

Clinico - mycological study of dermatophytosis in a tertiary care hospital in central India

Shaikh Waseemuddin Nayeemuddin^{1*}, Jayesh Ishwardas Mukhi², Kinjal Deepak Rambhia³, Rajesh Pratap Singh⁴

¹Resident Doctor, ²Associate Professor, ³Assistant Professor, ⁴Professor and HOD, Department of Dermatology-Venereology-Leprosy, Government Medical College and Hospital, Nagpur, Maharashtra-440003., INDIA.

Email: waseemgmc8854@gmail.com, jayesh.mukhi@gmail.com, kinjal_rambhia@hotmail.com, rpsingh13m@gmail.com

Abstract

Background: Dermatophytoses are superficial fungal infection of skin, hairs and nails. It constitutes one of the major burden of dermatology clinic. Nowadays there is an upsurge in the incidence and treatment resistance has been increasing. **Aim:** To study the clinicoetiological profile of dermatophytic infections. **Setting:** Hospital based observational study **Material and Methods:** One hundred and ten clinically diagnosed cases of dermatophytoses were included. After taking detailed history and complete cutaneous examinations, 10 % KOH for skin and hairs, while 40% KOH for nail samples was done along with culture on Sabourads dextrose agar slant, containing 0.05% chloramphenicol and 0.5% cycloheximide. **Results:** Males are more affected than females with male : female ratio of 1.34. Most common age group affected in 20-40 yrs (47.27%). Out of 110 samples, 62 (56.36%) were KOH positive, while 48 (43.63%) were culture positive. *Trichophyton mentagrophytes* was the predominant species isolated, followed by *Trichophyton rubrum*. Also *Trichophyton terrestre* was isolated in 2 samples. **Conclusions:** There is changing etiological spectrum of dermatophytosis in central india.

Key Words: Central India, Dermatophytosis, *Trichophyton mentagrophytes*, *Trichophyton rubrum*, *Trichophyton terrestre*

*Address for Correspondence:

Dr. Shaikh Waseemuddin Nayeemuddin, plot 21, 22; yunus colony layout; near motiwala function hall; behind AR medical hall; kat kat gate road; Aurangabad; Maharashtra-431001, INDIA.

Email: waseemgmc8854@gmail.com

Received Date: 06/10/2017 Revised Date: 13/11/2017 Accepted Date: 24/12/2017

DOI: <https://doi.org/10.26611/1021434>

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 28 December 2017

INTRODUCTION

Dermatophytes (literal meaning skin plant) are causative agents of superficial fungal infections of the keratinized tissues namely skin, hair, and nails. Dermatophytes represent more than 40 closely related species of three genera *Trichophyton*, *Epidermophyton* and *Microsporum*, classified by habitat and host preferences into three classes - anthropophilic, geophilic and zoophilic.

Dermatophytoses are one of the most common dermatological problems especially in developing countries like India. The etiological spectrum varies according to time and place, which may be attributed to changes in climatic and socioeconomic conditions. Recently there has been a surge in the incidence in the dermatophytosis. The reasons which could contribute to this increase might be the change in the etiological agent, with antifungal resistance also as a major factor. Surveillance is crucial for defining the burden of infection and changing trend; for evaluating the proper intervention. There are few studies in central India on dermatophytoses. Hence the present study was undertaken to study the clinicoepidemiological profile and etiological spectrum of dermatophytoses in a tertiary care centre; and to correlate the clinical diagnosis with potassium hydroxide smear and culture positivity.

