

ORIGINAL ARTICLE

Susceptibility profile and Frequency of candida infection among intensive care unit patients

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ABSTRACT:

Introduction: we aimed to identify the epidemiology of *Candida* spp. among blood culture isolates and to investigate the susceptibility pattern of these species to antifungal agents. **Methods:** The User Interface Screen was pressed and it was completed in 70seconds cycle. Blue indicator light was flashed when the filling cycle was completed. Cassette was removed from the filler section and loaded into the load section within 10 minutes. **Results:** The samples were obtained from the patients admitted in ICU^{rs} of Hospital. Out of 826, total 226 *Candida* isolate from various clinical specimen from different ward of intensive Care Unit. **Conclusions:** Infection caused by Non albicans *candida* (NAC) species has been increased. *C. tropicalis* was the most common isolated species. *Candida albicans*, *C. glabrata* and *C. krusei* showed high susceptibility to fluconazole and voriconazole. Amphotericin B, Caspofungin, Micafungin and Flucytosine showed high susceptibility towards other candida species.

Keywords: Theirsusceptibility profile, Intensive care unit, candida infection.

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Introduction:

Candida species are responsible for causing many health care associated and central line associated infections.¹

Nosocomial infection are concerned more with medical device leading to dreadful consequences like systemic infection that could be life taking, also complicated by destruction of internal tissue.² Mortality rate is 50% in patients of blood stream infection.³ Among Human immunodeficiency virus (HIV) patients and other immunocompromised patients oral candidiasis is very commonly caused by *Candida albicans*.⁴ In women it colonizes genital area causing vagina candidiasis leading to vaginal thrush.

Even though researchers have pointed out that *Candida* might be causative factor for mucositis of digestive tract, part played by catheter in patients with unusual lower number of neutrophils is still not understood in comparison to patients of intensive care unit (ICU).⁵

The cases of infection caused by *Candida albicans* have been reduced in number but rate of Non-albicans species have been increased.⁶

The alarming increase in infections with multidrug resistant bacteria is due to overuse of a broad spectrum antimicrobials, which leads to over growth of *Candida* spp.; thus, enhancing its opportunity to cause the disease. A shift has been observed in the relative frequency of each *Candida* spp. Antifungal agents available for the treatment of systemic and invasive candidiasis are restricted to polyenes, allylamines, azoles, and the recent echinocandin class of molecules. In the past few decades, the incidence of

resistance to antifungal treatment of *Candida* spp. has increased rapidly, which is of serious concern for healthcare professionals. Studies on prevalence of infections and antifungal susceptibility testing can help with deciding on clinical strategies to manage this problem. Herein, we aimed to identify the epidemiology of *Candida* spp. among blood culture isolates and to investigate the susceptibility pattern of these species to antifungal agents.

Material and Methods:

Total numbers of 826 clinical samples were processed in which 226 isolates were taken for *candida*. Sample was collected from various ICU's and various other clinical departments of the hospital. The different clinical specimens like blood, E.T aspirates, BAL fluid, throat swab, urine, high vaginal swab, Foley's catheter tip and Venous catheters were taken.

The growth of *Candida* spp. on sabouraud dextrose agar was confirmed by Gram staining, where gram-positive budding fungal cells were observed. The species identification as well as antifungal susceptibility testing were performed with VITEK 2 compact automated system using VITEK-2 cards for identification of yeast and yeast-like organisms) ID-YST card). Antifungal susceptibility testing was carried out with VITEK 2 fungal susceptibility card (AST-YS07 kit).

Loading of sample

Prepared Cassette were loaded into the filler section of instrument, after that door was closed. The User Interface Screen was pressed and it was completed in 70seconds cycle. Blue indicator light was flashed when

the filling cycle was completed. Cassette was removed from the filler section and loaded into the load section within 10 minutes. Barcodes were scanned & checked against the maintain Virtual Cassette electronic work list. Straws were cut and taped up. Finally, Cards were loaded into carousel. The cassette wastes were discarded and it was indicated by flashing blue arrow on

the instrument. The loading was completed.

