

A Clinico-Mycolological Profile of Superficial Fungal Infections in Eastern Rajasthan

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Abstract:

Dermatophytosis are one of the more common superficial fungal infection affecting a large number of world population. Dermatophytes are moulds belonging to the three genera of fungi imperfecti (1) Microsporum, (2) Trichophyton, and (3) Epidermophyton. Over the past few years, it has been documented that dermatophyte infections have increased by many folds in India. At the same time, there is also a change in the disease presentation, severity, response to treatment, and relapse rate. **Aims and Objective** of the study was to study clinico-epidemiological profile of superficial fungal infections in and around Jaipur. 200 clinically diagnosed registered cases of superficial fungal infections were subjected to clinical and mycolological examination along with fungal culture and species identification. **Results:** Dermatophytosis was found to be most common in 3rd decade of life. There was male preponderance in this study (with M:F ratio being 1.85:1.) *T. corporis* (46%) was found to be commonest clinical pattern. KOH mounts was found to be positive in 167 (83.5%) cases. Fungal culture was positive in 144 (72%) cases. *T. mentagrophyte* was found to be the commonest isolate (43.75%) followed by *T. rubrum* (33.33%) and *T. violaceum* (12.5%).

Key words: Superficial dermatophytosis , Mycolological examination, Fungal culture.

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I. Introduction:

Dermatophytosis are one of the more common superficial fungal infection affecting a large number of world population⁽¹⁾. These Infection are generally cutaneous and restricted to the nonliving cornified layers as the fungi is not able to penetrate the deeper tissue or organ of healthy immunocompetent host. The infection is commonly designated as ring worm or "tinea". Dermatophytes are moulds belonging to the three genera of fungi imperfecti (1) Microsporum, (2) Trichophyton, and (3) Epidermophyton.⁽²⁾ Over the past few years, it has been documented that dermatophyte infections have increased by many folds in India.^(3,4) At the same time, there is also a change in the disease presentation, severity, response to treatment, and relapse rate.⁽⁵⁾ The possible contributory factors may even be more diverse, from the irrational use of antifungal drugs to topical steroid usage and also to the poor socioeconomic status of the patients. The present study was undertaken to assess the clinic-epidemiological profile of dermatophytic infection to identify the species of fungi and to compare the clinical diagnosis with potassium hydroxide (KOH) smear positivity and culture positivity.

AIMS AND OBJECTIVES

To study clinico-epidemiological profile of superficial fungal infections in and around Jaipur.

II. Materials And Methods:

Study was carried out in the department of dermatology, venereology and leprosy at tertiary care center at Jaipur. 200 clinically diagnosed registered cases of superficial fungal infections attending the outpatient department. Patients of both gender presenting to the dermatology outdoor with the clinical diagnosis of dermatophytosis and not taken any topical or oral treatment were included.

The exclusion criteria:

1. Patient who have taken antifungal treatment (both topical and systemic) within 1 month.
2. Unwilling Patients.

BASELINE EVALUATION:

A detailed history was taken regarding age, sex, religion, occupation, socio-economic status, presenting complaints with duration, drug intake, oil application, bathing habit, clothes/towel/comb sharing and contact with cases of superficial fungal infections or pets. As well as systematic examination was also done. All patients were thoroughly examined for morphology, site, number and size of lesions and recorded in a proforma. Clinical photographs were also taken.

BASELINE INVESTIGATION

- Complete hemogram
- Urine analysis
- Blood sugar fasting, post prandial and random
- Mycological examination Direct microscopy (KOH mount): The affected area was cleaned and scraping for fungus were taken. Scales, crusts, hairs pieces of nails were collected on a dark colored paper and transferred to the laboratory and were subjected to mycological examination.
- Fungal culture The collected samples were also cultured on Sabourauds dextrose agar with 0.05% chloramphenicol and sabourauds dextrose agar with 0.05% chloramphenicol and 0.5% cycloheximide and incubated at 25C upto 4 weeks. If no growth was found after 4 weeks, it was taken as negative for the growth of fungi. If contaminant began to develop during this period then a subculture was done. Positive cultures were examined both macroscopically and microscopically for species identification. Special tests like; Lacto phenol cotton blue test, hair perforation test, rice grain test urease test were performed.