MATERIALS AND METHODS

110 clinically diagnosed patients of dermatophytosis attending our outpatient department were included in this study after obtaining written informed consent. The patients were randomly selected for the study. Ethical clearance was obtained before the start of study from the institutional ethical committee. Patients of all age group above one year were included in the study. Patients who were not willing for consent, pregnant females, patient on systemic antifungal treatment within last 1 month, applying steroids and indigenous topical preparations were excluded from the study. Detailed history and clinical examination were performed in each case. Routine investigations were done in all cases. Based on the site of infection scales, nail scrapping or hair were collected by the standard set of procedures. Specimens were subjected to potassium hydroxide – 10% for skin and hair samples; while 40% for nail sample, for a demonstration of fungal elements. Irrespective of KOH findings, all specimens were subjected to culture on Sabourads dextrose agar slant, containing 0.05% chloramphenicol and 0.5% cycloheximide to eliminate bacterial and nondermatophytic molds contamination. Culture tubes were incubated at 28°C for up to four weeks to label it as negative. Individual fungal isolates were identified based on macroscopic examination of the colony - morphology, pigmentation, growth rate, slide culture and lactophenol cotton blue mount. Special tests like hair perforation and urease test were done wherever required. Non dermatophytic moulds on culture were excluded and considered negative.

RESULTS

Out of 110 patients, 63 (57.27%) were males; while 47 (42.72%) were females with male female ratio of 1.34. Among various clinical presentations of dermatophytes, tinea corporis was most common in 31 (28.18%), followed by mixed pattern in 23 (20.90%) of patients. Most common age group affected was 20-40 yrs with 52 (47.27%) cases. Students were most common group affected, i.e 31 (28.18%). Family history / Contact history was given by 32 (29.09%) of cases. Among 110 samples given for KOH and culture, 62 (56.36%) were KOH positive, while 48 (43.63%) were positive on culture considering only dermatophytes. 8 samples were positive on culture but negative on KOH mount. *Trichophyton mentagrophytes* was most common isolate in 19 (40.42%) out of 48 culture positive samples, followed by *Trichophyton rubrum* in 11 (26.19%). Other dermatophytes grown on culture were *T.Verrucosum*, *T.Tonsurans*, *T.Violaceum*, *E.Floccusum*, *Trichophyton*

terrestre, *Microsporum ferrugineum*, *Trichophyton* *sondane*, *Trichophyton Schoenleinii*.

Table 1

Sr no	Age group (yrs)	Total no	Male	Female
01	1-10	09 (8.18%)	05	04
02	11-20	17(15.45)	11	06
03	21-40	52 (47.27%)	28	23
04	41-60	20 (18.18%)	10	10
05	>60	13 (11.81%)	09	04
TOTAL		110	63 (57.27%)	47 (42.72%)

Table 2

Clinical type	No of cases	Male	Female
T.Corporis	31 (28.18%)	19	12
T.Cruris	21 (19.09%)	13	8
Onychomycosis	12 (10.90%)	5	7
T.Facei	8 (7.27%)	5	3
T.Capitis	7 (6.36%)	4	3
T.mannum/pedis	8 (7.27%)	5	3
Mixed pattern	23 (20.90%)	12	10
Total	110	63	47

Table 3

Profession	Male	Female	Total
Students	21	10	31 (28.18%)
Emplyoees (unskilled workers)	15	7	22 (20%)
Housewives	-	15	15 (13.63%)
Farmers	10	5	15 (13.63%)
Laborers	7	5	12 (10.90%)
Teachers	3	2	5 (4.54%)
Skilled professionals	3	1	4 (3.63%)
Others	4	2	6 (5.45%)
Total	63	47	110

Table 4

Koh Mount	Culture		Total
	Positive	Negative	
Positive	40	22	62 (56.36%)
Negative	08	40 (36.36%)	48
Total	48 (43.63%)	62	110

Table 5

Clinical type	No of cases	KOH positive	Culture positive
T.Corporis	31	19	16
T.Cruris	21	11	9
Onychomycosis	12	6	3
T.Facei	8	4	4
T.Capitis	7	2	2
T.mannum/pedis	8	4	3
Mixed pattern	23	16	11
Total	110	62	48

Table 6

Species	No of positive cases
<i>T.Mentagrophytes</i>	19 (40.42%)
<i>T.Rubrum</i>	11 (26.19%)
<i>T.Verrucosum</i>	5 (11.90%)
<i>T.Tonsurans</i>	3 (7.14%)
<i>T.Violaceum</i>	3 (7.14%)
<i>E.Floccusum</i>	2 (4.76%)
Others	5 (11.90%)
Total	48

