9]. The study aims to determination the *C. albicans* infections among women suffering of urinary tract infections attending Gynecology Clinical of the Kirkuk General Hospital during the period of the study.

## Materials and Methods

A total of 174 urine samples were collected in sterile containers for isolation and identification of *Candida albicans*, 143(82.2%) pregnant and 31(17.8%) non-pregnant women patients attending Gynecological clinical of Kirkuk General Hospital. Their ages were ranged from 17 to  $\geq 47$  years, from December 2017 to October 2018. All patients were suffering of signs and symptoms from urinary tract infection which detected by Microscopical investigation.

To detection the *Candida albicans* as a causative agent of urinary tract infection, firstly the urine samples were inoculated under aseptic technique into the Sabouraud Dextrose Agar (SDA) supplemented with 0.05g/L of chloramphenicol, and then the urine samples were centrifuged at 2000 rpm for 5 minutes. The deposits were used to prepare wet mount and a thin smear on microscopic slid for Gram stain examined

microscopically for notice fungi and others of urine deposit constitutes. The cultures plates were incubated at 37°C for 24 to 48 hours, under aerobic conditions. For identification of *C. albicans* species colonies from the other categories of yeasts which were growth as another causative of UTI of patients, germ tube test method were performed using a single colony of the test yeast cells from pure cultures to suspended in a test tube containing 0.5 ml of human serum then incubated at 37 °C for 2 - 4 hours.

A drop of the yeast-serum mixture was placed on the clean microscope slide, covered with a coverslip and examined microscopically, using the x10 and x40 objective lenses. The observation of germ tubes of *Candida* yeast cells was the most important physiological property to decide the yeast cells as *Candida albicans*. The isolate was classified as either germ tube positive or negative. Any negative results of germ tube yeast colonies were regarded as a yeast other than *C. albicans* [10].

## Results

Out of the 174 urine samples were collected, 143 were from pregnant patients and 31 were a non-pregnant woman. In the case of pregnant patients, 67(93.1%) were shown to have positive *Candida* infections. While in non-pregnant patients, 5(6.9%) were shown to have positive *Candida* infections.

The frequency of Candiduria in pregnant patients was higher than the non-pregnant patients with respect to the total number 174 of urine samples examined. Statistically, a significant relationship was observed between the prevalence of Candiduria and the patient's pregnancy status ( $P < 0.05$ ) (Table 1).

**Table 1: Prevalence of urinary candidiasis among pregnant and non-pregnant women**

Characteristics	No. of samples examined	No. of samples +ve (%)	No. of samples -ve (%)
Pregnant	143	67 (93.1)	76 (74.5)
No-pregnant	31	5 (06.9)	26 (25.5)
Total	174	72 (100)	102 (100)

$\chi^2 = 9.745$ ,  $P = 0.001$  (significant)  $P < 0.05$

In relation to the patients age and pregnancy status, the results show that the majority of Candiduria isolates were predominantly present in the middle age group (27-36) years had the highest prevalence of 43(53.1%)

followed by the age group (37-46) years with 24(37.5%), whereas the age group (17-26) years had the least prevalence of 2(16.7%). The prevalence of Candiduria revealed that the pregnant patients had a higher

prevalence of 67(46.9%), within the highest rate of 40(52.6%) among age group (27-36) years, followed by 23(48.9%) among age group (37-46) years. While in the non-pregnant patients 5(16.1%) with the Candiduria prevalence of 3 (20%) followed by

1(17.4%) among the age groups (27-36) years and (37-46) years respectively. A statistically significant relationship was observed among Candiduria prevalence and the patient's age groups and pregnancy status (P < 0.05) (Table 2).

