ORIGINAL ARTICLE

Candidemia in ICU and Non-ICU Settings: Species Distribution and Antifungal Resistance Patterns from a Tertiary Care Center in India with Reference to ICMR AMR 2024

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Received: 02 May 2026; *Accepted:* 15 June 2026

Abstract

Background: Candidemia is a major cause of invasive fungal bloodstream infections associated with significant morbidity and mortality. An increase in bloodstream infections caused by nonalbicans *Candida* species is concerning because it has different epidemiological characteristics and antifungal susceptibility compared to *C. albicans*. Resistance to antifungal agents, particularly azoles, complicates treatment.

Materials and methods: This retrospective hospital-based observational study was carried out in the Department of Microbiology, Saveetha Medical College, Chennai, from January 2025 to December 2025. Blood samples were collected and loaded into the BACT/ALERT automated system for microbial detection. Identification and antifungal susceptibility testing (AFST) were performed using the VITEK 2 automated system. CLSI M60 guidelines were used for interpreting the results.

Results: *Candida* species were isolated in 68/1207 (5.6%) positive blood cultures; 38/68 (55.9%) from ICU and 30/68 (44.1%) from non-ICU settings. Males (27/38, 71.1%) predominated in ICU, whereas females (18/30, 60%) predominated in non-ICU. The most commonly isolated species in the non-ICU setting was *C. auris* (11/30, 36.7%), whereas in the ICU setting it was *C. tropicalis* (13/38, 34.2%). *C. albicans* and *C. glabrata* showed 100% susceptibility, whereas *C. auris* demonstrated high resistance to azoles with variable resistance to echinocandins. Diabetes mellitus was the most common risk factor in both settings. Mortality was higher in ICU patients (9/38, 23.7%) than non-ICU patients (5/30, 16.7%); however, this difference was not statistically significant ($p = 0.47$).

Conclusion: Candidemia remains a significant source of bloodstream infections with a notable trend toward nonalbicans species and emerging antifungal resistance. Continuous surveillance and appropriate infection control practices are essential.

Keywords: Antifungal resistance, *Candida auris*, *Candida duobushaemulonii*, *Candida utilis*, Candidemia, Indian Council of Medical Research.

Journal of The Association of Physicians of India (2026): 10.59556/japi.74.1629

Introduction

Candida species-related bloodstream infections (BSI) are the most common invasive fungal diseases globally and are linked to significant morbidity and mortality.[1] Candidemia is a significant public health issue due to adverse patient outcomes, extended hospitalizations, elevated healthcare expenditures, and mortality rates ranging from 5% to 58%.[2,3] Due to several risk factors such as central venous catheterization, mechanical ventilation, total parenteral nutrition, renal replacement therapy, immunosuppression, and extended exposure to broad-spectrum antibiotics, patients admitted to intensive care units are especially vulnerable to candidemia. But candidemia is not limited to critical care units; more cases are being recorded from non-ICU wards, which is indicative of the growing number of patients with impaired immune systems and the complexity of contemporary medical care.

Currently, over 200 species of *Candida* have been reported, of which only 10% are known to cause human infections.[4] *C. albicans, C. glabrata, C. tropicalis, C. parapsilosis* and *C. krusei* are typically responsible for the majority of invasive *Candida* infections. *C. auris* has become a significant nosocomial pathogen of concern that causes candidiasis in recent times.[5,6]

The rising cases of BSI with nonalbicans *Candida* species are alarming because they have a distinct epidemiological profile and antifungal susceptibility patterns compared to *C. albicans* and also can exhibit varying acquired and innate susceptibility to antifungal drugs.[7–9] The increasing resistance to conventional antifungal drugs, especially azoles, makes diagnosis and treatment of *Candida* infections more difficult.[10] There is ample evidence of fluconazole resistance in *C. albicans*, which is often linked to drug exposure.[11] Fluconazole resistance may be more common in some nonalbicans species than in *C. albicans,* such as *C. glabrata* and *C. parapsilosis*, while *C. krusei* is naturally resistant to fluconazole, further complicating its outcomes.[7–9]

National statistics on the distribution of *Candida* species and patterns of antifungal susceptibility are provided in the ICMR AMR 2024 report;[12] however, resistance trends are not separated by ICU and non-ICU settings; therefore, institution-based research is required to assess local epidemiology and antifungal resistance patterns. Additionally, comparing institutional data with the ICMR AMR report allows for the evaluation of local resistance trends and the development of targeted antifungal stewardship initiatives.

