

SPECTRUM OF OPPORTUNISTIC FUNGAL INFECTIONS IN HIV/AIDS PATIENTS IN TERTIARY CARE HOSPITAL, JHARKHAND, EAST INDIA.

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Abstract

Background:

HIV infection continues to be a major health problem with more than millions of AIDS related death annually. As CD4+ cell count decreases in HIV/AIDS patients, the risk of opportunistic fungal infections increases resulting in high morbidity and Mortality. The spectrum of opportunistic fungal infections varies from one region to another. The Purpose of the study was to investigate the occurrence of opportunistic fungal infection among the HIV/AIDS positive patients in Jharkhand.

Method:

This descriptive study carried out at tertiary care centre in Jharkhand, over a period of two year. Total 118 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 47.45 % patients. The most common fungi isolated were Candida species, *Cryptococcus neoformans*, Aspergillus species and Dermatophytes respectively being 27.96 % (n= 33), 12.71% (n= 15), 3.38 % (n= 4) and 3.38 % (n= 4). Commonest fungal agent is Candida species, comprised 58.92 %, followed by *Cryptococcus neoformans* 28.78 % of total fungal isolates.

Conclusion:

The common fungus isolated were Candida species, *Cryptococcus neoformans*, Aspergillus species and Dermatophytes in HIV positive patients in Jharkhand. This study would help to sensitize clinicians to make the correct diagnosis and plan appropriate strategies for the investigation and treatment of common opportunistic fungal infections at centre.

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1. Introduction

The most significant newly developing infectious disease of the 20th century is the human immunodeficiency virus (HIV).[1] Patients with

HIV are susceptible to a variety of clinical outcomes, from asymptomatic infection to opportunistic fungal infections (OFIs) and cancers that can be fatal.[2] The most common OFIs and cancers in Asia include non-Hodgkin's lymphoma, Kaposi sarcoma, *Cryptococcus neoformans*, Candida species, *Herpes simplex virus*, *Cryptosporidium parvum*, and *Mycobacterium tuberculosis*, in

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decreasing order of prevalence.[3]

The range of *Candida* infections is broad and includes asymptomatic colonisation, oropharyngeal candidiasis (OPC), esophagitis, onychomycosis, vulvovaginitis, cutaneous candidiasis, systemic candidiasis, and invasive candidiasis, such as candidemia [4, 5, 6]. The most common fungal opportunistic illness in HIV-infected people is oropharyngeal candidiasis, which is frequently the initial symptom of HIV infection [7]. Before active antiretroviral medication was available, oropharyngeal candidiasis was a highly common finding in HIV/AIDS patients. Oral Candidiasis rates are reportedly declining as a result of the development of potent anti-retroviral medications [8, 9, 10].

The spectrum of OFIs differs significantly between India and the west [11, 12]. When it comes to OFIs, *Aspergillus fumigatus*, *Candida albicans*, and *Cryptococcus neoformans* infections have been responsible for the majority of mycotic infections in immunocompromised people [13–16]. Though it has been discovered that *Candida albicans* is the most frequently isolated organism, certain research had revealed that non-albicans *Candida* species, such as *C. tropicalis*, *C. krusei*, and *C. glabrata*, are more common than *C. albicans* [17]. The Purpose of the study was to investigate the occurrence of opportunistic fungal infection among the HIV/AIDS positive patients in Jharkhand.

2. Methods

2.1. Study subject:

Total 118 HIV positive cases with CD4+ count ≤ 200 cells/mm³ participated in the study. Samples like sputum (n= 47), oral swab (n= 37), cerebrospinal fluid (CSF) (n= 22), skin scrapping (n= 4), nail clipping (n= 5) and stool sample (n= 3) were taken for identification of fungal infection.

2.2. Study Population and Design:

Two hundred eighty patients (n= 560) of all age groups and both sexes attending outpatient departments (OPDs) or antiretroviral treatment clinic (ART clinic) or admitted in the medical

wards were studied. All patients were evaluated by a predesigned protocol covering the biodata, history including presenting complaints, physical examination and mode of transmission.