Table 7

	T.Mentagrophytes	T.Rubrum	T.Verrucosum	T.Tonsurans	T.Violaceum	E.Floccusum	Others	Total
T.Corporis	7	3	1	1	1	0	2	16
T.Cruris	4	3	1	0	0	1	0	9
T.Capitis	1	0	0	1	0	0	0	2
T.Facei	2	1	0	0	1	0	1	4
T.Mannum/Pedis	0	1	1	0	0	0	1	3
Onychomycosis	0	2	0	0	0	1	0	3
Mixed pattern	5	2	1	1	2	0	0	11
Total	19	11	5	3	3	2	5	48

Others: *Trichophyton terrestre*, *Microsporum ferrugineum*, *Trichophyton soudanense*, *Trichophyton Schoenleinii*



Figure 1:



Figure 2:

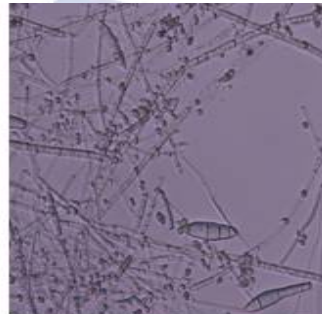


Figure 3:



Figure 4:



Figure 5:

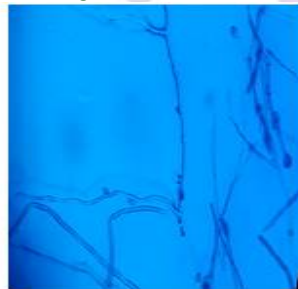


Figure 6:



Figure 7:



Figure 8:



Figure 9:



Figure 10:



Figure 11:



Figure 12:

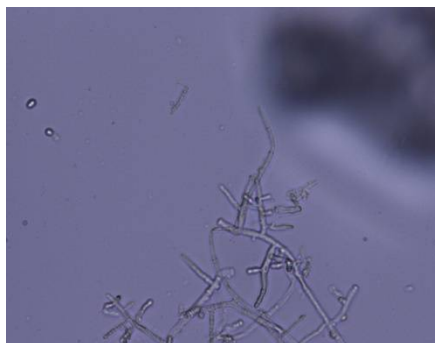


Figure 13:

Figure 1: *T.mentagrophytes*; Thallus color: white to sandy to butter yellow; **Figure 2:** *T.mentagrophytes*; Reverse: white to tan, rarely reddish brown; **Figure 3:** *T.mentagrophytes*; Round microconidia in grape-like clusters, spiral hyphae, +/- cigar shaped, thin walled macroconidia, narrowly attached to hyphae; **Figure 4:** *T.rubrum*; Thallus color: white to pale pink; **Figure 5:** *T.rubrum*; Reverse: blood red to reddish brown; **Figure 6:** *T.rubrum*; Few pyriform, lateral microconidia pencil shaped, macroconidia uncommon, 'birds on wire' appearance; **Figure 7:** *T.Violaceum*; Thallus color: purplish red with white sectors; **Figure 8:** *T.Violaceum*; Reverse: lavender to purple; **Figure 9:** *T.Verrucosum*; Thallus color: white, grey or yellow; **Figure 10:** *T.Verrucosum*; Reverse: colorless; **Figure 11:** *T.terrestre*; Thallus color: white to yellow; **Figure 12:** *T.terrestre*; Reverse: yellow, occasionally red; **Figure 13:** *T.terrestre*; Microconidia pyriform to elongate, often on pedicels