III. Observation and Results

Table 1: Clinical types of superficial fungal infections

Species	Number	Percentage
T. Corporis	92	46
T. Cruris	34	17
T. Capitis	24	12
Onychomycosis	15	7.5
T. Pedis	12	6
P. Versicolor	12	6
T. Faciei	4	2
T. Manuum	3	1.5
T. Barbae	2	1
Candidiasis	2	1

Table 2: Age and sex wise distribution according to clinical types

Clinical types	Age Group						Sex		%
	0-10	11-20	21-30	31-40	41-50	>50	Male	Female	
T. Corporis	2 2.17%	14 15.21%	33 35.8%	14 15.2%	16 17.3%	12 13.04%	60	32	46
T. Cruris	1 2.94%	3 8.82%	16 47.05%	4 11.76%	8 23.5%	3 8.82%	22	12	17
T. Capitis	15 62.5%	9 37.5%	0	0	0	0	16	8	12
Onychomycosis	3 20%	3 20%	3 20%	2 13.3%	1 6.66%	3 20%	6	9	7.5
T. pedis	1 8.33%	1 8.33%	3 25%	3 25%	3 25%	1 8.33%	9	3	6
P. versicolor	0	3 25%	7 58.33%	2 16.66%	0	0	8	4	6
T. faciei	0	1 25%	1 25%	1 25%	0	1 25%	4	0	2
T. manuum	0	0	1 33.3%	2 66.6%	0	0	2	1	1.5
T. Barbae	0	0	1 50%	1 50%	0	0	2	0	1
Candida	1 50%	0	1 50%	0	0	0	1	1	1
Total	23(11.5%)	34(17%)	66(33%)	29(14.5%)	28(14%)	20(10%)	130	70	100%

Table 3: KOH & Culture findings

NO. OF CASES	KOH POSITIVE CULTURE POSITIVE	KOH POSITIVE CULTURE NEGATIVE	KOH NEGATIVE CULTURE POSITIVE	KOH NEGATIVE CULTURE NEGATIVE	TOTAL
T. CORPORIS	74	11	0	7	92
T. CRURIS	22	4	0	8	34
T. PEDIS	7	3	0	2	12
ONYCHOMYCOSIS	12	1	1	1	15
P. VERSICOLOR	4	4	2	2	12
T.FACIEI	1	1	1	1	4
T.MANUUM	1	0	1	1	3
T. BARBAE	1	1	0	0	2
T. CAPITIS	14	6	2	2	24
CANDIDA	0	0	1	1	2
TOTAL	136	31	8	25	200
	KOH+VE:167 (83.5%)			Culture +VE:144(72%)	

Table 4: Different species isolated in the study

Species	No. of cases	Percentage
T. mentagrophyte	63	43.75%
T. rubrum	48	33.33%
T. violaceum	18	12.5%
T. tonsurans	3	2.08%
T. verrucosum	1	0.69%
M. audouinii	2	1.38%
M. canis	2	1.47%
E. floccosum	1	0.70%
Malassezia	5	3.47%
Candida	1	0.69%
Total	144	100%

The study revealed that the highest no. of patients(n=66,33%) were of age group 21-30 years and the minimum no. of patients were in the age group of more than 50 years(n=20,10%).The age of the patient varied between 2 to 60 years, smallest being 2years old child to eldest being 58 years female. No. of males(n=130) out numbered females(n=70) with a ratio of 1.85:1.T.corporis was the most common fungal infection seen in 92(46%) followed by T.cruris in 34(17%),T. capitis in 24(12%),onychomycosis in 15(7.5%),T.pedis and P. versicolor in 12(6%),T. faciei in 4(2%), T. manuum in 3(1.5%),T. barbae and candidiasis in 2(1%),in our study.(Table 1).T.corporis was more common in 21-30 years age group in 33 cases(35.8%) the similar results were there for T.cruris and +p.versicolor(n=7,58.33%). T. capitis was more common in age group of less than 10years(n=15,62.5%).Male predominance was seen in almost all clinical types ieT.corporis(n=60),T.cruris(n=22),T.capitis(n=16),T.pedis (n=9),P versicolor(n=8),T.faciei(n=4),T. manuum(n=2).(Table 2)

This study of 200 patients revealed 167(83.5%) of KOH Positivity and culture positivity was seen in 144(72%) cases. KOH and culture both were positive in 136(68%) cases, culture negative in 56(28%) and 8(4%) cases were KOH negative and culture positive. (Table 3)

Out of the culture positive cases the most common isolate was T.Mentagrophyte in 63(43.75%),T.Rubrum in 48(33.33%),

T. violaceum in 18(12.5%),T. tonsurans in 3(2.08%),T.verrucosum in 1(0.69%),M. audouinii in 2(1.38%),M. canis in 2(1.47%),E. floccosum in 1(0.70%),Malassezia in 5(3.47%),Candida in 1(0.69%) respectively.(Table 4)

