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### Original Article

## Clinicomycological profile of tinea capitis in children residing in orphanages

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#### ARTICLE INFO

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#### ABSTRACT

**Introduction:** Tinea capitis is the most common dermatophyte infection of the scalp affecting mainly children and rarely adults. It is closely related to the socio-economic and hygienic conditions typical of the lower strata of rural and urban population. **Aims:** The study was undertaken to delineate clinical and mycological profile of tinea capitis among children residing in orphanages and compare the sensitivity and specificity of KOH microscopy and culture. **Materials and methods:** A total of 218 children residing in orphanages were included in this cross sectional study. **Results:** Among the 218 children screened, 51 (23.3%) showed the clinical evidence of tinea capitis. Grey patch was the commonest clinical type (54.9%). Direct microscopic examination was positive in 68.62% cases. Dermatophytes were isolated in 43.13% cases and *Trichophyton rubrum* was the commonest species (50%) isolated. **Conclusions:** The results of this study reveal that tinea capitis is very common in children with a low socioeconomic profile (low standard of living, poor hygiene, overcrowded living conditions and poor health education).

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### 1. Introduction

Dermatophytosis is a cutaneous fungal infection with diverse clinical presentations. The most frequent types are tinea capitis, tinea cruris, tinea pedis and tinea unguium.[1] Tinea capitis is a common superficial fungal infection seen predominantly in children of school age in the developing countries.[2,3,4,5] Review of data by WHO has revealed that 7-33% of children of various age groups are affected.[6] The epidemiology of tinea capitis varies within different geographical areas throughout the world and in any given location, the species may change with time.[7,8,9] Hot humid tropical climates, low socioeconomic status, crowded living condition and poor hygiene contribute to an increased incidence of tinea capitis.[4,10,11,12] It is highly communicable and may reach epidemic proportions especially in over crowded setups.[6,7] Therefore, an increased level of surveillance in residential schools, hostels, orphanages are recommended. Very few research studies are available on prevalence and etiological agents of tinea capitis in children from this part of India. This study was undertaken to determine clinical and mycological profile of tinea capitis in children residing in orphanages and evaluate the sensitivity and specificity of KOH microscopy and culture.

### 2. Materials and methods:

This prospective, cross sectional study was carried out in the Department of Microbiology, B.L.D.E.U's Shri. B. M. Patil Medical College, Bijapur, Karnataka, India. The entire experimental protocol was approved by the institutional ethical committee. The study was conducted after obtaining the agreement of the concerned orphanage authorities.

**Inclusion criteria:** Children with clinical features of tinea capitis, aged between 3-14 years were included in the study.

**Exclusion criteria:** Children without clinical features of tinea capitis were excluded from the study.

#### Collection of samples:

A total of 218 male children aged between 3-14 years residing in orphanages in and around Bijapur were screened for the evidence of tinea capitis. Examination of the whole scalp was carried out to assess the morphological types of tinea capitis. The specimens were collected and processed according to Weitzman and Summerbell.[13] The lesions were thoroughly cleaned with 70% alcohol. The scalp scrapings were collected from the margins of the lesions with a sterile surgical blade (No.15), from at least two areas. The affected dull and lusterless hairs (approximately 12 hair stumps) were epilated with the help of a sterile forceps. All the specimens were collected in a clean sterile paper.

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### Processing of sample:

Direct microscopic examination of the scrapings and hairs was carried out by mounting with 1-2 drops of 10%-20% KOH for 15-30 min. Each specimen was inoculated on two separate Sabouraud's Dextrose Agar slopes containing chloramphenicol, one with and the other without cycloheximide (chloramphenicol-0.05 mg/mL, cycloheximide-0.5 mg/mL). The cultures were incubated at room temperature for 4-6 weeks and observed regularly for growth. The fungal isolates were identified on the basis of duration of growth, surface morphology, pigment production on the reverse, microscopic examination in lacto phenol cotton blue preparation and slide culture; urease and hair penetration test whenever necessary.

### Data analysis:

Statistical analysis of the data was done using GraphPad InStat software.

### 3. Results:

Of the 218 children screened, 51 (23.3%) showed the clinical evidence of tinea capitis. The highest incidence was seen in the age group of 5-10 years with 27 cases (52.9 %) and the mean age of the affected was  $9.24 \pm 3.07$ . Grey patch (58.8%) was the commonest clinical type, followed by black dot (21.5%), kerion (13.7%) and seborrhoeic (5.8%) type (Table 1). Of the 51 clinically diagnosed cases, KOH microscopy was positive in 35 (68.62%) individuals and 24 (47 %) were positive by culture (Table 2, 3). Significant difference in the positivity rates of KOH and culture was observed.