The purpose of this study was to compare pooled resistance data with the results of the ICMR AMR 2024 national monitoring and to ascertain the species distribution and antifungal resistance trends of *Candida* bloodstream isolates in ICU and non-ICU settings at a tertiary care hospital in India. This study is primarily descriptive in nature and aims to provide a single-center epidemiological snapshot rather than establish causal relationships or definitive comparative conclusions.

Materials and Methods

Study Design and Setting

This retrospective hospital-based observational study was carried out in the Department of Microbiology, Saveetha Medical College, Chennai, from January 2025 to December 2025 after obtaining approval from the Institutional Scientific Committee (730/01/2026/SRB/SMCH). As it

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How to cite this article: Praveetha C, Vetrivel R. Candidemia in ICU and Non-ICU Settings: Species Distribution and Antifungal Resistance Patterns from a Tertiary Care Center in India with Reference to ICMR AMR 2024. J Assoc Physicians India 2026;74(8):57–62.

was a retrospective study, a waiver certificate was obtained from the Institutional Ethical Committee.

Inclusion Criteria

Intensive care unit and non-ICU patients with laboratory-confirmed candidemia, defined as at least one positive blood culture for *Candida* species in the presence of clinical features of infection such as fever, hypotension, or signs of sepsis.

Only the first episode per patient was included in the analysis, and duplicate isolates from the same patient were excluded.

Exclusion Criteria

- Colonization-related cases without a clinical connection.
- Inadequate clinical records.

Specimen Collection and Transport

Blood samples were collected under aseptic precautions from hospitalized patients and inoculated directly into BACT/ALERT blood culture bottles (bioMérieux, France). Bottles were transported immediately to the microbiology laboratory and loaded into the automated BACT/ALERT blood culture system for continuous monitoring.[13]

Sample Processing

Blood cultures flagged as positive by the automated system were followed by Gram-staining and subcultured onto blood agar and CHROMagar for growth and species differentiation. The VITEK 2 automated system was used for identification (ID card: VITEK® 2 YST) and antifungal susceptibility testing (AST card: VITEK® 2 AST-YS08), and results were interpreted in accordance with CLSI M60 (2024) guidelines using clinical breakpoints or epidemiological cutoffs wherever applicable.[14] It is acknowledged that automated identification systems such as VITEK 2 may have limitations in accurately identifying rare or emerging species such as *C. auris,* and confirmatory methods (e.g., MALDI-TOF MS) were not available.

Statistical Analysis

Data were entered in Microsoft Excel and analyzed using OpenEpi software version 3.01, an open-source epidemiological statistics tool. Categorical variables were expressed as frequencies and percentages. The chi-square test was used for comparison when expected cell counts were ≥5; otherwise, Fisher's exact test was applied. Due to the small sample size, odds ratios and confidence intervals were interpreted cautiously. All statistical tests were two-tailed, and a p-value < 0.05 was considered statistically significant. Given the limited sample size and small subgroup counts, multivariate analysis was not performed, and findings were interpreted as exploratory. Species with ≤ 3 isolates were excluded from inferential statistical comparisons and described descriptively.

Results

A retrospective analysis of blood culture data from the study period showed 1,207 positive blood cultures. Of these, 310 (26%) were from ICU patients while 897 (74%) were from non-ICU patients. *Candida* species were isolated in 68 cases (30 non-ICU cases and 38 ICU cases), accounting for 5.6% of all positive blood cultures.

