ORIGINAL RESEARCH ARTICLE

NATIONAL JOURNAL NJMR MEDICAL RESEARCH

A Clinicomycological Study of Mucosal and Cutaneous Candidiasis in A Tertiary Care Centre in Central India

Isha Khandelwal[1*], Vivek Choudhary[2], Shyam Govind Rathoriya[3], Rochit Singhal[4], Sandeep Sharma[5]

[1,3,4]Department of Dermatology, Venereology and Leprosy, Chirayu Medical College and Hospital, Bhopal, India
[2]Department of Dermatology, Venereology and Leprosy, Ram Krishna Medical College Hospital and Research Centre, Bhopal, India
[5]Department of Dermatology, Venereology and Leprosy, District Hospital Murar, Gwalior, India

DOI:
10.55489/njmr.160320261342

***Corresponding author**:
Dr. Isha Khandelwal
(isha16khandelwal@gmail.com)

Date of Submission: 24/02/2026
Date of Acceptance: 06/05/2026
Date of Publication: 01/07/2026

Funding Support:
None Declare

Conflict of Interest:
The authors have declared that no conflict of interest exists.

How to cite this article:
Khandelwal I, Choudhary V, Rathoriya SG, Singhal R, Sharma S. A Clinicomycological Study of Mucosal and Cutaneous Candidiasis in A Tertiary Care Centre in Central India. Natl J Med Res 2026;16(03):131-137. DOI: 10.55489/njmr.160320261342

ABSTRACT

Background: Candidiasis ranks as a widespread opportunistic fungal infection sparked by species of genus Candida - typical commensals in the skin, mouth, gut and female genitals. Various local and systemic factors such as diabetes mellitus, immunosuppression, pregnancy, and antibiotic therapy predispose individuals to mucosal and cutaneous candidiasis. Despite its clinical importance, limited region-specific data are available regarding the clinical patterns and species distribution of candidiasis in Central India. The objective of the study was to evaluate the clinical profile, predisposing factors, and mycological characteristics of mucosal and cutaneous candidiasis and to identify different *Candida* species using culture and subculture.

Methodology: This observational study included patients of all ages and genders presenting with suspected mucosal and cutaneous candidiasis at a tertiary care centre. Only patients with positive 10% KOH examination were included. Detailed clinical evaluation and laboratory investigations were performed. For species identification, samples underwent culturing on Sabouraud Dextrose Agar and CHROMagar. Data analysis was performed using specialised statistical software.

Results: Out of 83 clinically suspected cases, 55 (66.3%) were KOH positive. A 1:1.9 male to female ratio highlighted higher prevalence among women while mean age of study population was 40.95 years. Diabetes mellitus dominated comorbidities at 62.8%. Mucosal candidiasis affected 74.5% of cases outpacing cutaneous forms. Oral candidiasis emerged as a leading type, accounting for 47.2% of cases. Among 31 culture-positive isolates, *C. albicans* was the predominant species (48.4%), followed by *C. tropicalis* (29%).

Conclusions: Mucosal candidiasis, particularly oral candidiasis, was the most frequent clinical presentation. Diabetes mellitus emerged as the major predisposing factor. Accurately identifying *Candida* species stands vital to diagnosing and managing mucosal and cutaneous candidiasis effectively.

Keywords: Candidiasis; Candida albicans, Non-albicans Candida, Diabetes Mellitus

Publisher: Medsci Publications [www.medscipublications.com] ISSN: 2249 4995 Official website: www.njmr.in

INTRODUCTION

Candidiasis encompasses a broad array of opportunistic fungal infections from yeasts of the genus Candida, which naturally inhabit the skin, digestive tract, and female genital tract, where they exist as normal flora.[1] The colonization of Candida may occur during birth or later in life. Over 200 Candida species exist, with more than 17 tied to human disease; five species account for approximately 90 % of cases: *Candida albicans*, *Candida glabrata*, *Candida tropicalis*, *Candida parapsilosis*, and *Candida krusei*.[2,3]

A prime virulence trait in the pathogenic fungus Candida *albicans* draws intense study and discussion for its dimorphism: the capacity to toggle between yeast and hyphal forms.[4] Candida species share similar cultural characteristics and can grow under both aerobic and anaerobic conditions. Temperature significantly affects their growth as higher temperature (37°C) tends to promote pseudohyphae formation, aiding pathogenicity.[5]

