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Original Research Article

Spectrum of Opportunistic Fungal Infections in HIV/AIDS Patients in a Tertiary Care Hospital

Neelam Kumari[1], Basavaraja Channabasappa Hunasemarada[2], Pushpa Rani[3]

[1]Senior resident, Department of Microbiology, Netaji Subash Medical College and Hospital Jamshedpur, Jharkhand, India

[2]Professor and HOD, Department of Microbiology, Netaji Subhas Medical College and Hospital Jamshedpur, Jharkhand, India

[3]Junior Resident, Department of Pathology, SKMCH Muzaffarpur, Bihar, India

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Corresponding Author: Neelam Kumari

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Abstract:

Introduction: HIV infection is a significant health issue, resulting in millions of AIDS-related deaths each year. As the CD4+ cell count declines in HIV/AIDS patients, the risk of opportunistic fungal infections escalates, leading to increased morbidity and mortality. The scope of opportunistic fungal diseases differs between regions. The objective of the study was to examine the prevalence of opportunistic fungal infections in HIV/AIDS positive individuals.

Method: This descriptive study was carried out at Netaji Subhas Medical College in Jamshedpur, India, over a duration of 13 months. A Total of 117 HIV positive patients with CD4+ count ≤ 200 cells/mm3 and suspected of having fungal infections were included. Samples were collected after taking an informed written consent from the patient. Isolation and identification of organisms were done as per standard Microbiological procedure.

Result: Opportunistic fungal infection was identified in 81/117 patients, not all. The most common fungi isolated were Candida species, Cryptococcus neoformans, Aspergillus species and *Pneumocystis jirovecii* respectively being 48.1 % (n= 39), 24.69% (n= 20), 12.3 % (n= 10) and 9.8 % (n= 8). Cryptococcus neoformans was the predominant etiological agent of fungal meningitis and exhibited a strong correlation with significantly reduced CD4 counts (<50 cells/μL), indicative of profound immunosuppression.

Conclusion: The prevalent fungi identified were Candida species, Cryptococcus neoformans, Aspergillus species in HIV-positive individuals in Jharkhand. This study aims to enhance physicians' awareness for accurate diagnosis and the formulation of suitable strategies for the investigation and treatment of prevalent opportunistic fungal infections at the centre.

Keywords: HIV/AIDS, Opportunistic fungal infections, Candidiasis, Cryptococcosis, CD4 count, morbidity.

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Introduction

The human immunodeficiency virus (HIV) infection continues to be a significant global health issue, especially in low- and middle-income nations [1]. Progressive immunosuppression in persons infected with HIV, particularly those with advanced disease and diminished CD4+ T-lymphocyte counts, renders patients susceptible to numerous opportunistic infections [2]. Opportunistic fungal infections are a primary cause of morbidity and mortality in individuals with acquired immunodeficiency syndrome (AIDS) [3].

Fungal pathogens, including Candida species, Cryptococcus neoformans, Aspergillus species, Pneumocystis jirovecii, and endemic dimorphic fungi, are frequently associated with HIV/AIDS [4]. The range of fungal infections differs according to geographic location, environmental exposure, availability of antiretroviral medication (ART), and level of immunosuppression [5]. Timely diagnosis and immediate antifungal treatment are essential for enhancing clinical outcomes [6].

Comprehending the local epidemiology and clinical characteristics of opportunistic fungal infections in HIV/AIDS patients is crucial for prompt diagnosis, suitable empirical treatment, and efficient preventative measures [7]. This study sought to assess the range of opportunistic fungal infections in HIV/AIDS patients at a tertiary care hospital.

Methods

Study Design and Setting: This hospital-based cross-sectional study was performed at Netaji

Subhas Medical College in Jamshedpur, India, over a duration of 13 months (January 2023–February 2024).

Study Population: The study comprised 117 HIV-positive patients with clinical manifestations indicative of opportunistic infections.

