

Prevalence of *Candida* spp. Isolated from Urine Samples of Pregnant Women from Kassala State, Sudan

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Abstract A urinary tract infection (UTI) is a major disease that affects people of all age groups. Women are more susceptible to UTI than men especially pregnancy, mainly due to the different structural features make easy contamination of the UTI with fecal flora. *Candida* is one of pathogenic which causing this problem. A total of 196 Clean-Catch midstream urine samples were collected from pregnancy referred to Kassala new Hospital and Abdurrahman Elmobark Medical center, their ages between 15 to 40 year old. Grams' staining, chlamyospores formation and Chromogenic Agar medium used to differentiate between *Candida* spp. 17 (8.67%) were positive for *Candida* species, these were *C. glabrata* (41.18%), *C. albicans* (23.52%), *C. krusei* (17.66%), *C. dubliniensis* (11.76%) and *C. tropicalis* (5.88%). No co-existence of *Candida* species was found. In the present study *C. glabrata* and *C. albicans* scored the highest frequency of occurrence.

Keywords: *Candida* spp, UT, pregnancy, Kassala, Sudan

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infection, isolate and identify it in urine samples from pregnant women.

1. Introduction

Urinary tract infection (UTI) is a major disease that affect people of all age groups, it is separated into asymptomatic and symptomatic cases based on its pathogenicity [1]. UTI is a common nonsurgical and nosocomial infection in postoperative patients and it is a healthcare associated infection [2,3]. Worldwide, about 150 million people are diagnosed with UTI each year [4] that's why it is a major driver of antibiotic usage globally [5]. Women are more susceptible to UTI than men. This is mainly due to short urethra, absence of prostatic secretion and easy contamination of the urinary tract with fecal flora [6], in addition to several anatomical and hormonal changes related to pregnancy [7]. The most isolated strains associated with uro-pathogenic biofilms are *Escherichia coli*, *Enterococcus faecalis*, *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Staphylococcus aureus* and *Candida tropicalis* [8]. Other causes included *Chlamydia* spp and fungi such as *C. albicans* [9]. 20% of the pregnant women with UTI are liable to be admitted in obstetrical wards [10]. Untreated UTI can lead to serious obstetrical complications, poor maternal and perinatal outcomes e.g. intrauterine growth restriction, preeclampsia, caesarean delivery and preterm deliveries [11]. The study aimed to determine the prevalence of *Candida* spp

2. Materials and Methods

2.1. Samples Collection

A total of 196 urine samples were collected from pregnant women referred to Kassala new Hospital and Abdurrahman Elmobark Medical center, their ages between 15 to 40 years old. Clean-Catch midstream urine method was used as described [12,13]. Collected urine samples were cultured on sabouraud dextrose agar with chloramphenicol medium [14].

2.2. Isolation and Identification of Fungi

Pure isolation on sabouraud dextrose agar with chloramphenicol medium and identification of pathogenic fungi was suggested by [14,15].

2.3. Microscopic Examination

Microscopical examination of gram reaction and formation of chlamyospores was performed according to [16,17,18] to observe yeast cells and chlamyospore formation.

3. Results

3.1. *Candida* Isolates

Out of 196 pregnant women cases 17 (8.67%) were positive for *Candida* species, these were *Candida. glabrat*, *C. albicans*, *C. krusei*, *C. dubliniensis* and *C. tropicales*. No co-existence of *Candida* spp. was found of the urine samples. *Candida* species cultural on Sabouraud Dextrose Agar with Chloramphenicol media appere white colour (Figure 1).



Figure 1. Selective isolation of *Candida* spp.

3.2. Identification of *Candida* spp.

Chromogenic agar medium differentiated between *Candida* spp. on basis of colour produced due to the reaction between the isolates and the medium (Table 1). Green colony colour was shown by *C.albicans* and *C.dubliniensis* that is why formation of Chlamydospore was used as an additional differentiating tool (Table 1).