Candida is an opportunistic infection, and immunosuppression due to leukemia, lymphoma, prolonged corticosteroid uses or cytotoxic chemotherapy increases susceptibility. Diabetes mellitus, pregnancy and oral contraceptive use may predispose to vaginal colonization. Oral and oesophageal candidiasis are closely associated with HIV infection.[5]

Clinically, candidiasis exhibits diverse presentations depending on the site of involvement. Oral thrush, or Pseudomembranous candidiasis, is the most prevalent form of oral candidiasis and manifests as easily removable white plaques. Candidal Balanitis presents with erythematous, inflamed lesions associated with thick white curd like discharge. Patients with vulvo-vaginal candidiasis experience vulvar pruritus, burning sensation, and curd like white discharge. Local or systemic antimicrobial treatments can trigger vulvovaginal candidiasis and may result in recurring episodes, hypothetically due to disruption of normal vaginal flora, allowing increased yeast colonization and proliferation.[6,7] These variations in clinical presentation often correlate with differences in host factors and infecting *Candida* species, emphasizing the need for integrated clinico-mycological evaluation.

Despite the clinical significance of candidiasis, its presentation, associated risk factors, and species distribution show considerable geographic variation. There is a lack of region-specific studies evaluating the relationship between clinical manifestations, predisposing factors, and species distribution of *Candida* in this population. It is hypothesized that variations exist in the clinical presentation, associated risk factors, and species distribution of candidiasis in this region. Our primary objective was to assess the spectrum of mucosal and cutaneous presentations of candidiasis. In addition, the study aimed to analyze associated predisposing factors, and to isolate and characterize different *Candida* species using culture techniques.

This study aimed to analyze the clinical profile of mucosal and cutaneous candidiasis and to determine the distribution of Candida species among clinically suspected and microbiologically confirmed cases as primary and secondary outcomes, respectively.

MATERIALS AND METHODS

This cross-sectional observational study took place over 18 months from July 2023 to December 2024 in the Department of Dermatology, Venereology and Leprosy. All patients irrespective of age and gender showing symptoms and signs of mucosal and cutaneous candidiasis who attended the Out Patient Department were further screened for Candida and those patients showing *Candida* positivity on KOH microscopy qualified for inclusion. The inclusion of only KOH-positive cases was a deliberate methodological choice to ensure mycological confirmation of candidiasis and to minimize inclusion of dermatological mimics and misclassification bias. While this approach may have excluded clinically suspected but KOH-negative cases, it enhanced the diagnostic validity, specificity and reliability of the study findings by restricting the cohort to microbiologically confirmed cases.

Individuals testing negative on initial KOH exam or those using topical antifungals in the prior 2 weeks or systemic ones within 4 weeks beforehand, did not qualify for the study.

Eligible candidiasis patients received enrollment after providing written consent in the regional vernacular, with the study commencing post Institutional Ethics Committee approval.

A detailed history, including age, gender, onset, and duration of muco-cutaneous lesions as well as clinical types, morphology, distribution and presentations, were all recorded in a prescribed format. A thorough general, systemic, and local examination was conducted, with all details documented in a predesigned proforma. Cutaneous examination included site of lesions, its morphology, pattern, area involved, description of lesions, and any other specific features of Candida species and subspecies.

All routine and special investigations, including culture in Sabouraud Dextrose agar (SDA) and CHROM agar were carried out for all patients who tested positive for Candida in the 10% KOH examination.

Statistical Analysis: All data were systematically recorded and entered into Microsoft Excel for data coding, tabulation, and validation. The dataset was subsequently analyzed using SPSS version 25.0. Descriptive statistics were used to summarize the study variables. Categorical variables such as gender distribution, clinical types of candidiasis, KOH findings, and associated comorbidities were expressed as frequencies and percentages. Continuous variables, including age, were presented as mean ± standard deviation (SD).

Ethical consideration: Ethical clearance was obtained from the Institutional Ethics Committee vide Letter No. CMCH/EC/2023/84 dated 10/07/2023. The study was carried out in accordance with established ethical principles and institutional guidelines.