Demographic Profile of Candidemia

Sex-wise Distribution

Males (71.1%) constituted the majority of candidemia cases in ICU, whereas females (60%) made up a larger percentage of cases in the non-ICU group. Overall, candidemia was more common in male patients. A statistically significant difference in sex distribution was noted between ICU and non-ICU patients ($p = 0.014$). Male patients had higher odds of ICU admission compared to females (OR 3.68; 95% CI 1.34–10.13) (Table 1).

Age-wise Distribution

The most common age group affected was 41–60 years in the ICU group, whereas in the non-ICU group, the 61–80 years age group predominated. There was no statistically significant difference in age distribution between ICU and non-ICU groups ($p = 0.265$) (Table 2).

Species Distribution of *Candida*

The most commonly isolated species in the non-ICU setting was *C. auris,* followed by *C. parapsilosis, C. tropicalis, C. albicans, C. glabrata, C. guilliermondii* and *C. utilis.*

In ICU, *C. tropicalis* was most commonly isolated, followed by *C. auris, C. albicans, C. glabrata, C. duobushaemulonii, C. parapsilosis, C. lusitaniae* and *C. utilis.*

Among the *Candida* species, only *C. parapsilosis* ($p = 0.018$) showed a statistically significant difference between ICU and non-ICU settings. No statistically significant differences were observed for other species (all $p > 0.05$). Species with ≤3 isolates (*C. guilliermondii, C. duobushaemulonii, C. lusitaniae* and *C. utilis*) were categorized as rare *Candida* species and are presented descriptively without inferential statistical comparison (Table 3).

Species-wise Antifungal Resistance Pattern of *Candida* Isolates

Antifungal resistance patterns are presented as the number of resistant isolates over total isolates tested (n/N) along with percentages. *Candida albicans* showed complete susceptibility to all antifungal agents tested in both ICU and non-ICU settings (0/6 and 0/1, respectively).

In ICU settings, *C. auris* showed resistance in 5/8 isolates (62.5%) to fluconazole, 8/8 isolates (100.0%) to voriconazole, 4/8 isolates (50.0%) to itraconazole, 2/8 isolates (25.0%) to clotrimazole, 5/8 isolates (62.5%) to micafungin and 3/8 isolates (37.5%) to amphotericin B, while all isolates were susceptible to caspofungin (0/8).

In non-ICU settings, *C. auris* showed resistance in 7/11 isolates (63.6%) to fluconazole, 11/11 isolates (100.0%) to voriconazole, 7/11 isolates (63.6%) to itraconazole, 3/11 isolates (27.3%) to clotrimazole and 7/11 isolates (63.6%) to amphotericin B, while all isolates were susceptible to caspofungin and micafungin (0/11).

In ICU settings, *C. duobushaemulonii* showed resistance in 2/3 isolates (66.7%) to fluconazole, 1/3 isolates (33.3%) to voriconazole, and 1/3 isolates (33.3%) to

Table 1: Sex-wise distribution of *Candida* species

Sex	*Non-ICU [n (%)]*	*ICU [n (%)]*	*Total [n (%)]*
Male	12 (40%)	27 (71%)	39 (57%)
Female	18 (60%)	11 (29%)	29 (43%)
Total	30 (100%)	38 (100%)	68 (100%)

Table 2: Age-wise distribution of *Candida* species

Age (years)	*Non-ICU [n (%)]*	*ICU [n (%)]*	*Total [n (%)]*
0–20	7 (23.33)	10 (26)	17 (25)
21–40	4 (13.34)	4 (11)	8 (12)
41–60	7 (23.33)	16 (42)	23 (34)
61–80	12 (40)	8 (21)	20 (29)
Total	30 (100)	38 (100)	68 (100)

Table 3: Species distribution of *Candida* isolates

Species	*Non-ICU [n (%)]*	*ICU [n (%)]*	*Total [n (%)]*	*p-value*
C. albicans	1 (3.3)	6 (15.8)	7 (10.3)	0.12
C. tropicalis	7 (23.3)	13 (34.2)	20 (29.4)	0.42
C. glabrata	1 (3.3)	4 (10.5)	5 (7.4)	0.37
C. parapsilosis	8 (26.7)	2 (5.3)	10 (14.7)	0.01
C. auris	11 (36.7)	8 (21.1)	19 (27.9)	0.18
C. guilliermondii	1 (3.3)	0	1 (1.5)	–
C. duobushaemulonii	0	3 (7.9)	3 (4.4)	–
C. lusitaniae	0	1 (2.6)	1 (1.5)	–
C. utilis	1 (3.3)	1 (2.6)	2 (2.9)	–

p-values were calculated using Fisher's exact test; $p < 0.05$ was considered statistically significant

amphotericin B, while all isolates were susceptible to caspofungin (0/3).

