ABSTRACT

BACKGROUND
Dermatomycoses constitute more than 50% of cases in Dermatology outpatient department, which do not require compulsory notifications, but rather cause cosmetic defacements. Indian subcontinent is favourable for various fungal infections. The objective of this study is to identify the aetiology of fungal infections of skin, nail and hair in patients attending a tertiary care centre in North East India.

MATERIALS AND METHODS
A total of 160 samples from clinically suspected dermatomycoses were collected. Direct microscopy in 10% KOH (potassium hydroxide) and culture on (Sabouraud's dextrose agar) SDA containing gentamicin (5 gm/L) and chloramphenicol (50 gm/L) were performed.

RESULTS
Out of the 160 samples, 95 cases were positive on direct KOH mount and 108 were culture positive. In 64 cases, both KOH and culture were positive. Maximum number of cases belonged to the age group of 31-40 years. Males were more affected compared to females. Most common isolates obtained in our study were yeasts followed by dermatophytes and non-dermatophytic moulds (NDMs). Candida albicans (25%) was the most common yeast isolated. Among the dermatophytes, Trichophyton mentagrophytes was the commonest and among the non-dermatophytic moulds (NDMs), Aspergillus niger was the most frequent.

CONCLUSION
Our study reflects an increasing role of yeasts as a causative agent of dermatomycoses replacing the dermatophytes.

KEYWORDS
Dermatomycoses, Dermatophytes, Yeasts, Non-Dermatophytic Moulds.

from erythematous growing margins of the lesion with a sterile blunt scalpel and in case of tinea capitis, infected and lustreless hairs were plucked with sterile surgical forceps. In tinea unguium, nail clippings were taken. Samples were collected in sterilised Whatman filter paper envelope as fungal spores resist drying and remain viable for several weeks when stored in paper.

**Direct Microscopic Examination**

Direct examination of fungal elements from skin scales and hair samples was done by using 10% KOH mounts.

**Isolation by Culture**

All the samples were cultured on Sabouraud’s dextrose agar (SDA) with gentamycin (5 gm/L) and chloramphenicol (50 gm/L). Samples were inoculated in two sets of the culture media. One set was incubated at 37°C and another set at 25°C. Cultures were examined thrice weekly for the appearance of growth. Cultures were incubated for 1-month before discarding them as negative. Fungal growth was identified by colony morphology, pigment production and microscopic examination by tease mount technique in lactophenol cotton blue (LPCB). Urease test and in-vitro hair perforation tests were also performed to differentiate Trichophyton rubrum and Trichophyton mentagrophytes when there was difficulty in identification by microscopic and macroscopic examination.

Cream coloured, smooth looking colonies were subjected to Gram stain. Colonies showing Gram positive budding yeast like cells with pseudohyphae were further subjected to germ tube test.

**RESULTS**

Out of the 160 cases, majority of them belonged to the age group of 31 - 40 years (40; 25%) followed by 21 - 40 years (35; 21%). The youngest patient was a 7-year-old boy and the eldest was an 81-year-old man [Table 1]. 91 (57%) of the samples belonged to males and 69 (43%) were female with a male:female ratio of 1.3:1 [Table 2].

Out of all the samples received 80 were nail, 67 were skin and 13 were hair [Table 3]. Among the 160 samples, 95 cases were positive on direct KOH mount and 108 were culture positives. In 64 cases, both KOH and culture were positive. 77 (48%) of the samples were both KOH and culture negative, [Table 4].

Most common isolates obtained in our study were yeasts (42, 38.8%) followed by dermatophytes (37, 34%) and NDMs (29, 26.8%). Among the yeasts, C. albicans (27, 25%) was the commonest followed by non-albicans Candida (15, 13.8%). Among the dermatophytes, T. mentagrophytes (15, 13.8%) was the commonest followed by T. rubrum (12, 11%), T. verrucosum (6, 5.5%), T. tonsurans (3, 2.7%) and M. gypseum (1%). Among the NDMs, A. niger was the most common (5, 4.6%) followed by Fusarium spp. (4, 3.7%), Cladosporium spp. (2, 1.8%), Exophiala dermatitidis (3, 2.7%), Penicillium marneffei (3, 2.7%), Scopulariopsis spp. (3, 2.7%), Aspergillus flavus (2, 1.8%), Aspergillus fumigatus (2, 1.8%), Cladosporium carthii (4, 3.7%), Cladophialaphora spp. (2, 1.8%) and Geotrichum spp. (1, 1%) [Table 5].

**DISCUSSION**

The reason for increased percentage of males may be due to increased outdoor exposure and more physical work that results in increased sweating. This finding is similar to that of earlier studies. However, in a study done in northern Iran by Falahi AA and his colleagues published at 2017 showed a female preponderance.

It is also found that the dermatophyte infection is predominant in the adult age group (31 - 40 years). This may be due to increased level of physical activity in the particular age group leading to excessive sweating, which favours the growth of dermatophytes. Socialisation with different people is also high in this age group, which eventually helps in
spreading of infection. This finding correlates with the earlier studies.7

The predominant isolates obtained in our study were yeasts (42, 38.8%) followed by dermatophytes (37, 34%) and NDMs (29, 26.8%). Among the yeasts, C. albicans (25%) was the commonest followed by non-albicans Candida (13.8%). Among the dermatophytes, T. mentagrophytes (15, 13.8%) was the commonest followed by T. rubrum (12, 11%), T. verrucosum (6, 5.5%), T. tonaurans (3, 2.7%) and M. gypseum (1, 1%). Among the NDMs, A. niger was the most common (5, 4.6%) followed by Fusarium spp. (4, 3.7%), Cladosporium spp. (2, 1.8%), Exophiala dermatitidis (3, 2.7%), Penicillium marneffei (3, 2.7%), Scopulariopsis spp. (3, 2.7%), Aspergillus flavus (2, 1.8%), Aspergillus fumigates (2, 1.8%), Cladosporium carrionii (4, 3.7%), Cladophialophora spp. (2, 1.8%) and Geotrichum spp. (1, 1%).

Many studies showed that dermatophytes were the most common fungi associated with dermatomycoses. But in our study, the most frequently isolated organism was found to be yeasts- Candida spp. (38.8%). It may be due to the fact that majority of the samples received were nails and yeast is one of the commonest causative agents of onychomycosis. This finding is in accordance with the studies conducted at Mumbai and Gujarat.5,8

CONCLUSION
Most common isolates obtained in our study were yeasts followed by dermatophytes and NDMs. Our study reflects an increasing role of yeasts as a causative agent of dermatomycoses, replacing the dermatophytes. As treatment protocol differs depending upon the causative agents of dermatomycoses, culture identification is a must.

REFERENCES