RESULTS

In our study, KOH mounts were prepared for 83 patients who were clinically suspected of having candidiasis. Out of these, 55 (66.3%) cases were tested positive for Candida on KOH mount and were included in the study. On direct microscopy of these KOH positive smears, pseudohyphae with budding yeast cells were observed in 32 (58.2%) cases, isolated budding yeast cells in 14 (25.5%) cases, and both pseudohyphae and blastoconidia in clusters in 9 (16.3%) cases. Abundant pseudohyphal forms were noted, in mucosal lesions, particularly in cases of vulvovaginal and oral candidiasis, while predominantly yeast forms were observed in some cases of intertrigo and paronychia.

The remaining 28 (33.7%) KOH-negative cases were excluded from the study and were further evaluated for other clinical mimics like dermatophytosis, erythrasma, inverse psoriasis, seborrheic dermatitis, contact dermatitis, bacterial intertrigo, lichen planus (in oral lesions), and leukoplakia.

In the present study, female preponderance was observed who constituted approximately 65.5% of the sample, corresponding to a male to female ratio of 1:1.9. (See Figure 1)

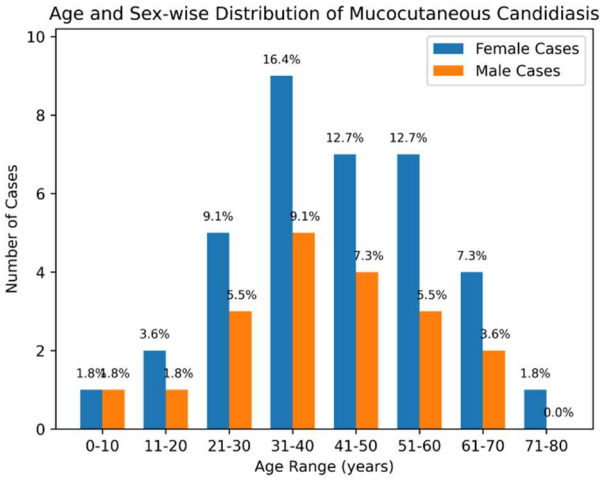

Figure 1: AGE AND SEX - WISE DISTRIBUTION OF VARIOUS CANDIDIASIS

The wide age distribution of patients was noted in our study, ranging from a 9-week-old infant, suffering from candidal diaper dermatitis to a 73-year-old adult with candidal balanoposthitis, with a mean age of 40.95 ± 16.52 years. (See Figure 1) The majority of cases were observed in the third to fifth decades of life. The present study analyzed 24 cases (43.6%) showing duration of 1-3 months followed by less than 1 month in 18 cases (32.7%). (See Table 1)

Among the 55 KOH-positive cases included in the study, 43 patients (78.2%) had identifiable underlying systemic or dermatological conditions predisposing them to candidiasis. (See Table 1)

Diabetes mellitus was the most common associated comorbidity, observed in 27 cases (62.8%). Autoimmune blistering disorders were noted in 5 cases (11.6%); all cases were of pemphigus vulgaris. HIV infection was present in 2 cases (4.7%), single cases were observed in association with systemic lupus erythematosus (SLE) (2.3%) and pregnancy (2.3%).

Among the 55 KOH-positive cases, mucosal candidiasis constituted the majority, accounting for 41 cases (74.5%), while cutaneous candidiasis was observed in 14 cases (25.5%). (See Table 2) In the mucosal subgroup, oral candidiasis constituted as a predominant form, documented in 26 cases (47.2%). In the cohort of 26 oral candidiasis cases, pseudomembranous candidiasis was the leading form, comprising 14 instances (54%), presenting as removable white curd-like plaques, where the buccal mucosa was involved in 8 cases (57.1%), tongue in 4 cases (28.6%), and the soft palate in 2 cases (14.3%). Angular cheilitis was noted in 4 cases (15%), involving the angles of the mouth and presenting with fissuring and erythema. Erythematous candidiasis (3 cases, 11%), predominantly affected the dorsum of the tongue and palate, showing erythematous depapillated areas, while hyperplastic candidiasis (2 cases, 8%), was observed over the buccal mucosa as non-scrapable white plaques. Chronic atrophic candidiasis (2 cases, 8%) involved the palatal mucosa and single case of median rhomboid glossitis involved the midline of the posterior dorsum of the tongue. The hallmark white curd-like plaques appeared in 61.5 % of oral candidiasis cases, with oral burning sensation noted next in prevalence (57.7 %).