Results:

The samples were obtained from the patients admitted in ICU's of Hospital. Out of 826, total 226 *Candida* isolate from various clinical specimen from different ward of intensive Care Unit.

Table 1: Showing out of 226 (100%) samples 87 (38.4%) were *C.albicans* and 139 (61.5%) were NAC.

Species	Number	Percentage
<i>C.albicans</i>	87	38.4%
NAC	139	61.5%
Total	226	100%

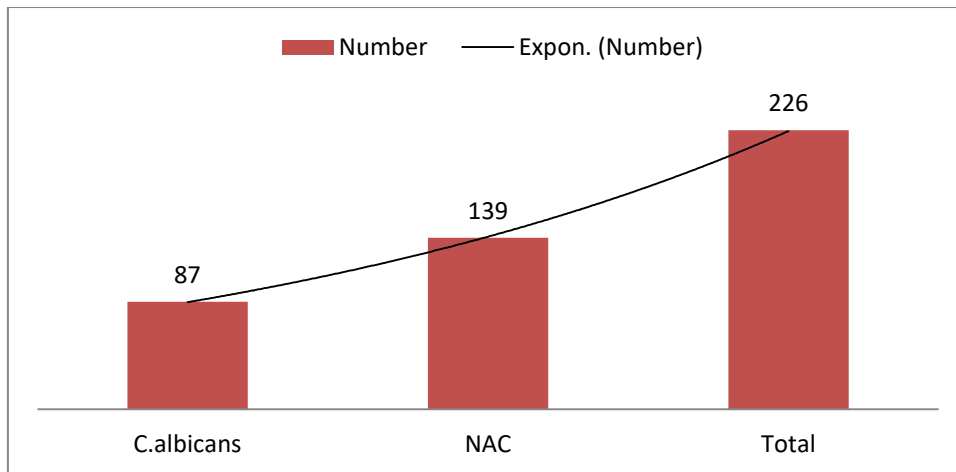


Figure 1: Showing out of 226 (100%) samples 87 (38.4%) were *C.albicans* and 139 (61.5%) were NAC.

Table 2: Showing Sex wise distribution. The *Candida* infection were more in male in contrast to female.

Sex	Number	Percentage
Male	(n=150)	66.3%
Female	(n=76)	33.6%
Total	(n=226)	100%

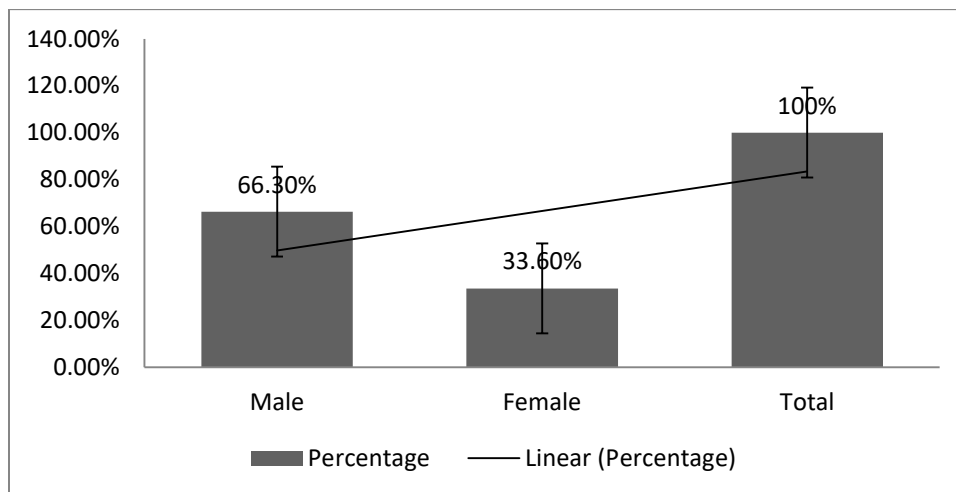


Figure 2: Showing Sex wise distribution. The *Candida* infection was more in male in contrast to female.

