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**Research Article** 

# STUDY OF ISOLATION AND DISTRIBUTION OF CANDIDA SPECIES AND RISK FACTORS ASSOCIATED WITH CANDIDIASIS

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## ABSTRACT

Fungal infections are a growing medical problem requiring prompt diagnosis with species identification and early adapted. In the recent few decades candida species are the most common among the increasing fungal infections. Candida species are now the fourth-most-common cause of hospital-acquired bloodstream infections. Fluconazole has become the drug of choice for the treatment of candidiasis in immunocompromised patients. candida strains, maximum i.e. 40.95% were isolated from urine specimens followed by 22.38% from oral swab and 20.00% from vaginal swab. Maximum number of candida strains i.e. 47.64% were isolated in the age group of 31 to 50 years followed by 16.66% strains in the age group of 21-30 years. In the neonates, 10.95% candida were isolated. Candida isolates were 57.64% in males and 42.38% in females. Prior antibiotic therapy 71.42% was found to be a major risk factor for candidiasis, followed by urinary catheterization 60.47% and diabetes mellitus 45.23%.

### Keywords :- Antifungal therapy, Candida, Candidiasis, Fluconazole.

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## INTRODUCTION

Fungal infections are a growing medical problem requiring prompt diagnosis with species identification and early adapted antifungal therapy.[1-4] Among the increasing fungal infections, candida species are the most common in the recent few decades.[5-9] Candida species colonize the mucosal surfaces of all humans soon after birth and the risk of endogenous infection is everpresent.[10,11] But the organism become pathogenic only when the normal bacterial flora is disturbed by antibiotics or other factors that produce fungal overgrowth.[12]

The frequent use of antibacterial, cytotoxic and immunosuppers sive drugs required to treat both malignant and other diseases has recently been associated

with rise in the incidence of serious candida infections.[13] Candida infections has been shown to contribute to excess hospitalization stay and to be an independent determinant for death.[14] Candida species are now the fourth-most-common cause of hospitalacquired bloodstream infections.[10,11] The opportunistic fungal pathogen, Candida albicans, is the most frequent cause of superficial and deep seated candidiasis.[10,15] The risk of infection by this opportunistic yeast has increased in immunocompromised patients, particularly in HIV infected and AIDS patients during recent years.[10,16]

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Other species of candida such as C. glabrata, C. krusei and C. tropicalis are emerging as important opportunistic pathogens and this transition has had a significant clinical impact due to decreased susceptibility of these yeasts to antifungal agents,[17] hence recent epidemiological data reveals a shift from C. albicans to non-albicans species.<sup>[14]</sup> The strains of Candida albicans can be differentiated at the phenotypic level by physiological tests and by detection of phenotypically expressed macromolecular structures. For this various combined tests have been suggested. Of these combined methods, resistotyping and morphotyping are the most suitable methods which are easily available.[18]

## METHODOLOGY

The study was carried out in the Department of Microbiology. A total of 210 candida isolates of suspected cases of candidiasis from various clinical specimens were included in the study. Methodology includes,

- Repeated isolation of candida species from oropharyngeal, vaginal and sputum specimens.
- Single isolation of candida species from sterile body fluids like blood, peritoneal fluid.

#### **RESULT AND DISCUSSION**

The study was carried out in the Department of Microbiology. A total of 210 candida isolates of suspected cases of candidiasis from various clinical specimens were included in the study. Candida isolates from different infections and their representative clinical specimens are shown in Table 1. Table 1 shows that, out of 210 candida strains, maximum i.e. 86 (40.95%) were isolated from urine specimens followed by 47 (22.38%) from oral swab and 42 (20.00%) from vaginal swab. Blood specimens showed 18 (08.57%) candida isolates. From sputum, pus, peritoneal fluid, synovial fluid 7 (3.33%), 5 (2.38%), 3 (1.43%), 2 (00.96%) candida strains were isolated respectively. Oral thrush and vaginal candidiasis are superficial infections and others are invasive infections.

Table 2 shows that, maximum number of candida strains i.e. 100 (47.64%) were isolated in the age group of 31 to 50 years followed by 35 (16.66%) strains in the age group of 21-30 years. In the neonates, 23 (10.95%) candida were isolated. Candida isolates were 121 (57.64%) in males and 89 (42.38%) in females.

Prior antibiotic therapy 150 (71.42%) was found to be a major risk factor for candidiasis, followed by urinary catheterization 127 (60.47%) and diabetes mellitus 95 (45.23%).

Other risk factors like I V cannulations 81 (38.57%), HIV infection 25 (11.90%), central venous catheter 25 (11.90%), pregnancy 23 (10.95%), chronic renal failure 10 (4.76%), oral contraceptive pills 8 (3.80%), malignancy 7 (3.33%) were also found to be associated with candidiasis. The risk factor, tuberculosis was associated with nine cases of candidiasis.

Table 4 shows that germ tube was seen in 118 (56.19%) candida isolates indicating their identification as C. albicans. It was not seen in 92 (43.81%) isolates indicating them as belonging to species other than C. albicans.