3. Results

This study was conducted over a period of two year from January 2020 to March 2023, in the Department of Microbiology, Rajendra Institute of Medical Sciences, Ranchi. A total of 118 individuals were included in this study where two-third of the participants were male. The mean age of the participants was 36.4 (SD \pm 7.5). Majority of the studied individuals were in the age range of 31-40 years.

Opportunistic fungal infection was identified in 56 (47.45 %) HIV positive patients. Fungus was isolated from different clinical samples with their percentage frequency of isolates as shown in figure 1. The mean CD4+ count of the patients with fungal infection in our study was 117.3 cells/ μ l. The different fungi isolated were: *Candida* species isolated from 33 (27.96 %) patients comprising 58.92 % of total fungal isolates, among the *Candida* species, the most common species was *Candida albicans*. Next common was *Cryptococcus neoformans*, 15 (26.78%) and dermatophytes and *Aspergillus* species were isolated from 4 patients each.

Patients belonged to a wide age group (4–68 years). Maximum number of OFI cases was observed in 21–40 years (77%), the most productive age group of the country. We found that males (67.14%) were more commonly infected, and a male predominance was seen in most of the age groups (Table 2).

4. Discussion

HIV related OFIs are an important cause of morbidity and mortality in the developing countries like ours. [18] The CD4+ T lymphocytes are HIV's main target cells. At the terminal stage of HIV infection, the progressive depletion of these cells ultimately results in loss of immunological response to any pathogens and patient death.[19]

