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# Clinico-mycological study of Dermatophytosis in a tertiary care centre in Bagalkot

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**Abstract**
Superficial mycoses by Dermatophytes show widespread involvement of population at large, particularly in the tropical and subtropical countries like India. The clinical presentation, though very typical of ringworm infection, is often confused with other skin disorders, making laboratory diagnosis and confirmation necessary. Skin, nail and hair specimens taken from a total of one hundred and five clinically diagnosed randomly selected patients of dermatophytosis attending the outpatient department, HSK Hospital and Research Centre, Bagalkot , (North Karnataka, India) were subjected to routine microbiological examination (potassium hydroxide preparation (KOH) for direct microscopy and culture) for clinicoetiological correlation of the fungal infection in the study samples. Fungi were demonstrated in 74 cases (70.48%) either by KOH and/or culture. Most common clinical presentation was found to be tinea corporis (44.8%) followed by tinea cruris (18.09%) and the aetiological agents isolated were T. rubrum (51.35%) followed by T. mentagrophyte (43.24%) and E. floccosum (5.4%).

**Keywords:** Dermatophytosis; Tinea corporis; Tinea cruris; Trichophyton rubrum; Trichophyton mentagrophyte.

## 1. Introduction
Superficial cutaneous fungal infections are commonly encountered fungal diseases prevalent in most parts of the world. The dermatophytes are by far the most significant cutaneous fungi because of their widespread involvement of population at large and their worldwide prevalence [1].

Dermatophytes are closely related keratinophilic fungi with ability to degrade keratin and invade the skin, hair and nails, thus causing dermatophytosis (ringworm or tinea) [2]. The classical presentation of tinea infection, is an annular lesion, sharply marginated with central clearing and surrounded by an advancing, inflamed, raised border. However, there is wide variation in clinical presentation depending upon the infecting species, size of inoculum, site of infection and immune status of the host. Dermatophytes are assuming greater significance both in developed and developing countries particularly due to advent of immunosuppressive drugs and disease. Hot and humid climate in the tropical and subtropical countries like India makes dermatophytosis or ringworm a very common superficial fungal skin infection [3].

Species distribution and prevalence varies with the geographical area and during the course of time and is governed by environmental conditions, personal hygiene and individual's susceptibility. The epidemiology of most of the clinically significant dermatophytosis has substantially changed over the last few years [1, 4].

The clinical presentation is very often confused with other skin disorders particularly due to rampant application of broad-spectrum steroid, making laboratory diagnosis and confirmation necessary and although it responds to conventional antifungals, dermatophytosis has a tendency to recur at same or different sites [5]. Hence, a correct diagnosis is important to initiate appropriate treatment and also essential for epidemiological purposes.

## 2. Materials and Methods
A total of one hundred and five clinically diagnosed randomly selected cases of skin, hair and nail infection, of all age groups and of both sexes, attending Dermatology and Venereology outpatient department of HSK Hospital & Research centre, S.N Medical College, Bagalkot were included in the study.

A detailed history was taken which included patient details, occupation, application of any local medications, duration of illness and involvement of more than one site, following which clinical examination of patient was made in good light which included site of lesion, number of lesions, types, presence of inflammatory margin, etc.

The affected area was cleaned with 70% ethyl alcohol, skin scales, crusts and pieces of nail or hairs were collected in clean, dry, brown paper packets. Skin specimen was collected by scraping across the inflamed margin of lesion into the apparently healthy tissue. Nail specimen was collected by taking clippings of the infected part and scrapings beneath the nail. Hair specimen was collected by plucking with epilating forceps along with the base of the hair shaft around the follicle.

Ethical clearance was obtained for the above procedure from the Ethical committee of the institute (S.N Medical College and HSK Hospital & Research Centre)

Specimen collected was subjected to potassium-hydroxide (KOH) wet preparation of various concentrations (10%, 20% and 40%) depending on the type of clinical specimen for the presence of fungal elements. The fungal elements appear as highly refractile, hyaline septate branching filaments. Following direct microscopic examination, irrespective of demonstration of fungal elements, the specimen was inoculated onto two sets of test tubes, one containing Sabouraud's dextrose agar with 0.05% chloramphenicol, 0.1% gentamicin and 0.5% cycloheximide, and the other to dermatophyte test medium.

Sabouraud's dextrose agar with 0.05% chloramphenicol, 0.1% gentamicin and 0.5% cycloheximide was incubated at 28°C for upto four weeks, and was observed periodically for growth. If no growth was found after four weeks, it was taken as negative for the growth of fungi.

Dermatophyte test medium was incubated at 28°C for up to ten days and was observed for colour change.

Fungal isolate was identified based on colony morphology, pigmentation, growth rate, microscopy (LPCB), slide culture, urease test and hair perforation test.