Discussion:

Candida species normally present as commensal of the human body but capable of causing opportunistic infections especially in immunocompromised individuals.⁸ Although, infection caused by *C. albicans* is very common but recently infection of NAC is increasing. NAC species are gaining importance in recent years because they show resistance to antifungal drugs. In our study, percentage of non albicans *Candida* (62.6%) was higher than *Candida albicans* (37%). Identical study was conducted by Sundaram M et al⁷ concluded that NAC (57%) was higher than *C. albicans* (43%). While in a study conducted by Lerory O et al⁹ *C. albicans* (57.0%) were isolated more as compared to Non-albicans *Candida*.

In our present study albicans isolated was 37% and in NAC most commonly isolated species was *C. tropicalis* (33.9%) followed by *C. parapsilosis* (11.6%), *C. glabrata* (9.2%), *C. dubliniensis* (5.8%), *C. krusei* (1.4%) and *C. africana* (0.4%). A study done by Ahmad I et al¹⁰ had similar percentage that *C. albicans* isolated was 36% and in *C. tropicalis* (40%) followed by *C. glabrata* (10%), *C. dubliniensis* (9%) and *C. krusei* (2%).

Our study showed that the rate of *Candida* infection were more in male 67% than in female 36%. This result is comparable with other study conducted by Yashavanth R. et al¹¹ where 62.12% of *Candida* was isolated in male and 37.87% in female. This is contrast to the study conducted by Kauffman C et al.¹² which showed *Candida* were more isolated in female 54.7% than male 45.3%.

In our study, *C. albicans* showed 35%, 34%, 22% resistance to fluconazole, voriconazole and Flucytosine but showed least resistance to Micafungin 10%, Caspofungin 10% and 8% to amphotericin-b. More resistance to azole was seen in *C. albicans* and this was comparable to a study conducted by Rajeevan et al.¹³

All isolated *C. krusei* were resistance to fluconazole which was comparable to the study done by Mondal et al.¹⁴ *C. krusei* was 67% susceptible to Caspofungin, Micafungin, amphotericin-b, Flucytosine and only 33% susceptible to voriconazole.

The decrease in susceptibility of *Candida* isolates to FLC (75%) is a matter of concern although VRC, AMP, and 5FC continue to show good efficacy. Western data have revealed that *Candida* species are reliably susceptible to polyenes, azoles, and echinocandins, but Indian studies demonstrate very high resistance to FLC for all *Candida* isolates although AMP susceptibility is high,¹⁵ which is in agreement with our findings.

In this present study, caspofungin shows 100% sensitivity pattern to few NAC species, which may be useful for healthcare professional to treat the *Candida* infection caused by NAC. Widespread use of FLC in various clinical conditions is the major cause of NAC dominance over *C. albicans*.¹⁶

With various types of antifungal agents available in the market, performing antifungal susceptibility testing and reporting their therapeutic outcome seems to be necessary. Evaluation of the recent antifungal agents is required, as well.

Our study is limited to a single institution's experience, other shortcomings of this study include retrospective design and scarcity of data on the costs associated with *Candida* infection and virulence among *Candida* species in different age groups. Additionally, the small number of isolates of *Candida* spp. has limited our ability to evaluate the relative significance of these specific non-albicans species.

Further studies with richer clinical data and larger samples are required to evaluate the costs associated with albicans and NAC species. In summary, the prevalence of *Candida* BSI has shifted dramatically from *C. albicans* to NAC spp. Therefore, early and accurate diagnosis of *Candida* infection is essential since each species varies significantly in susceptibility to the currently used antifungal drugs. Conducting antifungal susceptibility testing in the laboratories can aid clinicians with timely administration of the appropriate and accurate antifungal agents, it may also restrict the empirical use of the current antifungal agents.

Conclusion

Infection caused by Non albicans *Candida* (NAC) species has been increased. *C. tropicalis* was the most common isolated species. *Candida albicans*, *C. glabrata* and *C. krusei* showed high susceptibility to fluconazole and voriconazole. Amphotericin B, Caspofungin, Micafungin and Flucytosine showed high susceptibility towards other *Candida* species.

Our study concluded that VITEK 2 was more accurate and less time consuming as comparative to conventional methods. Identification of *Candida* species and their antifungal susceptibility are important for the treatment of immunocompromised patients and patient with serious underlying disease.

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