DISCUSSION

Present study is carried in central India, where climate is hot and humid, thereby facilitating growth of fungus. Males are more affected than females with male female ratio of 1.34, a finding that is well correlated with previous studies done by Noronha *et al.*¹, Amin *et al.*² and Singh *et al.*³ The reason for less incidence in females might be due to social restrictions, personal inhibitions preventing them for reporting. The most common age group is 20-40 yrs of age. This finding is in collaboration with studies by Chaudhary *et al.*⁴, Aggrawal *et al.*⁵ and Grover *et al.*⁶. Both of these facts can be explained by outdoor physical activity increasing the exposure. The most common clinical presentation is Tinea corporis followed by mixed pattern. This can be partly attributed by fact that people are not reporting early so many present mixed pattern at presentation. This is in accordance with the studies done by Surekha *et al.*⁷, Nagabhusanam *et al.*⁸ and Patwardhan *et al.*⁹ and few other studies.¹⁰⁻¹³ We got 20.3% of mixed infection, a finding correlated with Siddappa *et al.*(23%)¹⁴, which can be explained by delay in reporting. Also we found that Tinea capitis affected only children less than 10 yrs of age, a similar finding reported by Grover *et al.*¹⁴, more common in males than female. This can be explained by increased fungistatic triglyceride content of sebum in adults.¹⁵ Short hairs in male facilitates the growth of fungus, while regular use of vegetable oil is associated with low incidence of Tinea capitis in females.¹⁶ Most common group affected were students. Unskilled workers were more affected than skilled workers. Both the facts can be attributed by fact that they are more exposed to

outdoor environment. Family history was given by 32 (28.18 %). Bindu *et al.*¹⁷ reported family history in 30 cases - 20%. In our study KOH positivity was seen in 62 (56.63%), while culture positivity 48 (43.63%). 22 (20%) samples were KOH positive, culture negative. 8 samples were KOH negative, culture positive which can be due to error in reporting the KOH mount or insufficient sample. 40 samples (36.36%) were both KOH and culture negative. Comparable findings were reported by Noronha *et al.*¹, Chaudhary *et al.*⁴, Bindu *et al.*¹⁷, Kumaran *et al.*¹⁸ hence we can assume that both KOH mount and culture should be done to prevent false negative reporting. *Trichophyton mentagrophytes* was the most common species isolated on culture (40.42%), followed by *T.rubrum*. Similar findings have been reported by Noronha *et al.*¹, Kumaran *et al.*¹⁸ Aggrawal *et al.*¹⁹ kumaran *et al.*¹⁸ It was undoubtedly proven that *T.rubrum* was most common causative organism for dermatophytosis.^{3,4,7-9,11,12,20,21} But recently there has been change in etiological spectrum with most common cause *T.mentagrophytes*, a zoophilic from an anthropophilic species, *T.rubrum*. However Grover *et al.*⁶ had reported *T. tonsurans* (20.5%) as the commonest isolate. It could be explained on the basis of different climatic conditions and geographic distribution. In our study, geophilic species, *T.terrestre* was isolated in 2 cases. After reviewing the literature, we found that there has been only one case report of *T.terrestre* in india.²² It has been stated that lesions of zoophilic and geophilic species are more inflammatory than those of anthropophilic infection. We can assume that there has been change in morphology of dermatophytes to more inflammatory type of lesions.²³

Also there has been studies regarding antifungal susceptibility of both of these species, indicating lower efficacy of fluconazole, while higher with griseofulvin and ketoconazole of *T.mentagrophytes* as compared to *T.rubrum*.^{24,25,26}

CONCLUSION

There is changing pattern of etiological spectrum of dermatophytosis. There might be change in the clinical presentation. Also there might be change in antifungal sensitivity. Both of these facts are to further justified by more large scale studies.