Statistical analysis: Percentages, proportions and appropriate statistical tests was used for data analysis

**Fig 1:** Colony of T.rubrum on dermatophyte test medium (plain and with growth of fungus)

## 3. Results

Out of 105 cases, most common clinical type was tinea corporis with 47 cases (44.76%) followed by tinea cruris (18.09%), tinea unguium (15.24%), tinea capitis (7.62%), tinea corporis with tinea cruris (5.71%), tinea pedis (3.81%), tinea faciei (3.81%) and tinea manuum (1.9%).

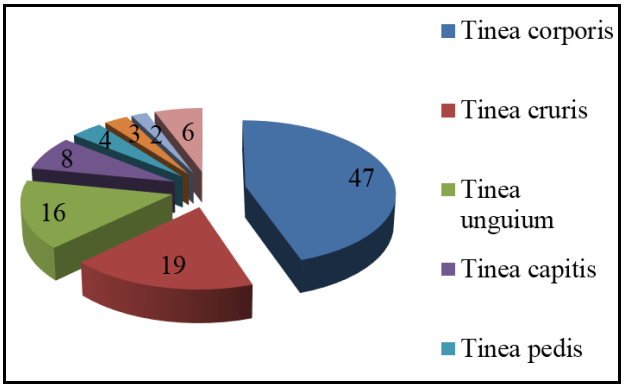


**Fig 2:** Clinical types of dermatophytosis in the study group

**Table 1:** KOH and culture findings

| | Total KOH and/or culture +ve | KOH +ve Culture +ve | KOH +ve Culture ve | KOH –ve Culture +ve | KOH –ve Culture –ve |
|---|---|---|---|---|---|
| Number of cases | 74 | 35 | 37 | 2 | 31 |
| Percentage | 70.48% | 33.33% | 35.24% | 1.09% | 29.52% |

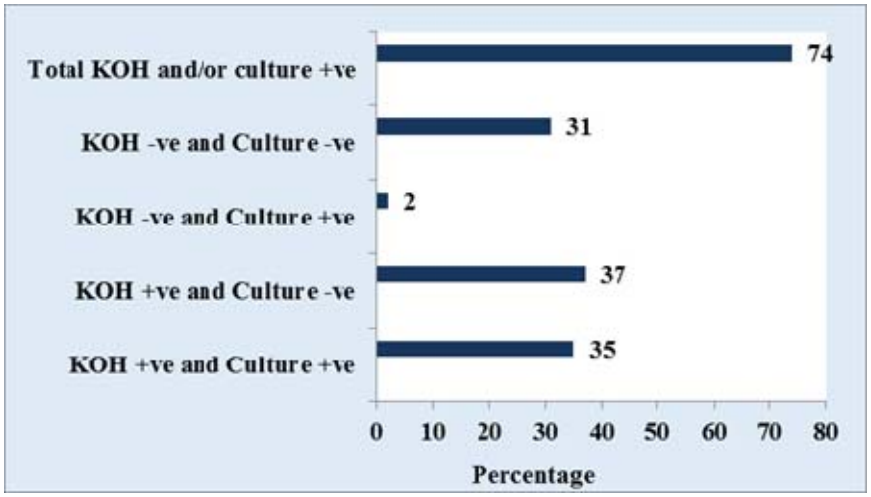


**Fig 3:** Correlation of number of KOH positives and culture positives.

Out of 105 clinically suspected cases of dermatophytosis, fungi were demonstrated in 74 cases (70.48%) either by direct microscopy and/or culture. Thirty-five cases (33.33%) were positive by both microscopy and culture. Thirty-seven (35.24%) were positive by microscopy and negative by culture. Two cases (1.9%) were negative by microscopy but culture positive. Thirty-one cases (29.52%) were negative both by microscopy and culture.

**Table 2:** Dermatophytes isolated in relation to clinical types

| Clinical type | No. | T. rubrum | T. mentagrophyte | E. floccosum | Total isolated |
|---|---|---|---|---|---|
| Tinea corporis | 47 | 6 (50%) | 5 (41.67%) | 1 (8.33%) | 12 (25.53%) |
| Tinea cruris | 19 | 3 (75%) | 1 (25%) | - | 4 (21.05%) |
| Tinea unguium | 16 | 2 (20%) | 7 (70%) | 1 (10%) | 10 (62.5%) |
| Tinea capitis | 8 | 2 (66.67%) | 1 (33.33%) | - | 3 (37.5%) |
| Tinea pedis | 4 | 1 (50%) | 1 (50%) | - | 2 (50%) |
| Tinea faciei | 3 | 1 (100%) | - | - | 1 (33.33%) |
| Tinea manuum | 2 | 2 (100%) | - | - | 2 (100%) |
| Tinea corporis with cruris | 6 | 2 (66.67%) | 1 (33.33%) | - | 3 (50%) |
| Total | 105 | 19 (51.35%) | 16 (43.24%) | 2 (5.4%) | 37 (35.24%) |