3.3. Microscopic Characteristics

3.3.1. Gram Reaction

All the isolates were Gram positive and oval cells in shape (Figure 2).

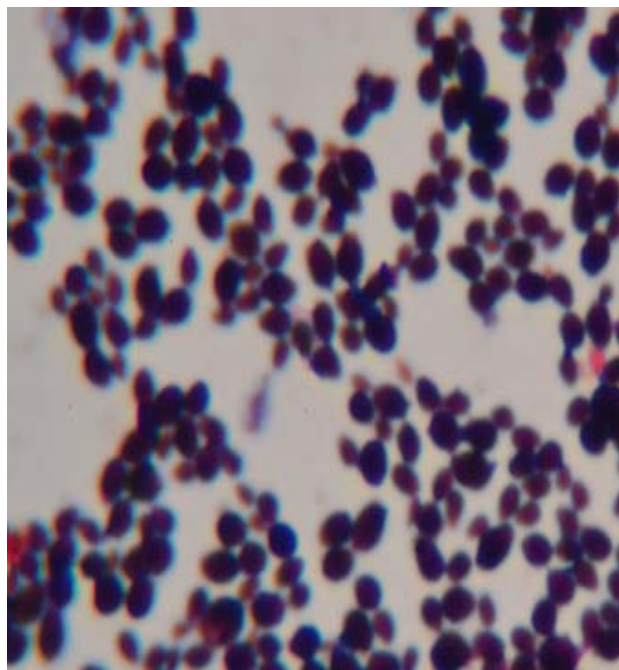


Figure 2. Microscopic characteristics of *Candida* spp.

3.3.2. Formation of Chlamydospore

On Corn Meal Agar medium *Candida* spp. form five types of chlamydospores. Seven isolates lack hyphae or pseudohyphae. Both are characteristic feature of *C. glabrat*. Four isolates which forming large, thick-walled chlamydospore, usually terminal and single indicating *C. albicans*. Three isolates formed long, slender, straight cells tree-like branching and chains of blastoconidia arising from the point between cells showing *C. krusei*. Two isolates formed true hyphae with solitary or cluster of blastoconidia, characteristic of *C. dubliniensis* and *C.tropicales* forming abundant branched pseudohyphae composed of elongated cells (Table 1 and Figure 3).

Table 1. Colour and description of chlamydospore by *Candida* spp.

Isolates Number	<i>Candida</i> spp. colour	Description
14, 108, 159, 179, 191, 192, 196	<i>C. glabrat</i> (White)	Absence of hyphae or pseudohyphae.
151, 155, 164, 176	<i>C. albicans</i> (Green)	Forming large, thick-walled chlamydospore, usually terminal and present singly.
153, 154, 168	<i>C. krusei</i> (Pink)	Long, slender, straight cells showing tree-like branching and chains of blastoconidia arises from the point between cells.
152, 169	<i>C. dubliniensis</i> (Green)	Production of true hyphae with Presence of solitary or cluster of blastoconidia.
166	<i>C. tropicales</i> (Blue)	Abundant branched pseudhyphae composed of elongated cells