REFERENCES

- Noronha TM, Topakhane RS, Nadiger S. Clinico-microbiological study of dermatophytosis in a tertiary care hospital in north Karnataka. *Indian Dermatol Online J* 2016; 7:264-71.
- Amin AG, Shah HS. Dermatophytosis. *Indian J Dermatol* 1973; 19:22-7.
- Singh S, Beena PM. Profile of dermatophyte infections in Baroda. *Indian J Dermatol Venereol Leprol* 2003; 69:281-3.
- Chaudhary J K, Kumar A. A Clinico - Mycological Profile of Dermatophytosis at a Tertiary Care Hospital in Bihar. *Int.J.Curr.Microbiol.App.Sci* (2016) 5(2): 181-189
- Aggarwal A, Arora U, Khanna S. Clinical and Mycological Study of Superficial Mycoses in Amritsar. *Indian J dermatology* 2002; 47:4: 218 – 20.
- Grover WCS, Roy CP. Clinico-mycological Profile of Superficial Mycosis in a Hospital in North East India. *Medical, Journal Armed Forces India* 2003; 59:2:114- 6.
- Surekha A, Ramesh Kumar G, Sridevi K, Murty DS, Usha G, Bharathi G. Superficial dermatomycoses: a prospective clinicomycological study. *J Clin Sci Res* 2015; 4:7-15.
- Nagabhushanam P, Tirumal Rao D, Patnaik R. Dermatomycoses in Hyderabad area. *Indian J Dermatol Venereol Leprol* 1969; 35:120-3.
- Patwardhan N, Dave R. Dermatomycosis in and around Aurangabad. *Indian J Pathol Microbiol* 1999; 42:455-62.
- Belurkar DD, Barmi RN, Karthikeyan S, Vadhavkar RS. A mycological study of dermatophytosis in Thane. *Bombay Hosp J* 2004; 46:2.
- Sumana V, Singaracharya MA. Dermatophytosis in Khammam (Khammam district, Andhra Pradesh, India). *Indian J Pathol Microbiol.* 2004; 47:287-9.
- Patel P, Mulla S, Patel D, Shrimali G. A study of superficial mycosis in south Gujarat region. *Natl J Commun Med* 2010; 1:85-8.
- Das K, Basak S, Ray S. A study on superficial fungal infection from West Bengal: A Brief Report. *J Life Sci* 2009; 1:51-5.
- Grover C, Arora P, Manchanda V. Tinea capitis in Paediatric population: A study from north India. *Indian Journal of Dermatol, Venereol Leprol* 2010; 76:527
- Siddappa K, Mahipal OA. Dermatophytoses in Davangere. *Indian J Dermatol Venereol Leprol* 1982; 48:254-9.
- Rippon J M. Dermatophytosis and Dermatomycosis, In Chapter 8. *Medical Mycology: The Pathogenic Fungi and Pathogenic Actinomycetes.* 3rd Edition. W. B Saunders Company, Philadelphia; 1988: 169-275.
- Dasgupta L R, Sharma K B, Fernandez D. Superficial mycosis in Pondicherry. *Indian J Pathol Bacteriol* 1973; 19: 41-46.
- Bindu V, Pavithran K. Clinico-mycological study of dermatophytosis in Calicut. *Indian J Dermatol Venereol Leprol* 2002; 68:259-61.
- G.Kumaran, M Jeya. clinico-mycological profile of dermatophytic infections. *Int J Pharm Bio Sci* 2014 April;5(2):(B) 1-5.
- Agarwal US, Saran J, Agarwal P. Clinico-mycological study of dermatophytes in a tertiary care centre in northwest India. *Indian J Dermatol Venereol Leprol* 2014; 80:194.
- Surendran K, Bhat RM, Bolor R, Nandakishore B, Sukumar D. A clinical and mycological study of dermatophytic infections. *Indian J Dermatol* 2014; 59:262-7.
- Pavani A, Singh M, Basireddy S, et al. Dermatophytosis in and around Mahabubnagar. *J. Evolution Med. Dent. Sci.* 2016;5(32):1739-1743
- Kumar S, Bhaduria S. Clinico-mycological profiles of dermatophytosis in Jaipur, India. *Afr. J. Microbiol. Res* 2016; 10(35):1477-82.
- Radentz WH. Fungal skin infections associated with animal contact. *Am Fam Physician.* 1991 Apr; 43(4):1253-6.
- Sowmya N, Appalaraju. B, Srinivas CR, Surendran P. *JMR* 2015; 1(2): 64-67.
- Indira G. In Vitro Antifungal Susceptibility Testing of 5 Antifungal Agents against Dermatophytic Species by CLSI (M38-A) Micro Dilution Method. *Clin Microbiol* 2014; 3:145.
- Jessup CJ, Warner J, Isham N, Hasan I, Ghannoum MA. Antifungal susceptibility testing of dermatophytes: establishing a medium for inducing conidial growth and evaluation of susceptibility of clinical isolates. *J Clin Microbiol.* 2000 Jan; 38(1):341-4.

Source of Support: None Declared
Conflict of Interest: None Declared