

Original Research Article**Menace of Chronic Dermatophytosis - A Descriptive Study in a Tertiary Care Center**

Authors

**Jamuna SL<sup>1</sup>, Kaviarasan PK<sup>2\*</sup>, Prasad PVS<sup>3</sup>, Kannambal K<sup>4</sup>, Poorana B<sup>5</sup>, Abhirami C<sup>6</sup>**<sup>1</sup>Post Graduate, Department of Dermatology Venereology and Leprosy, Rajah Muthiah Medical College & Hospital, Annamalai University, Chidambaram, India – 608002.<sup>2</sup>Head of the Department, Department of Dermatology Venereology and Leprosy, Rajah Muthiah Medical College & Hospital, Annamalai University, Chidambaram, India – 608002.<sup>3</sup>Professor, Department of Dermatology Venereology and Leprosy, Rajah Muthiah Medical College & Hospital, Annamalai University, Chidambaram, India – 608002<sup>4</sup>Associate professor, Department of Dermatology Venereology and Leprosy, Rajah Muthiah Medical College & Hospital, Annamalai University, Chidambaram, India – 608002<sup>5</sup>Assistant professor, Department of Dermatology Venereology and Leprosy, Rajah Muthiah Medical College & Hospital, Annamalai University, Chidambaram, India – 608002<sup>6</sup>Lecturer, Department of Dermatology Venereology and Leprosy, Rajah Muthiah Medical College & Hospital, Annamalai University, Chidambaram, India – 608002

\*Corresponding Author

**Kaviarasan PK****Abstract****Background:** *Dermatophytes are the most common superficial fungal infection worldwide. The distribution of dermatophytosis vary according to the geographic region studied. Chronic dermatophytosis is now being increasingly encountered and runs a protracted course with exacerbations and remissions. Hence we studied this problem with regard to the epidemiology, etiology and associated risk factors.***Aims:** *We sought to determine the various host and pathogen factors responsible for chronic dermatophytic infections and to identify the causative fungal species.***Materials and Methods:** *Seventy two clinically diagnosed cases of chronic dermatophytosis attending the Dermatology venereology leprosy outpatient department of RMMCH, Chidambaram were included in the study. Detailed history and clinical examination were recorded in pre-designed proforma. Direct microscopy with 10% KOH mount and culture using SDA medium was done.***Results:** *Chronic dermatophytosis (duration >6 months) was observed in 60%. Male female ratio 1.5:1 and most common age group 21-30yrs (37.5%). Multiple site involvement was the most common clinical presentation, 54.1% of patients (n=39). Among the risk factors, 72% of patients had contact with intrafamilial contacts, 60% had history of fomite sharing, 53.2% of patients had irrational use topical corticosteroid creams. KOH mount showed fungal hyphae in 77.5% and definitive culture characteristics was observed in 56%. Trichophyton mentagrophytes was the most common species identified (50.8%).***Conclusion:** *Irrational use of topical corticosteroids, poor compliance to treatment, lack of health awareness and various other host and agent factors, seem to have all contributed to the chronicity and recurrence of dermatophytosis.***Keywords:** *chronic dermatophytosis, corticosteroid abuse, risk factors, KOH - potassium hydroxide, SDA– Sabouraud dextrose agar.*

## Introduction

Dermatophytosis is the superficial fungal infection of keratinised tissue (skin, hair and nail). According to World Health Organisation, the prevalence rate of superficial mycotic infection has been found to be 20-25% worldwide<sup>1</sup>. Robert remak, was the first to identify and described the microscopic features of dermatophyte *Trichophyton schoenleinii* from favus<sup>2</sup>. This condition is caused by three known genera of filamentous fungi namely *Trichophyton*, *Microsporum* and *Epidermophyton*. The mode of transmission are of three types, anthropophilic, zoophilic and geophilic<sup>3</sup>. Dermatophytes produce proteases and keratinases which degrade the keratin and thus invade the superficial skin cells<sup>4</sup>. Over the past few years, there was an alarming increase in prevalence and changes in clinical patterns which represent just the tip of an iceberg. Although not fatal, dermatophytosis can cause significant distress to the patient socially, economically and financially. The recent increase of incidence and prevalence is attributed to the use of inappropriate steroid antifungal combination formulations, poor patient compliance, virulent or resistant species, various host and environmental factors<sup>5</sup>.

Chronic dermatophytosis is defined as an infection that persists for 6 months to one year with or without recurrence inspite of being treated<sup>6</sup>. Thus patients with chronic and recurrent disease are potential source of infection not only to their family members but also to the public, posing public health threat. Hence we studied it in regard to its epidemiology, etiological factors, clinical presentations and cultural characteristics.

## Aims and Objectives

We aimed at exploring the various host and pathogen factors in chronic dermatophytosis among patients attending the dermatology venereology leprosy outpatient department of Rajah Muthiah medical college, Chidambaram.

## Methodology

About one hundred and twenty clinically diagnosed cases of dermatophytosis attending the outpatient department during the period of November 2017- October 2019 were randomly selected. Ethical clearance was sought from the Institutional Ethical Committee. Of which chronic dermatophytosis was observed in 72(N) patients who were included in the study. Sample size was calculated based on the N-master sample size software system and the study design was descriptive observational study.

Data was collected through a detailed history and thorough clinical examination with reference to site and area of involvement. All patients who gave consent for the required investigations were included in the study.