**Table 2: Prevalence of Candiduria according to the patient's age and pregnancy status**

Age/years	Patients Marital of Candiduria Positive				Total (+ve %)
	Pregnant		Non-pregnant		
	No. Exam.	N (+ve %)	No. Exam.	N (+ve %)	
17 – 26	4	1(25.0)	8	1(12.5)	2(16.7)
27 – 36	76	40(52.6)	5	3(20.0)	43(53.1)
37 – 46	47	23(48.9)	17	1(17.4)	24(37.5)
≥ 47	16	3(12.5)	1	0(00.0)	3(17.6)
Total	143	67(46.9)	31	5(16.1)	72(41.4)

$\chi^2 = 9.05, P = 0.02$  (significant)  $P < 0.05$

Out of the total of 72 yeasts isolates from the urine culture, *Candida albicans* had the frequency (Germ tube test) in 38(52.8%) of the positive patients, whereas yeasts other than *Candida albicans* species collectively had in 34(47.2%) of samples. In relation to the patients pregnancy status, *Candida albicans* infection revealed a prevalence of 36(53.7%) for the pregnant women patients higher than 2(40%) for the non-pregnant

patients, while non-*Candida albicans* yeasts infections for pregnant and non-pregnant patients revealed a prevalence of 31(46.3%) and 3(60%) respectively with abnormal general urine examination. A statistically no significant relationship was observed in the prevalence of *Candida albicans* and non-*Candida albicans* yeasts infections in relation to the patient's pregnancy (P > 0.05) (Table 3).

**Table 3: Prevalence of Candida albicans growth on Sabouraud dextrose agar according to the patient's pregnancy status**

Isolate	Pregnant n (+ve %)	Non-pregnant (n +ve %)	Total n (+ve %)
<i>Candida albicans</i>	36(53.7)	2(40)	38(52.8)
Non <i>Candida albicans</i>	31(46.3)	3(60)	34(47.2)
Total	67(100)	5(100)	72(100)

$\chi^2 = 0.309, P = 0.57$  (Non-significant.)  $P > 0.05$

In relation to the antibiotic uses, this study showed a higher prevalence of *Candida albicans* in users of antibiotics 30(30.6%) than the nonusers of antibiotics 8(10.5%).

A statistically there was a significant relationship between the *Candida albicans* incidence and uses of antibiotics (P < 0.05) (Table 4).

**Table 4: Relationship between the incidence of Candiduria and the antibiotics uses**

Antibiotics	No. examined	<i>Candida albicans</i> (%)	Non-albicans (%)
Users	98	30(30.6%)	18(18.4%)
Non users	76	8(10.5%)	16(21.1%)
Total	174	38(21.8%)	34(19.5%)

$\chi^2 = 10.733, P = 0.001$  (significant)  $P < 0.05$

### Discussions

The more incidence of Candiduria in pregnancy states may be due to vaginal candidiasis yeasts through ascending from the genitourinary tract to the urinary tract that gives the greater happening of Candiduria in pregnant patients [11]. The study result showed a higher prevalence of Candiduria among pregnant patients 46.9% than non-pregnant patients 16.1%. These findings were in agreement with the findings from India [12].

According to the age distribution, the study result showed that *Candida* prevalence 43(53.1%) is predominantly present in age group (27-36) years. Majority of these isolates 40(52.6%) were found among pregnant patients. These results were in agreement with a study from Kenya [13]. The commonest *Candida* species identified in this study was *Candida albicans* (52.8%), whereas a non-albicans *Candida* species was 47.2%. This result is in agreement favorably with a result reported from India [14] who reported a prevalence of 52.4% of *C. albicans* and 47.6% of non-albicans species in their

study and similar reports recorded from Iran [15] showed the most common isolates were *C. albicans* (53.3%).

This result is a bit lower than studies from Pakistan (55.6%), and Iran (58.53%) [16, 17]. The prevalence of *Candida albicans* among pregnant 36(53.7%) was higher than non-pregnant 2(40%). This is in agreement with the result finding in Nigeria [18].

Our result is somewhat higher than that obtained from India [19]. In addition of the physiological, functional and structural changes that pregnant women undergo through the pregnancy period make women's urine a favorable medium more susceptible to various pathogens due to high concentration of albumin and amino acids, changes in the

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