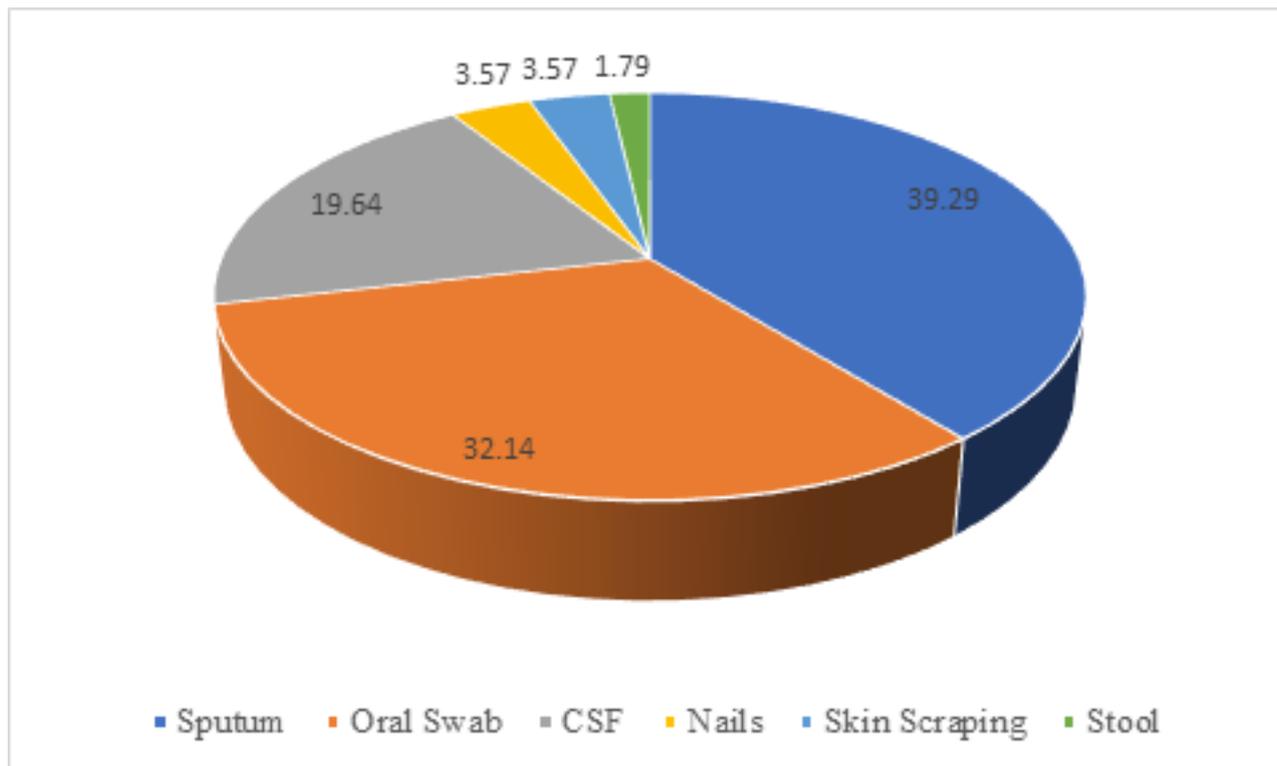


Figure 1: Types of different clinical samples with percentage frequency of fungal isolates

Table 1: Types of fungal isolates in different clinical samples with percentage frequency and mean CD4+ count

Type of sample	Type of infection	Frequency (%)	Mean CD4+ count cells/ μ l
Sputum	Candida species	14 (25)	72.6
	Aspergillus species	4 (7.14)	60.5
	Cryptococcus species	4 (7.14)	31
Oral swab	Candida species	18 (32.14)	131.5
Cerebrospinal fluid	Cryptococcus neoformans	11 (19.65)	121.5
Nail	Trichophyton species	2 (3.57)	152.3
Skin scrapping	Trichophyton species	2 (3.57)	89
Stool	Candida species	1 (1.79)	156
Total		56 (100)	

OFIs are a major factor in the morbidity and mortality of these patients.[20] The gender distribution in our analysis showed a preponderance of men (67%), which was consistent with the information provided by the National AIDS Control Programme.[21] The most prevalent method of HIV transmission is confirmed to be sexual contact in research conducted in India.[22–26] Our findings were consistent with the earlier research.

This demonstrates that despite numerous education campaigns regarding safe sex and condom use by NACP [27], it appears that the message has not been received by the general public.

In developing countries like ours, HIV-related OFIs are a significant source of morbidity and mortality. There are numerous publications on the pattern of OFIs in HIV-positive people [18], but there are few data from India on the aetiol-

Table 2: Age and sex distribution of the patients (n = 560)

Age group (in years)	Male		Female		Intersex		Total	
	n	%	n	%	n	%	n	%
0-10	4	0.71	0	0	0	0	4	0.71
11-20	10	1.79	6	1.07	8	1.43	24	4.29
21-30	130	23.21	84	15.00	0	0	214	38.21
31-40	146	26.07	52	9.29	6	1.07	204	36.43
41-50	62	11.07	20	3.57	0	0	82	14.64
51-60	16	2.86	6	1.07	0	0	22	3.93
61-70	8	1.43	2	0.36	0	0	10	1.79
Total	376	67.14	170	30.36	14	2.5	560	100

ogy and range of fungal infections in these patients [28]. The range of prevalent OFIs among HIV/AIDS patients in a tertiary care facility in north India is revealed by our study. The bulk of the patients in this study (67%), who were among the most productive age groups in the nation aged 21 to 40, were men, with a male to female ratio of 2.25 to 1, which is comparable with research on HIV patients in Iran and India [29, 30]. The fact that men predominate may be related to their movement to major cities in quest of employment. They may have contracted HIV because they were away from their spouse for longer stretches of time and because men were known to engage in public philandering. Additionally, the male majority may have been caused by the fact that women in India's current social environment are reluctant to seek medical attention out of concern for rejection and the loss of support from their families [31, 32].

5. Conclusion

Patients who are HIV positive may get opportunistic fungal diseases such as Candidiasis, Cryptococcosis, and Aspergillosis. In conclusion, it was discovered that oropharyngeal candidiasis was the most prevalent OFI among the other fungal diseases. This study will raise physicians' awareness of the importance of early detection, good patient management, and accurate diagnosis of these illnesses, especially in India's resource-poor regions.

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The authors declare no conflict of interest

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