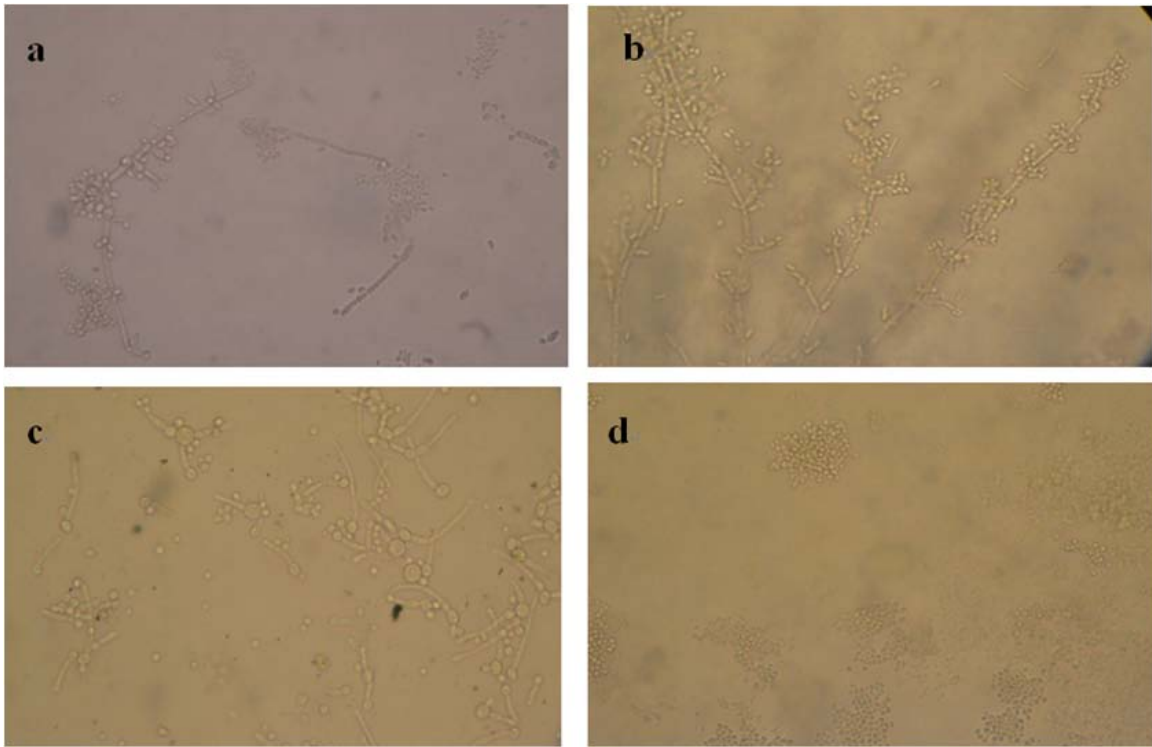


Figure 3. Chlamydospores of *Candida* spp.: a) *C. tropicalis*; b) *C. krusei*; c) *C. albicans*; d) *C. glabrata*

4. Discussion

Out of 196 patients cases, 17 (8.67%) were positive for *Candida* species. *C. albicans* were found in 8% of patients attending Khartoum hospitals [19]. In other study recorded 36% [20,21]. Kauffman *et al* reported that 10-15% of *Candida* spp. account for almost nosocomial UTIs cases [22]. Subsequent epidemiological surveillance found that *Candida* spp. are one of the most common pathogens causing nosocomial bloodstream and UTI [23], The most frequently isolated species is *C. albicans*, but *C. tropicalis*, *C. glabrata*, *C. krusei*, and *C. parapsilosis* are also emerging as important etiologic agents of *Candida* UTI [24]. The current study showed that seven out of 17 isolates belongs to *C. glabrata* (41.18%). Four isolates were *C. albicans* (23.52%), three isolates were *C. krusei* (17.66%), two isolates were *C. dubliniensis* (11.76%) and one isolate was *C. tropicalis* (5.88%). The present study agreed with [25] in the flowing spp. *C. glabrata*, *C. albicans*, *C. krusei*, *C. tropicalis* except in *C. kefyr*. In the present study *C. glabrata* scored the highest frequency of occurrence, while it is *C. albicans* as reported by other study [21,26,27,28,29,30]. Non-*albicans* species, especially *C. tropicalis* and *C. glabrata* predominate in many regions [31]. Using Chromogenic Agar medium, each species isolates showed a distinct colour which is in accord with [32,33,34]. The description of chlamydospore formed by *Candida* spp. (Table 1) is in agreement with [35].

Ethics

This study was approved by Ethical Clearance Committee Federal Ministry of Health, Kassala, Sudan. It worth mentioning that in some rural communities women get married under legal age.

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