Vulvovaginal candidiasis accounted for 9 cases (16.4%), of which 3 cases also showed associated anal involvement. Vulval itching was the predominant complaint, reported in about 88.9% of cases, while thick curdy white vaginal discharge and burning sensation were observed in 77.8% and 55.5% of patients respectively.

In males, candidal balanitis was noted in 4 cases (7.3%), while balanitis with posthitis was observed in 2 cases (3.6%). Pruritus was noted in 83.3 % of cases while erythema of the glans ± prepuce was observed in 66.6% of cases. In intertriginous candidiasis (4 cases), the lesions commonly presented with pruritus (83.3%), erythema with maceration (66.6%), and burning sensation (33.3%).

Out of the 55 KOH mount confirmed cases of candidiasis, 31 (56.4%) were culture positive and subjected to species identification. On culture of the 31 culture-positive cases, visible growth within 24-72 hours was

observed in 27 cases (87.1%), while 4 cases (12.9%) demonstrated comparatively slower growth after 72 hours. Among the 31 Candida isolates, *C. albicans* was the predominant species accounting for 15 (48.4%) isolates, followed by *C. tropicalis* in 9 (29%) cases. The leading presentation was oral candidiasis (12 cases), dominated by *C. albicans* isolates (6 cases) and succeeded by *C. tropicalis* (3 cases). Out of 7 cases of vulvovaginal candidiasis, *C. albicans* was isolated in 3 cases, while 2 cases were of C. *tropicalis*. Both balanitis ± posthitis and intertriginous candidiasis presented in 3 cases each where *C. albicans* led (2 cases each) and *C. tropicalis* trailed (1 case each).

On Sabouraud Dextrose Agar (SDA), most *Candida* isolates exhibited typical yeast-like colonies. *C. albicans* showed creamy white, smooth, and dome-shaped colonies in 100% of isolates. *C. tropicalis* produced cream to slightly bluish-white colonies in 88.8% of cases. *C. krusei* demonstrated dry colonies with a characteristic "ground-glass" appearance in all isolates (100%). *C. glabrata* presented as smooth, creamy to tan colonies in 75% of isolates appearing smaller in size. On CHROM agar Candida, species differentiation was based on colony color and morphology. *C. albicans* produced distinct light to emerald green colonies in 98-99% of isolates. *C. tropicalis* appeared as steel blue to blue-gray colonies in 93-98% of cases.

Table 1: Clinical profile of patients with candidiasis in the study population

Parameter	Cases(%)
Duration of symptoms	
< 1 month	18 (32.7)
1-3 months	24 (43.6)
> 3 months	13 (23.7)
Underlying comorbidities / predisposing conditions	
Diabetes Mellitus	27 (62.8)
Pemphigus Vulgaris	5 (11.6)
Herpetic Gingivostomatitis	3 (6.8)
Stevens-Johnson Syndrome / Toxic Epidermal Necrolysis	3 (6.8)
HIV Infection	2 (4.7)
Sexually Transmitted Infections	2 (4.7)
Systemic Lupus Erythematosus	1 (2.3)
Pregnancy	1 (2.3)
Clinical types of candidiasis	
Mucosal Candidiasis	41 (74.5)
Oral Candidiasis	26 (47.2)
Vulvovaginal Candidiasis	9 (16.4)
Balanitis ± Posthitis	6 (10.9)
Cutaneous Candidiasis	14 (25.5)
Intertriginous Candidiasis	6 (10.9)
Interdigital Candidiasis	4 (7.3)
Candidal Onychomycosis ±Paronychia	2 (3.6)
Candidal Diaper Dermatitis	1 (1.8)
Candidal Perianal Dermatitis	1 (1.8)
Total	**55 (100)**

Table 2: Candida species in different types of candidiasis

Clinical type	C. *albicans*	C. *tropicalis*	C. *glabrata*	C. *krusei*	Culture negative	Total cases
Oral Candidiasis	6 (40)	3 (33.33)	2 (50)	1 (33.33)	14 (58.33)	26 (47.27)
Vulvovaginal Candidiasis	3 (20)	2 (22.22)	1 (25)	1 (33.33)	2 (8.33)	9 (16.36)
Balanitis ± Posthitis	2 (13.33)	1 (11.11)	0 (0)	0 (0)	3 (12.5)	6 (10.91)
Intertriginous Candidiasis	2 (13.33)	1 (11.11)	0 (0)	0 (0)	3 (12.5)	6 (10.91)
Interdigital Candidiasis	1 (6.67)	1 (11.11)	0 (0)	0 (0)	2 (8.33)	4 (7.27)
Candidal Onychomycosis ± Paronychia	0 (0)	1 (11.11)	1 (25)	0 (0)	0 (0)	2 (3.64)
Candidal Diaper Dermatitis	0 (0)	0 (0)	0 (0)	1 (33.33)	0 (0)	1 (1.82)
Candidal Perianal Dermatitis	1 (6.67)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1.82)
Total	15 (100)	9 (100)	4 (100)	3 (100)	24 (100)	55 (100)