C. glabrata showed complete susceptibility to all antifungal agents tested in both ICU and non-ICU settings (0/4 and 0/1, respectively).

In ICU settings, *C. lusitaniae* showed complete susceptibility to all antifungal agents tested (0/1).

In ICU settings, *C. parapsilosis* showed complete susceptibility to all antifungal agents tested (0/2). In non-ICU settings, *C. parapsilosis* showed resistance in 3/8 isolates (37.5%) to fluconazole, 2/8 isolates (25.0%) to voriconazole, 2/8 isolates (25.0%) to itraconazole, and 3/8 isolates (37.5%) to amphotericin B, while all isolates were susceptible to caspofungin and micafungin (0/8).

In non-ICU settings, *C. guilliermondii* showed complete susceptibility to all antifungal agents tested (0/1).

In ICU settings, *C. tropicalis* showed resistance in 2/13 isolates (15.4%) to voriconazole, 4/13 isolates (30.8%) to itraconazole, 1/13 isolates (7.7%) to caspofungin, and 3/13 isolates (23.1%) to micafungin, while all isolates were susceptible to fluconazole and amphotericin B (0/13). In non-ICU settings, *C. tropicalis* showed resistance in 1/7 isolates (14.3%) to fluconazole, 2/7 isolates (28.6%) to voriconazole, 2/7 isolates (28.6%) to itraconazole, 5/7 isolates (71.4%) to micafungin, and 3/7 isolates (42.9%) to amphotericin B, while all isolates were susceptible to caspofungin (0/7).

C. utilis showed complete susceptibility to all antifungal agents tested in both ICU and non-ICU settings (0/1 each) (Table 4).

Risk Factors and Outcomes of the Patients with Candidemia

The most frequently observed risk factors included diabetes mellitus and dialysis, with no statistically significant differences observed between ICU and non-ICU groups ($p > 0.05$). Other risk factors such as preterm status, prolonged antibiotic use, chemotherapy, and radiotherapy were observed in the non-ICU group, while mechanical ventilation, polytrauma, steroid use, and systemic lupus erythematosus were observed in the ICU group. No statistically significant differences were observed for any of the evaluated risk factors (all $p > 0.05$).

Mortality was numerically higher among ICU patients (23.7%) compared to non-ICU patients (16.7%); however, this difference was not statistically significant ($p = 0.47$) (Table 5).

Antifungal Resistance among *Candida* Bloodstream Isolates in ICU and Non-ICU Settings with Reference to ICMR AMR 2024 National Surveillance Data

Antifungal resistance patterns observed in the present study are presented alongside ICMR AMR 2024 surveillance data for reference. *C. albicans* in our study showed 100% susceptibility to fluconazole, voriconazole, caspofungin and micafungin, while the ICMR AMR 2024 report documented resistance rates of 2.1% to fluconazole, 2.8% to voriconazole, 2.8% to caspofungin and 2.7% to micafungin.

C. auris showed an overall resistance rate of 63.2% to fluconazole, 100% to voriconazole, 26.3% to micafungin, and 100% susceptibility to caspofungin in our study, while the ICMR AMR 2024 report documented a resistance rate of 50% to fluconazole, 84% to voriconazole, 10.1% to caspofungin, and 2.8% to micafungin.

C. glabrata showed 100% susceptibility to fluconazole and voriconazole in our study; ICMR AMR 2024 documented resistance rates of 2% to fluconazole and 3.5% to voriconazole.