Out of the 200 cases (85%) cases were positive on KOH and 144(72%) cases were positive on culture. Out of total 92(46%) cases of T. corporis,78 were KOH positive and culture positive 11 were KOH positive culture negative and 3 cases were negative on culture and KOH.34(17%) caseswere there of T. cruris, 26 cases were KOH +veand culture +ve and 8cases were culture and KOH negative. In 24casesof T.capitis 20 cases were

KOH +ve and 22 were culture positive, 2 were negative on KOH and culture. In 15 (7.5%) cases of onychomycosis 12 were KOH +ve and 13 were culture +ve. In 12 cases of *T. pedis* (6%), 10 cases were KOH +ve and 2 were culture and KOH negative. Out of the 12 cases *P. versicolor* (6%), 8 cases were KOH +ve and culture positive and 2 cases were culture positive, 2 were culture negative. In 4 cases of *T. faciei* (2%), 1 case was KOH +ve and culture positive and 1 was KOH positive and culture negative. In 2 cases of *T. barbae* (1%), 1 was culture and KOH positive and 1 was KOH negative and culture positive. In 2 cases of *Candida* (1%), 1 was KOH and culture negative and 1 case was culture positive.

IV. Discussion

Eastern Region has got a dry climate but in the summer, the temperature exceeds even 46°C with high humidity during the monsoon season. These climatic conditions favour the occurrence of fungal infections.

In this study, maximum number of cases of dermatophytosis were noted in the age group of 21–30 years. Similar peak in this age group was observed by Malik et al., Bhagra et al., Agarwal et al. and Hanumanthappa et al.^[6,7,8] However, Bindu et al. observed highest peak in second decade.^[9] Maximum incidence in 3rd decade of life in our study was probably due to heavy physical work, outdoor activities predisposing them to increased perspiration and maceration. In our study, males 130 (65%) were more commonly affected than females 70 (35%) with male to females ratio of 1.85:1. Similarly, male predominance was reported by Sahai et al. at (2011) etc.^[10] The high incidence in male was presumably due to increased opportunity for exposure to excessive outdoor activities. Similar to our study Bindu et al. study stated that tinea corporis and tinea cruris are the most common clinical type of dermatophytic infections.^[11] In the studies by Sardari et al.^[12] and Verma et al.^[13] it has been reported that tinea cruris was the most common clinical type. Out of the 200 cases 167 (83.5%) cases were positive on KOH and 144 (72%) cases were positive on culture which showed *T. mentagrophyte* was isolated in 63 (43.75%), *T. rubrum* in 48 (33.33%), *T. violaceum* in 18 (12.5%), *T. tonsurans* in 3 (2.08%), *T. verrucosum* in 1 (0.69%), *M. audouinii* in 2 (1.38%), *M. canis* in 2 (1.47%), *E. floccosum* in 1 (0.70%), *Malassezia* in 5 (3.47%), *Candida* in 1 (0.69%) respectively among 144 culture positive cases, similar to Belukar et al. study^[14], in which Out of the 100 cases 96 cases were positive on KOH and 39% culture positivity rates. In culture most common dermatophyte growth was of *T. mentagrophytes* followed by *T. rubrum* in our study. Similar results were observed by Agarwal et al. and Mahajan et al.^[8,15]

Table 5: KOH and fungal positivity by other authors

Authors	Region	Species
Mahajan et al [15]	North India	<i>T. Mentagrophyte</i> (75.9%) <i>T. Rubrum</i> (21.9%)
Malik et al [6]	North India	<i>T. Mentagrophyte</i> (21.1%) <i>T. Rubrum</i> (58.5%)
In our study	North India	<i>T. Mentagrophyte</i> (39.13%) <i>T. Rubrum</i> (32.29%)

V. Summary And Conclusion

- The present study gives an insight about the epidemiology of superficial fungal infection in Rajasthan.
- The finding of our study are
- Dermatophytosis was found to be most common in 3rd decade of life.
- There was male preponderance, with M:F ratio being 1.85:1.
- *T. corporis* (46%) was found to be commonest clinical pattern.
- KOH mounts was found to be positive in 167 (83.5%) cases.
- Fungal culture was positive in 144 (72%) cases.
- *T. mentagrophyte* was found to be the commonest isolate (43.75%) followed by *T. rubrum* (33.33%) and *T. violaceum* (12.5%).

Figure 1: Macroscopic Colony Morphology of T.Rubrum



Figure 2: Micro Morphology of Trichophyton mentagrophytes with microconidia, spherical, and pyriform shaped, arranged in clusters along the Hyphae.



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