DISCUSSION

The study population had a mean age of 40.95 years ± 16.52, ranging from a 9-week-old infant to a 73-year-old adult. Candidiasis in infancy is well documented and is attributed to immature cell-mediated immunity, colonization during passage through the birth canal, the warm and moist skin environment. On the other extreme, elderly patients are frequently exposed to Candida overgrowth, likely due to age-related decline in immunity, associated comorbidities and polypharmacy. A study conducted by Muzaheed et al. noted highest number of candidal infections in age group of 50-59 years (14.97%) and 40-49 years (14.17%), followed by 70-79 years group (13.45%).[8] In contrast to our findings, Kim JH et al, in their study on oral candidiasis, reported that the majority of cases occurred in individuals aged >60 years (72.2%), followed by 40-60 years (21.1%), 20-40 years (5.6%), and <20 years (1.1%).[9] The relatively younger age distribution observed in our cohort, compared to global trends, may be attributed to the higher prevalence of risk factors such as diabetes mellitus, as opposed to the age-related immunosenescence that predominates in Western populations.

In the current study, female outnumbered males, representing 65.5% of cases and yielding a male to female ratio of 1:1.9. The higher prevalence of candidiasis in females may be attributed to increased estrogens, altered vaginal pH, occlusive clothing and immunological differences and favourable anatomical factors such as moist and occluded areas, which enhance fungal adherence to epithelial cells and promote proliferation. A similar gender distribution was documented by Mohan S et al. in a cross-sectional study of 100 patients where females constituted 73% of cohort corresponding to a male-to-female ratio of 1:2.7.[1] A comparable distribution was also reported by Grace BN et al[10] in a prospective study involving 166 participants, where the

overall male-to-female ratio was 1:1.24. In the subgroup of 121 culture-positive cases, females constituted 69 (57%), while males accounted for 52 (43%), yielding a male-to-female ratio of 1:1.3. In contrast to our observations, a study by Thilak S et al. on cutaneous fungal infections in diabetic individuals demonstrated a nearly equal gender distribution in candidiasis cases, with 60 males and 56 females.[11] Shukla R et al. also reported a predominance of male patients (67%) over females (33%) in their cohort of candidiasis cases.[12]

We found diabetes mellitus as the most common comorbidity (62.8%). Candidal predominance among diabetic patients can be attributed to hyperglycemia, which enhances Candida adherence to epithelial cells, impairs neutrophil function, and provides a glucose-rich environment that promotes fungal proliferation. Likewise, Shukla R et al. in their prospective study of 100 patients with candidiasis found diabetes mellitus being the most common (46%) predisposing factors.[12] Kim JH et al. reported that systemic diseases were found in 88.1% of patients with oral candidiasis and among them endocrine, nutritional and metabolic diseases group showed a high proportion (22%).[9] Contrary to our observations, the study by Seeniammal S et al. on vulvovaginal candidiasis highlighted HIV positivity as the leading associated condition (48.7%), followed by antibiotic intake and diabetes.[13] This highlights that in our specific geographic and clinical setting, metabolic health is a greater driver of fungal opportunistic infection than viral-induced immunosuppression.

Among the clinical entities assessed oral candidiasis occurred most often, representing 47.2% of cases with vulvovaginal candidiasis ranking second at 16.4% cases. The frequent involvement of the oral cavity may be explained by established risk factors such as diabetes mellitus, immunosuppression, poor oral hygiene, denture use, and antibiotic therapy, all of which alter the normal oral flora and facilitate fungal proliferation. Similarly, in a study on cutaneous fungal infections among patients with diabetes mellitus conducted in Tamil Nadu, Thilak S et al. reported oral candidiasis (31%) as the most frequent presentation, followed by erosio interdigitalis (22%), vulvovaginitis (22%) and balanoposthitis (16%).[11]

The increased frequency of vulvovaginal candidiasis suggests contiguous spread in moist muco-cutaneous areas along with hormonal influences, especially in women of reproductive age, diabetes and antibiotic use, all of which likely contributed to these cases. Also, moist vaginal environment and rich glycogen content favor Candida colonization and overgrowth in vaginal mucosa.