C. parapsilosis showed overall 20% resistance to fluconazole, 20% resistance to voriconazole, and 100% susceptibility to micafungin and caspofungin in our study, while the ICMR AMR 2024 report documented a resistance rate of 19.1% to fluconazole, 4.3% to voriconazole, 1.4% to caspofungin, and 0.4% to micafungin.

C. tropicalis showed an overall resistance rate of 5% to fluconazole, 20% to voriconazole, and 100% susceptibility to caspofungin and micafungin in our study, while the ICMR AMR 2024 report documented a resistance rate of 6.2% to fluconazole, 5.3% to voriconazole, 0.7% to caspofungin, and 1.4% to micafungin.

These differences may reflect local epidemiological variation rather than true population-level differences (Table 6).

Discussion

The present study highlights the burden, demographic trends, species distribution, and antifungal resistance pattern. In our study, *Candida* species constituted about 5.6% of all positive blood cultures, indicating that fungal bloodstream infections are an important contributor to morbidity, particularly among hospitalized and critically ill patients, which is in concordance with several other studies.[15,16] The larger patient base in general wards may account for the higher candidemia cases; however, ICU patients usually have more predisposing risk factors such as extended hospital stays, invasive procedures, and immunosuppression, which increase susceptibility to invasive fungal infections.[17]

The demographic study revealed a gender-based variation in the incidence of candidemia. In ICU settings, the majority of cases were male, whereas in non-ICU settings, females were most commonly affected. Generally, the incidence of candidemia was found to be higher in males.[18] A significant male predominance was noted among ICU patients ($p = 0.014$); however, this association should be interpreted with caution given the limited sample size. This is consistent with a number of studies that have shown a slightly higher incidence of bloodstream infections in males, potentially due to greater exposure to comorbid conditions.[18]

Based on the age distribution, candidemia affected a broad range of patients. The 61–80 years age group was most commonly affected in the ICU group, while the 41–60 years age group predominated in the non-ICU group. In general, both elderly and middle-aged populations were greatly impacted. The higher incidence in older age groups is mainly due to chronic illnesses, a weakening immune system, and frequent exposure to healthcare facilities.[19]

Diabetes mellitus is a well-established risk factor for candidemia, as hyperglycemia impairs immune function and promotes fungal proliferation; recent studies have

Table 4: Species-wise antifungal resistance pattern of *Candida* isolates

Species	*Antifungal drugs*	*ICU R (%) (N/N)*	*Non-ICU R (%) (N/N)*
C. albicans	Fluconazole	0% (0/6)	0% (0/1)
	Voriconazole	0% (0/6)	–
	Itraconazole	0% (0/6)	0% (0/1)
	Caspofungin	0% (0/6)	0% (0/1)
	Micafungin	0% (0/6)	0% (0/1)
	Amphotericin B	0% (0/6)	0% (0/1)
C. auris	Fluconazole	62.5% (5/8)	63.6% (7/11)
	Voriconazole	100% (8/8)	100% (11/11)
	Itraconazole	50% (4/8)	63.6% (7/11)
	Clotrimazole	25% (2/8)	27.3% (3/11)
	Caspofungin	0% (0/8)	0% (0/11)
	Micafungin	62.5% (5/8)	0% (0/11)
	Amphotericin B	37.5% (3/8)	63.6% (7/11)
C. duobushaemulonii	Fluconazole	66.7% (2/3)	–
	Voriconazole	33.3% (1/3)	–
	Caspofungin	0% (0/3)	–
	Amphotericin B	33.3% (1/3)	–
C. glabrata	Fluconazole	0% (0/4)	0% (0/1)
	Itraconazole	0% (0/4)	0% (0/1)
	Voriconazole	0% (0/4)	0% (0/1)
	Clotrimazole	0% (0/4)	0% (0/1)
	Amphotericin B	0% (0/4)	0% (0/1)
C. lusitaniae	Fluconazole	0% (0/1)	–
	Voriconazole	0% (0/1)	–
	Amphotericin B	0% (0/1)	–
C. parapsilosis	Fluconazole	0% (0/2)	37.5% (3/8)
	Voriconazole	0% (0/2)	25% (2/8)
	Itraconazole	0% (0/2)	25% (2/8)
	Caspofungin	0% (0/2)	0% (0/8)
	Micafungin	0% (0/2)	0% (0/8)
	Amphotericin B	0% (0/2)	37.5% (3/8)
C. guilliermondii	Fluconazole	–	0% (0/1)
	Voriconazole	–	0% (0/1)
	Caspofungin	–	0% (0/1)
	Micafungin	–	0% (0/1)
	Amphotericin B	–	0% (0/1)
C. tropicalis	Fluconazole	0% (0/13)	14.3% (1/7)
	Voriconazole	15.4% (2/13)	28.6% (2/7)
	Itraconazole	30.8% (4/13)	28.6% (2/7)
	Caspofungin	7.7% (1/13)	0% (0/7)
	Micafungin	23.1% (3/13)	71.4% (5/7)
	Amphotericin B	0% (0/13)	42.9% (3/7)
C. utilis	Fluconazole	0% (0/1)	0% (0/1)
	Voriconazole	0% (0/1)	0% (0/1)
	Itraconazole	0% (0/1)	0% (0/1)
	Amphotericin B	0% (0/1)	0% (0/1)