When compared to KOH, the sensitivity and specificity of culture was 60% and 81.25% respectively. *Trichophyton rubrum* was the commonest species (54.1%) isolated followed by *T. mentagrophytes* (25%), *T. violaceum* (12.5%) and *T. tonsurans* (08.3%) (Table 4). Maximum number of isolates were from grey patch.

The affected children were referred to the skin OPD of our hospital for treatment.

**Table -1 Clinical types of tinea capitis**

Clinical type	No. of cases
Grey patch	30 (58.8%)
Black dot	11 (21.5%)
Kerion	07 (13.7%)
Seborrhoeic	03 (05.8%)
$\chi^2$ Test	P < 0.0001

**Table - 2 Results of Direct microscopy and culture**

Total screened	Tinea capitis cases	KOH positive	Culture positive
218	51 (23.3%)	35 (68.62%)	24 (47%)

**Table - 3 Comparison of KOH and culture results**

Total	KOH positive Culture positive	KOH positive Culture negative	KOH negative Culture positive	KOH negative Culture negative
51	21 (41.17%)	14 (27.45%)	3 (5.88%)	13 (25.49%)
Fisher exact test		P = 0.0076		

**Table-4 Clinicomycological correlation of 24 isolates**

Isolates	Grey patch	Black dot	Kerion	Seborrhoeic	Total
T.rubrum	9	-	2	2	13 (54.1%)
T.mentagrophytes	3	-	2	1	06 (25%)
T.violaceum	2	1	-	-	03 (12.5%)
T.tonsurans	-	2	-	-	02 (08.3%)
Total	14	3	4	3	24 (100%)

### 4. Discussion:

Tinea capitis is a common fungal infection in children of school age, particularly among those living in unhygienic crowded conditions. In the present study the rate of tinea capitis was 23.3%. Varying prevalence rates of tinea capitis ranging from 4.6% - 39.6% have been reported in studies from Nepal, Nigeria, Central Africa, India, Iran.[8, 14,15,16,17]

Predominant age group affected in our study was 5-10 years (52.9 %). Similar findings have been noted in studies by Grover C et al., Al Samarai AGM, Bose S et al., Amer Abu El - Enin et al. and Wani MM et al.[2,10,18,19,20] However in a study by Ayanbimpe GM et al. from Nigeria, the prime age group affected was 10-14 years.[3]

Among the range of clinical variants, grey patch was the commonest type followed by black dot and kerion. Similar findings have been noted by Jha BN et al. and Yazdanfar A.[8,21] In a study by Grover C et al., black dot was the major clinical type followed by grey patch and kerion.[2] Bose S et al. and Singal A et al. have reported seborrhoeic variant as the predominant type followed by black dot and kerion.[18,22] Scaly type followed by black dot and kerion has been reported by Amer Abu El - Enin et al.[19]

In this study the KOH positivity rate was 68.62% which is comparable with earlier studies by Jha BN et al. and Woldeamanuel Y et al. where in the rates were 62.3% and 62%.[8, 23] Our KOH positivity rate was lower when compared to that of Grover C et al. ( 82.3%) and Amer Abu El - Enin et al. (80%) [2,19] but higher when compared to 16.3% by Hogewoning A A et al.[15]

Dermatophytes were isolated in 47 % of cases in this study. Isolation rates ranging from 24%-93% have been reported in earlier studies from different geographical areas.[8,10,18, 21,22,24,25]

Isolation of different species of dermatophytes varies from one ecological niche to another. *Trichophyton rubrum* was the commonest species isolated in our study and also in a study by Jain N.[26] This result does not match with earlier studies by various authors. In previous studies by Ahmed I et al., Jha BN et al., Woldeamanuel Y et al., Azab MM et al. and Grover C et al., *T. violaceum* was the most frequent species isolated.[ 4,8,23,25,27] *T. tonsurans* was the major isolate reported by Audonneau N et al., A East-Innis et al., Al Samarai AGM, Garg J et al.,[5,9,10,24] while *T. soudanense* was predominant in studies by Ayanbimpe GM et al and Hogewoning AA et al.[3,15]. *M. audonii* was the most prevalent species noted by Avasn Maruthi Y et al. and Emele FE et al.[11,14] *M. canis*, as the frequent isolate has been reported by Amer Abu El-Enin et al.[19] while *T. mentagrophytes* and *T. verroccusum* were common in studies by Bose S et al. and Yazdanfar A respectively.[18,21]

## 5. Conclusion

In the present study, the incidence of tinea capitis was 23.3% and grey patch was the most frequent clinical type. KOH examination was more sensitive than culture and the commonest species isolated was *T. rubrum*. The results of this study emphasize that tinea capitis is a superficial fungal infection seen predominantly in children. In tropical countries, a warm and humid climate, crowded living and poor sanitary conditions augment the spread of this infection. Therefore, there is a need for regular epidemiological surveillance and health education programmes aimed at population with low socioeconomic profile, especially in crowded areas like orphanages and boarding schools.

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