In the present study, among the 26 patients with oral candidiasis, 54% had pseudomembranous candidiasis, followed by 15% with angular cheilitis and 11% with the erythematous type. Similarly, Mohan S et al. found pseudomembranous pattern to be the most common (62.5%), followed by angular cheilitis (20.8%) and acute erythematous (16.7%).[1]

In our study among patients with oral candidiasis, white curd-like plaques were seen in 61.5% of cases, oral burning sensation in 57.7% of patients. In a study by Czajka KM et al. 93 % of cases had dry mouth, of which 50.9% had taste disturbances, while 42.1% experienced burning mouth.[14] Monsen RE et al. conducted a study of oral candidiasis in advanced cancer patients where 48% of the patients had dry mouth.[15]

Among males with balanitis ± posthitis, itching and erythema of the glans or prepuce were the most frequent symptoms. The warm, moist environment beneath the prepuce, poor hygiene, and uncontrolled diabetes were important contributing factors in these patients. A study by Jegadish N et al. found fissuring being the most common presentation (53.06%), succeeded equally by phimosis and erythema in 51.02% each.[16]

In this study, *C. albicans* stood out as the most prevalent species, accounting for 48.4% of the culture positive cases. Echoing this Muzaheed et al. highlighted C. *albicans* dominance (58.3%) over C. *glabrata* (6.3%) in a 20-year retrospective survey of Candida cases.[8] In parallel Kanna BV et al. analysed 50 Candida strains from assorted clinical sources, identifying C. *albicans* as the leading isolate (51%) trailed by C. *tropicalis* 25% among non albicans group.[17]

In oral candidiasis, *C. albicans* accounted for 50% of culture positive cases, followed by *C. tropicalis* 25%, *C. glabrata* 16.7%, and *C. krusei* 8.3%, demonstrating a mixed species distribution .This finding is comparable to a large scale population based study on oral candidiasis by Hu L et al. where C. *albicans* prevailed as the most top species (75.37%), with C. *tropicalis* (6.06%), C. *krusei* (2.79%) and C. *glabrata* (2.02%) following in descending order.[18]

In the present study, vulvovaginal candidiasis was predominantly caused by *C. albicans* (42.9%) among culture positive cases, followed by *C. tropicalis* (28.6%), while *C. glabrata* and *C. krusei* each accounted for 14.3%. Seeniammal S et al. performed a clinicomycological analysis of vulvovaginal candidiasis, revealing C. *albicans* as the predominant isolate, (82%), while non albicans Candida species comprised 18%.[13]

In our study, balanitis ± posthitis showed a predominance of *C. albicans* (66.7%), followed by *C. tropicalis* (33.3%) in the culture positive cases. A comparable pattern emerged from Jegadish N et al.'s descriptive profiling of balanoposthitis etiology and clinical traits, where 92.31% exhibited candidal proliferation, exclusively yielding C. *albicans* across all cultures.[16]

Also, the observation of 51.6% non-albicans Candida in our study indicates a possible shift in species distribution within our region. This has important clinical implications, as these species are often linked to increased biofilm formation and reduced susceptibility to commonly used azole antifungals.

In a study by Prateeksha S et al., 50% of 36 *Candida* isolates were *C. albicans* and 50% non-albicans (predomi-

nantly *C. tropicalis*), with biofilm formation in 33.3% mainly *C. albicans* highlighting its role in antifungal resistance and persistence.[19]

Grace BN et al. in their study on cutaneous candidiasis observed that non albicans Candida species were found to be the most common (57%) showing increased trend in non albicans Candida infections recently.[10] Also, Shukla R et al., in their study of different Candida species isolation from various clinical samples, observed predominance of non-albicans Candida (76%), with C. *tropicalis* as the principal isolate (~50%).[12]

STRENGTH AND LIMITATIONS

The present study provides a comprehensive clinico-mycological evaluation of mucosal and cutaneous candidiasis in a tertiary care setting in Central India, contributing valuable regional data where such information is limited. The inclusion of patients across different age groups and both genders allowed a broader assessment of the clinical spectrum of candidiasis. Rigorous diagnostic methodology, including confirmation with 10% KOH examination followed by culture on Sabouraud dextrose agar and CHROM agar enhanced the accuracy of species identification. Detailed clinical evaluation and documentation of associated comorbidities further strengthened the correlation between clinical presentation and mycological findings. These methodological strengths improve the reliability of the results and provide useful insights for clinicians managing mucocutaneous candidiasis.