Inclusion Criteria

- Confirmed HIV-positive status as per national testing guidelines
- Clinical suspicion of fungal infection (oral lesions, chronic cough, meningitis, dysphagia, skin lesions)
- Age ≥18 years

Exclusion Criteria

- Patients already receiving systemic antifungal therapy
- Patients with incomplete clinical or laboratory data

Sample Collection and Processing: Clinical specimens comprised mouth swabs, sputum, bronchoalveolar lavage (BAL), cerebrospinal fluid (CSF), blood, skin scrapings, and tissue biopsies. Samples were processed utilising conventional mycological techniques, encompassing direct microscopy (KOH mount, India ink), culture on Sabouraud dextrose agar, and species identification through germ tube test, cornmeal agar morphology, and biochemical assays.

CD4 Count Estimation: CD4+ T-cell numbers were assessed via flow cytometry. Patients were categorised according to CD4 counts: <50, 50–200, and >200 cells/µL.

Statistical Analysis: The data were analysed employing descriptive statistics. Results were presented as frequencies and percentages.

Results

Demographic Profile: Among the 117 individuals examined, 75 (64%) were male and 42 (36%) were female. The predominant cohort of patients was within the 31–50-year age range.

Spectrum of Opportunistic Fungal Infections: Candida spp. were the most frequently isolated species among all fungal infected pathogens.

Table 1: Spectrum of Opportunistic Fungal Infections (n=117)

Fungal Pathogen	Number of Cases	Percentage (%)
Candida species	39	48.1
Cryptococcus neoformans	20	24.7
Aspergillus species	10	12.3
Pneumocystis jirovecii	8	9.8
Others (Mucor, Histoplasma)	4	4.9

Clinical Presentation and Site of Infection: Oral candidiasis was the predominant manifestation, succeeded by cryptococcal meningitis.

Table 2: Clinical Presentation of Fungal Infections

Clinical Syndrome	Fungal Etiology	Number
Oral thrush	Candida spp.	34
Meningitis	Cryptococcus neoformans	21
Pulmonary infection	Aspergillus spp. / P. jirovecii	12
Esophagitis	Candida spp.	9
Cutaneous lesions	Mucor/others	5

Correlation with CD4 Count: A significant correlation was identified between reduced CD4 count and opportunistic fungal infections.

Table 3: Distribution of Fungal Infections According to CD4 Count

CD4 Count (cells/µL)	Number of Patients	Fungal Infections n (%)	p-value
<50	24	22 (92.9)	$p < 0.001$
50–200	44	34 (78.6)	$p < 0.001$
>200	27	9 (33.3)	$p < 0.001$

Discussion

This study emphasises the significant prevalence of opportunistic fungal infections in HIV/AIDS patients within a tertiary care hospital environment. Approximately two-thirds of the patients exhibited laboratory-confirmed fungal infections, underscoring the influence of immunosuppression in advanced HIV illness.

Candidiasis has become the predominant opportunistic fungal infection, primarily impacting the oral and esophageal mucosa, aligning with its function as an early indicator of immunological decline. Cryptococcus neoformans was the predominant etiological agent of fungal meningitis and exhibited a strong correlation with significantly

reduced CD4 counts (<50 cells/μL), indicative of profound immunosuppression.

Pulmonary fungal infections attributed to Aspergillus species and Pneumocystis jirovecii were notable factors in morbidity. The distribution of fungal pathogens identified in this study corresponds with findings from other Indian and regional investigations; however, discrepancies may arise from environmental and healthcare-related influences [8].

Limitations

Advanced diagnostic techniques, including fungal antigen detection and molecular approaches, were not employed consistently. The study was performed at a single centre, perhaps restricting external validity.

Conclusion

Opportunistic fungal infections continue to be a significant source of morbidity in HIV/AIDS patients, especially in individuals with diminished CD4 counts. Candida species and Cryptococcus neoformans are the primary fungal pathogens in this context. Prompt diagnosis, regular CD4 monitoring, and the appropriate commencement of antifungal therapy and antiretroviral treatment are crucial for alleviating disease burden and enhancing patient outcomes.

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