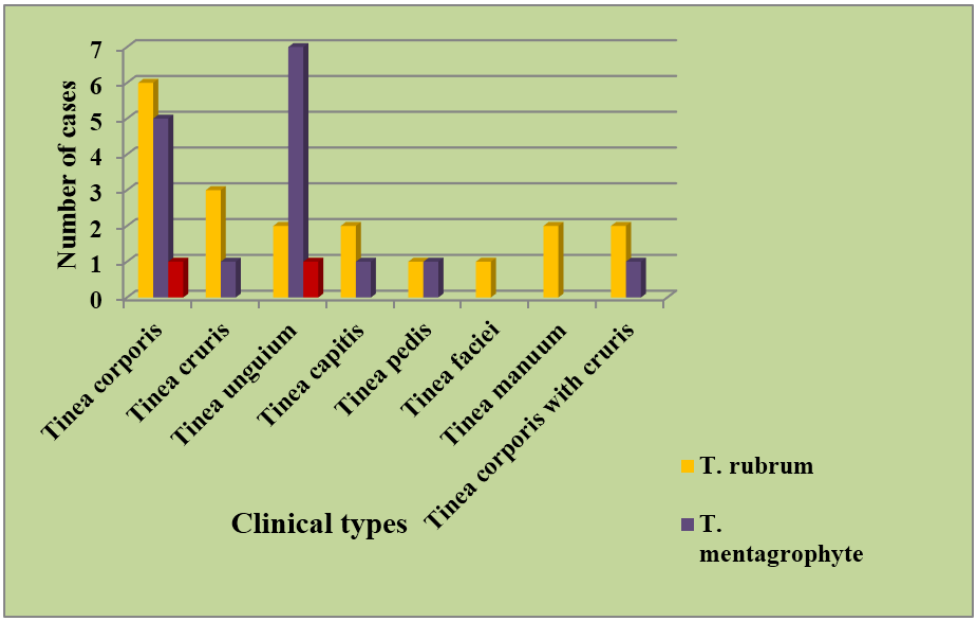


**Fig 4:** Correlation of Dermatophytes isolated in relation to clinical types

## 4. Discussion

Dermatophytosis is the commonest group of superficial fungal infections seen in the tropics where hot and humid climate is conducive for the growth of the fungi [6, 7].

In the present study which was carried out in Bagalkot, a district of North Karnataka, the clinical type and socio-demographic pattern of dermatophytosis was studied along with the species prevalent in this part of the country.

Dermatophytosis was more common in the age group of 31-40 years (27.6%) followed by 21-30 years (24.76%), which is comparable with other studies done by Veer P *et al.* [8], Madhuri JT *et al.* [9] The higher incidence in adults aged 20-40 years could be due to greater physical activity with increased sweating and increased opportunity for exposure.In the present study, males (70.48%) were more commonly affected than females (29.52%). Male to female ratio was 2.38:1, which is comparable with previous studies by Siddappa K *et al.* [6], Karmakar S *et al.* [10]. Male predominance could be due to increased outdoor physical activities and increased opportunity for exposure to infection than females.

Most infected cases were occupationally manual workers (48.6%), which included agricultural workers and manual laborers and household workers (mainly housewives) (24.8%), which have been established by previous studies of Veer P *et al.* [8]. and Sumana V *et al.* [11] This could be due to increased physical activity and opportunity for exposure in case of manual workers and increased wet work in case of housewives.

In the present study, tinea corporis was the commonest clinical type encountered (44.76%) followed by tinea cruris (18.09%) which is comparable with previous works by Bindu V [12] (54.6%), Singh S *et al.* [7], Sen SS [4] (48%) and Jain Neetu [13] (37%).

The variations seen in the KOH and Culture findings in the current study have been reported earlier by Sumana V *et al.* [11], Karmakar S *et al.* [10], Singh S *et al.* [7] and Bindu V. [12] and could be due to non-viability of fungal elements in some cases.

In the present study, T. rubrum 19 (51.35%) was the commonest aetiological agent in majority of clinical types followed by T. mentagrophytes 16 (43.24%) and E. flocossum was the third aetiological agent of dermatophytosis to be isolated in 5.4% cases which is comparable to other studies done by Bindu V *et al.* [12], Ranganathan S *et al.* [14], Singh S *et al.* [7] and Jain N *et al.* [13], Sahai S *et al.* [5]

## 5. Conclusions

Dermatophyte infections are very common in our country where hot and humid climate in association with poor hygienic conditions play an important role in the growth of these fungi.

There is varying difference in isolation of different species from southern and northern part of India. By and large Trichophyton species forms the commonest aetiological agent of dermatophytosis.

T. rubrum was the commonest isolate in tinea corporis, tinea cruris and tinea capitis. T. mentagrophytes was the commonest isolate in tinea unguium. E.floccosum was isolated in a case of tinea corporis and of tinea unguium.

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