Although valuable, this study is constrained by limitations, including its modest sample size, which could curtail the broader applicability of results. Notably, not all KOH-positive cases yielded positive cultures, which might have affected the complete assessment of species distribution. Biochemical tests and advanced molecular diagnostic techniques were not performed, which could have provided more accurate species recognition and therapeutic guidance.

CONCLUSION

This investigation delineates the clinical and etiological landscape of candidiasis, highlighting oral candidiasis as the primary manifestation. Among the culture positive isolates C. *albicans* remained the predominant pathogen, however, a substantial fraction of cases stemmed from non-albicans Candida species, mirroring the shifting epidemiological contours chronicled in contemporary reports. The disparity between KOH-positive cases and culture recovery underscores the challenges in species - level identification in clinical settings. The study also emphasizes the increasing frequency of candidiasis in certain predisposing factors such as diabetes mellitus and other conditions that disrupt host-microbiome balance. Early recognition of clinical patterns along with species-level identification is essential for appropriate management and prevention of antifungal resistance. Larger multicentric studies and the development of newer antifungal agents are required to better address the changing epidemiology and therapeutic challenges of candidiasis.

Acknowledgement: The authors convey their appreciation to the Department of Dermatology, Venereology and Leprosy and the Department of Microbiology of the institution for their support and facilities provided during the conduct of this study. They further extend their appreciation to all the patients who took part in the study for their cooperation. The support provided by the staff in sample processing as well as culture procedures is also duly acknowledged. They additionally express their gratitude to the Institutional Ethics Committee for approving the conduct of this research.

Individual Author's Contribution: IK contributed to the study conception, study design, data collection, data analysis and interpretation, and manuscript preparation. **VC** contributed to the study conception, data collection, and data analysis and interpretation. **SGR** contributed to the study conception, study design, data analysis and interpretation, and manuscript preparation. **RS** contributed to data collection, data analysis and interpretation, and manuscript preparation. **SS** contributed to the study conception, study design, and data collection. All authors reviewed and approved the final version of the manuscript.

Availability of data: The data that support the findings of this study are available from the corresponding author on reasonable request.

Declaration of non-use of generative AI Tools: This article was prepared without the use of generative AI tools for content creation, analysis, or data generation. All findings and interpretations are based solely on the authors' independent work and expertise.

REFERENCES

1. Mohan S, Madhu R, Janaki C. A Cross sectional Study on Clinicomycological Aspects of Mucocutaneous Candidiasis in a Tertiary Care Center. Int J Dermatol Clin Res. 2018;4(1):003-007. DOI: https://doi.org/10.17352/2455-8605.000026
2. Turner SA, Butler G. The Candida pathogenic species complex. Cold Spring Harb Perspect Med. 2014;4(9):a019778. DOI: https://doi.org/10.1101/cshperspect.a019778 PMid:25183855 PMCid:PMC4143104
3. Swaminathan R, Kamath N. Candida-An emerging and re-emerging pathogen. IP Int J Med Microbiol Trop Dis. 2023;9(1):6-9. DOI: https://doi.org/10.18231/j.ijmmtd.2023.002
4. Jacobsen ID, Wilson D, Wächtler B, Brunke S, Naglik JR, Hube B. Candida albicans dimorphism as a therapeutic target. Expert Rev Anti Infect Ther. 2012;10(1):85-93. DOI: https://doi.org/10.1586/eri.11.152 PMid:22149617
5. Singh A, Verma R, Murari A, Agrawal A. Oral candidiasis: An overview. J Oral Maxillofac Pathol. 2014;18(Suppl 1):S81-S85. DOI: https://doi.org/10.4103/0973-029X.141325 PMid:25364186 PMCid:PMC4211245