Specimens	Candida isolates (%)
Urine	86 (40.95%)
Oral swab	47 (22.38%)
Vaginal swab	42 (20.00%)
Blood	18 (08.57%)
Sputum	07 (03.33%)
Pus	05 (02.38%)
Peritoneal fluid	03 (01.43%)
Synovial fluid	02 (00.96%)
TOTAL	210 (100%)

Table 1. Candida isolates from clinical specimens (n = 210)

Table 2. Age and sex wise distribution of patients with candida isolation (n = 210)

Age	Male	Female	Total (%)
0-28 days	15	08	23 (10.95)
29 days-12 months		02	02(00.95)
1 - 10  yrs	10	05	15 (07.14)
11 - 20  yrs	12	06	18 (08.57)
21 – 30 yrs	20	15	35 (16.66)
31 – 40 yrs	32	26	58 (27.61)
41 - 50 yrs	22	20	42 (20.03)
> 50 Yrs	10	07	17 (08.09)
Total (%)	121 (57.63)	89 (42.37)	210 (100)

Risk factors	No. of cases of candidiasis (%)	
Prolonged antibiotic therapy	150 (71.42)	
Urinary catheter	127 (60.47)	
Diabetes mellitus	95 (45.23)	
I.V. cannula	81 (38.57)	
HIV infection	25 (11.90)	
Central venous catheter	25 (11.90)	
Pregnancy	23 (10.95)	
Chronic renal failure	10 (4.76)	
Tuberculosis	9 (4.28)	
Oral contraceptive pills	8 (3.80)	
Malignancy	7 (3.33)	

#### Table 3. Risk factors associated with candidiasis

#### Table 4. Results of germ tube test

Germ tube Test	No. of Isolates (%)
Positive	118 (56.19)
Negative	92 (43.81)
Total	210 (100)

#### CONCLUSION

Over some decades, there is much advancement in medical field. Accompanying these; there has been increase in the variety of opportunistic infections caused by relatively avirulent organisms. Critically ill patients in medicine intensive care unit (MICU) and surgical intensive care unit (SICU) have been primary targets for opportunistic fungal infections particularly due to candida species.78 There is increase in incidence of invasive candida infections due to multiple associated risk factors. Most of candida infections are caused by Candida albicans but now in recent years non albicans candida species are on rise, and hence the spectrum of candidiasis has changed.30,31 This study has been carried out in the department of Microbiology, in a tertiary care hospital. Candida strains isolated from different infections were included in the study. Out of total 210 candida isolates, 40.95% were isolated from urine, 22.38% were from oral swab, 20.00% from vaginal swab, 8.57% from blood, 3.33% from sputum, 2.38% from pus, 1.43% from peritoneal fluid and 0.96% from synovial fluid. Maximum strains were isolated from urine (40.95%) followed by oral (22.38%) and vaginal swabs (20.00%). They also found predominance of the urinary isolates (62.74%), followed by the blood isolates (29.41%). In the present study, majority of candidiasis patients belonged to 31-40 (27.61%) years followed by 41-50 (20.00%) years. Prior antibiotic therapy 150 (71.42%) was found to be a major risk factor for candidiasis, followed by urinary catheterization 127 (60.47%) and diabetes mellitus 95 (45.23%).Other risk factors like I V cannulations 81 (38.57%), HIV infection 25 (11.90%), central venous

catheter 25 (11.90%), pregnancy 23 (10.95%), chronic renal failure 10 (4.76%), oral contraceptive pills 8 (3.80%), malignancy 7 (3.33%) were also found to be associated with candidiasis. The risk factor, tuberculosis was associated with nine cases of candidiasis. Present study showed predominance of males (57.63%) in candida infections. Antibiotics can suppress the endogenous flora, decrease the incidence of bacterial infections and promote the colonization of mucosal surfaces and lead to invasive fungal infections. Use of procedures like central venous catheters is significantly related to candidiasis. The ability of candida species to form biofilm on surfaces such as catheters has contributed to the emergence of these fungi as major pathogens of patients with indwellingmedical devices. World-wide data shows, proportion of candidemia cases with HIV infection varied from 10% to 15%.

Prior antibiotic therapy 150 (71.42%) was found to be a major risk factor for candidiasis, followed by urinary catheterization 127 (60.47%) and diabetes mellitus 95 (45.23%). Other risk factors like I V cannulations 81 (38.57%), HIV infection 25 (11.90%), central venous catheter 25 (11.90%), pregnancy 23 (10.95%), chronic renal failure 10 (4.76%), oral contraceptive pills 8 (3.80%), malignancy 7 (3.33%) were also found to be associated with candidiasis. The risk factor, tuberculosis was associated with nine cases of candidiasis.

Germ tube was seen in 118 (56.19%) candida isolates indicating their identification as C. albicans. It was not seen in 92 (43.81%) isolates indicating them as belonging to species other than C. albicans.

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