'–' indicates that no isolates were available for testing

consistently identified diabetes as one of the most common comorbidities associated with candidemia.[20]. In both ICU and non-ICU groups, other risk factors such as dialysis, long-term antibiotic usage, chemotherapy and preterm status were noted; however, none of these factors showed a statistically significant association between ICU and non-ICU groups. Despite having a substantially higher mortality rate (23.7% vs 16.7%) than non-ICU patients, this difference was not statistically significant and should be interpreted cautiously.

The antifungal resistance patterns in our study help in understanding the regional susceptibility trends. *C. albicans* demonstrated complete susceptibility to all the antifungal drugs tested in this study, which is in line with global trends that show that *C. albicans* resistance is still relatively low compared to nonalbicans species.[21] However, in both ICU and non-ICU settings, *C. auris* demonstrated high resistance rates to azoles, particularly fluconazole and voriconazole.[22,23] Resistance to amphotericin B was also notable. The elevated resistance observed in *C. auris*, especially to azoles and echinocandins, may be attributed to intrinsic mechanisms such as ERG11 gene mutations and efflux pump overexpression, as reported in previous studies. Although molecular characterization was not performed in the present study, these findings may indicate the presence of resistant clades and underscore the need for further genomic surveillance. These observations highlight the importance of periodic antifungal susceptibility testing and careful selection of empirical antifungal therapy.

C. tropicalis showed considerable resistance to azoles and echinocandins, which suggests changing resistance trends, especially in non-ICU settings.[24] *C. parapsilosis* showed variable resistance to fluconazole and Amphotericin B in non-ICU patients, which is important from a clinical point of view as this species is commonly associated with catheter-related bloodstream infections. *C. glabrata, C. lusitaniae, C. utilis* and *C. guilliermondii* had overall lower resistance rates; however, these findings should be interpreted cautiously due to the small number of isolates.

The findings in our study reveal both agreement and discrepancies when compared to the ICMR 2024 national surveillance data.[12] In our study, the fluconazole resistance rate in *C. auris* was higher than the ICMR report, which may reflect local or regional variation. *C. auris* may require focused attention in antimicrobial stewardship programs, as the resistance rate of micafungin in *C. auris* was higher than that reported in national surveillance data. On the other hand, compared to the national data, *C. albicans* and *C. glabrata* had a lower rate of resistance, which indicates that these species are still susceptible to the commonly used antifungal drugs.