6. Tellapragada C, Eshwara VK, Johar R, Shaw T, Malik N, Bhat PV, et al. Antifungal susceptibility patterns, in vitro production of virulence factors, and evaluation of diagnostic modalities for the speciation of pathogenic Candida from blood stream infections and vulvovaginal candidiasis. J Pathog. 2014;2014:142864. DOI: https://doi.org/10.1155/2014/142864 PMid:25110589 PMCid:PMC4119684

7. Willems HME, Ahmed SS, Liu J, Xu Z, Peters BM. Vulvovaginal Candidiasis: A Current Understanding and Burning Questions. J Fungi (Basel). 2020 Feb 25;6(1):27. DOI: https://doi.org/10.3390/jof6010027 PMid:32106438 PMCid:PMC7151053

8. Muzaheed, Alshehri BA, Rabaan AA, El-Masry OS, Acharya S, Alzahrani FM, et al. A 20-year retrospective clinical analysis of Candida infections in tertiary centre: Single-center experience. J Infect Public Health. 2022 Jan;15(1):69-74. DOI: https://doi.org/10.1016/j.jiph.2021.11.014 PMid:34815182

9. Kim JH, Ahn J. Clinical Characteristics of Patients with Oral Candidiasis. J Oral Med Pain 2021;46:33-40. DOI: https://doi.org/10.14476/jomp.2021.46.2.33

10. Grace BN, Chandra TJ. A prospective research on cutaneous candidiasis from a tertiary health care unit. Int J Med Biomed Stud. 2021;5(8):407-410. Available from: https://ijmbs.info/index.php/ijmbs/article/view/2948

11. Thilak S, Anbumalar M, Sneha Priya M. Cutaneous fungal infections in subjects with diabetes mellitus. Int J Res Dermatol . 2017;3(1):55-58. DOI: https://doi.org/10.18203/issn.2455-4529.IntJResDermatol20164412

12. Shukla R, Reddy SG, Bilolikar AK. A study of Candida albicans and non-albicans Candida species isolated from various clinical samples and their antifungal susceptibility pattern. J Med Sci Res. 2020; 8(1):1-11. DOI: https://doi.org/10.17727/JMSR.2020/8-1

13. Seeniammal S, Selvakumar M, Nirmaladevi P. Clinicomycological study of vulvovaginal candidiasis. Indian J Sex Transm Dis AIDS. 2021;42(1):57-61. DOI: https://doi.org/10.4103/ijstd.IJSTD_49_18 PMid:34765939 PMCid:PMC8579598

14. Czajka KM, Verschoor CP, Santi SA, Brabant-Kirwan D, Kusnierczyk MH, Venkataraman K, et al. Signs and symptoms of oral candidiasis associated with health factors and resistant Candida infections in a Northern Ontario patient cohort. Front Oral Health. 2025 Sep 22;6:1661524. DOI: https://doi.org/10.3389/froh.2025.1661524 PMid:41059211 PMCid:PMC12498526

15. Monsen RE, Kristoffersen AK, Gay CL, Herlofson BB, Fjeld KG, Hove LH, et al. Identification and susceptibility testing of oral candidiasis in advanced cancer patients. BMC Oral Health. 2023 Apr 18;23(1):223. DOI: https://doi.org/10.1186/s12903-023-02950-y PMid:37072843 PMCid:PMC10111683

16. Jegadish N, Fernandes SD, Narasimhan M, Ramachandran R. A descriptive study of the clinical and etiological profile of balanoposthitis. J Family Med Prim Care. 2021 Jun;10(6):2265-2271. DOI: https://doi.org/10.4103/jfmpc.jfmpc_2467_20 PMid:34322423 PMCid:PMC8284224

17. Kanna BV, Kumar GA, M. S, Easow JM. Isolation and identification of candida species from various clinical samples in a tertiary care hospital. Int J Res Med Sci. 2017;5(8):3520-3522. DOI: https://doi.org/10.18203/2320-6012.ijrms20173554

18. Hu L, He C, Zhao C, Chen X, Hua H, Yan Z. Characterization of oral candidiasis and the Candida species profile in patients with oral mucosal diseases. Microb Pathog. 2019;134:103575. DOI: https://doi.org/10.1016/j.micpath.2019.103575 PMid:31175972

19. Prateeksha S, Shwetha DC, Venkatesha D. Isolation and identification of Candida species and their biofilm production status. Int J Curr Microbiol Appl Sci. 2020;9(6):3630-3638. DOI: https://doi.org/10.20546/ijcmas.2020.906.427