The increasing number of cases of nonalbicans *Candida* species and the trend of antifungal resistance make it necessary

Table 5: Risk factors and outcomes of the patients with candidemia

Risk factors/comorbidities	*ICU (%)*	*Non-ICU*	*p-value*
Dialysis	6 (15.8)	5 (16.7)	0.90
Prolonged antibiotic use	1 (2.6)	2 (6.7)	0.60
Chemotherapy	1 (2.6)	2 (6.7)	0.60
Diabetes mellitus	15 (39.5)	10 (33.3)	0.59
Preterm	4 (10.5)	6 (20)	0.32
Radiotherapy	0 (0)	1 (3.3)	0.44
Mechanical ventilation	4 (10.5)	0 (0)	0.06
Polytrauma	3 (7.9)	0 (0)	0.11
Steroid	2 (5.3)	0 (0)	0.20
SLE	1 (2.6)	0 (0)	0.36
Outcome			
Dead	9 (23.7)	5 (16.7)	0.47
Recovered	29 (76.3)	25 (83.3)	0.47

p values were calculated using Fisher's exact test; $p < 0.05$ was considered statistically significant

Table 6: Antifungal resistance among *Candida* bloodstream isolates in ICU and non-ICU settings with reference to ICMR AMR 2024 national surveillance data

Species	*Antifungal drugs*	*ICU + Non-ICU settings*	*ICMR AMR 2024*
C. albicans	Fluconazole	0% (0/7)	2.1%
	Voriconazole	0% (0/7)	2.8%
	Caspofungin	0% (0/7)	2.8%
	Micafungin	0% (0/7)	2.7%
C. auris	Fluconazole	63.2% (12/19)	50%
	Voriconazole	100% (19/19)	84%
	Caspofungin	0% (0/19)	10.1%
	Micafungin	26.3% (5/19)	2.8%
C. glabrata	Fluconazole	0% (0/5)	2%
	Voriconazole	0% (0/5)	3.5%
C. parapsilosis	Fluconazole	20% (2/10)	19.1%
	Voriconazole	20% (2/10)	4.3%
	Caspofungin	0% (0/10)	1.4%
	Micafungin	0% (0/10)	0.4%
C. tropicalis	Fluconazole	5% (1/20)	6.2%
	Voriconazole	20% (4/20)	5.3%
	Caspofungin	0% (0/20)	0.7%
	Micafungin	0% (0/20)	1.4%

to identify the species early and perform susceptibility testing.[25,26] The use of antifungal agents should be appropriate and timely to reduce the mortality rate due to candidemia. Infection control practices play an important role in the prevention of nosocomial fungal infections, particularly in ICUs. The development and spread of resistance can be prevented by strictly adhering to aseptic practices and antimicrobial stewardship programs.

Limitations

The study has some limitations in the form of being a retrospective study done at a single center, which might have implications in terms of generalization of the study. Secondly, the study has a small sample size in general, and some of the *Candida* species have very few isolates, which might have implications in terms of the robustness of the statistical analysis and the interpretation of the results. In addition, the study has relied on VITEK 2 for species identification, and it might have implications in terms of the absence of advanced technology in the form of MALDI-TOF mass spectrometry for species identification, especially for rare species of *Candida*. In addition, the absence of molecular typing of the isolates and the lack of longitudinal data are some of the limitations.

Conclusion

Candidemia is an important cause of bloodstream infections with an increasing trend of nonalbicans species of *Candida* and increased resistance to antifungal agents. *C. tropicalis* and *C. auris* were the most common pathogens, with *C. auris* demonstrating higher resistance to antifungal agents. There is an urgent need to monitor, perform antifungal susceptibility testing, and use antifungal agents judiciously along with infection control measures to combat the rising threat of candidemia, both in ICU and non-ICU settings.

Author Contributions

Praveetha C: Conceptualization, data curation, formal analysis, investigation, methodology, software, supervision, validation, visualization, writing—original draft, and writing—review and editing. Rithvika Vetrivel: Data curation, supervision, validation, visualization, and writing—review and editing.

Ethical Approval

The study was approved by the Institutional Scientific Committee (approval no. 730/01/2026/SRB/SMCH). As this was a retrospective study, a waiver of informed consent was obtained from the Institutional Ethics Committee.

Patient Consent Statement

Not applicable. The study was reviewed by the Institutional Ethics Committee, which determined that ethical approval was not required due to the retrospective nature of the study using anonymized data.

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