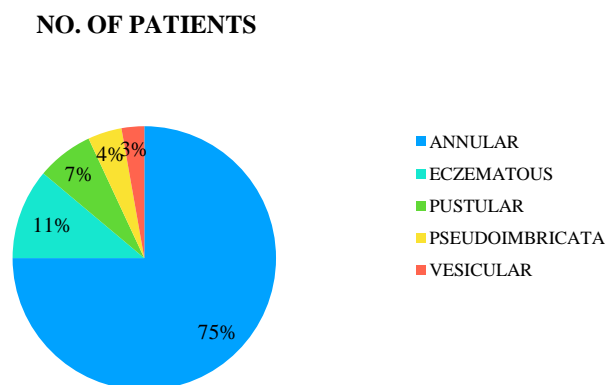
The required specimens including skin scales, nail clippings and infected hairs were collected and subjected to potassium hydroxide wet preparation for the presence of fungal elements. After direct microscopic examination, irrespective of demonstration of fungal elements, the specimen was inoculated into the test tube containing Sabouraud's dextrose agar with 0.05% chloramphenicol and 0.5% cycloheximide. The medium was incubated at 28°C for upto 4 weeks before labelling as negative for the fungal growth. Fungal isolates were identified based on the colony morphology and microscopy through lactophenol cotton blue mount. Data obtained were tabulated in Microsoft office excel 2007. Descriptive statistics like mean and percentage were used to infer results.

## Results

Among the 120 cases studied, chronic dermatophytosis was recognised in 60%. Male preponderance was seen in chronic cases, with male female ratio of 1.5:1. Most common age group affected was 21-30years (37.5%) followed by 31-40years (34.7%). No chronic cases were seen in less than 10 years of age. Multiple site involvement was the most common clinical pattern of involvement observed, 54.1% followed by tinea

corporis alone in 18% and tinea cruris in 16%. Extensive dermatophytosis, more than 10% of body surface area involvement was seen in 66.6%. Morphological distribution is seen in the (figure 1-3).

**Figure-1:** Morphological distribution of dermatophytes



Intrafamilial contact was observed in 72%. Sharing of fomites was seen in 60% and occlusive and synthetic clothing were worn by 77%. Among the chronic dermatophytosis, 32% had associated toe or finger nail onychomycosis which probably serve as the nidus of infection. Diabetes mellitus was the most common associated comorbidity seen in 22.2%.

More than half of the patients 53.2% had used topical corticosteroids for variable period of time (figure 4-5). Of which steroid anti-fungal combination creams were used by 60.5% and plain corticosteroids were used by 39.4%. Majority of patients had taken treatment before coming to our outpatient department, in the form of over the counter medication in 37.5%, quacks in 29%, registered medical practitioner in 24% and native medications by 9.5%.

Direct microscopic examination of 10% potassium hydroxide mount specimens showed septate hyphae in 77.5%. Definite cultural characteristics were observed in 56%. *Trichophyton mentagrophytes* was the most common species isolated 50.8% (figure-6,7) followed by *Trichophyton rubrum* 44.3% (figure-8,9) and infrequently isolated organisms includes *Trichophyton*

*tonsurans* in 2.4% and *Microsporum gypseum* in 2.4%.

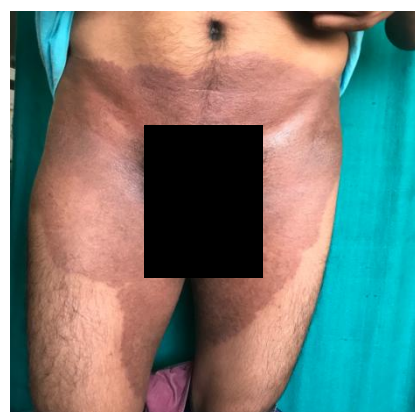
**Atypical Forms of Dermatophytic Infection**



**Fig 2:** Pustular Tinea Corporis



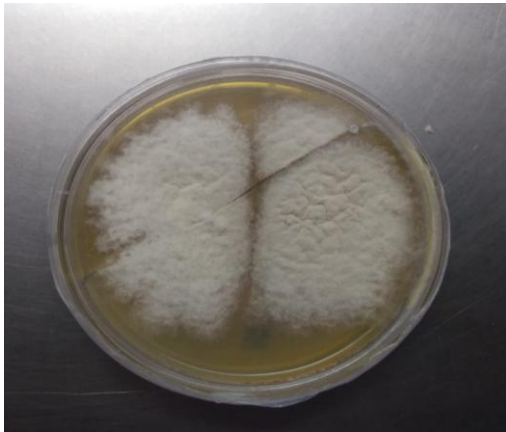
**Fig 3:** Tinea Pseudoimbricata



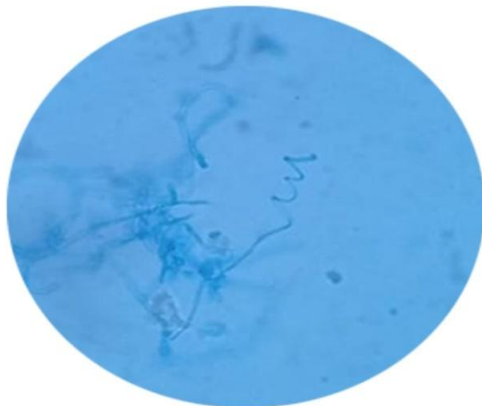
**Fig 4:** Large Patch Tinea Cruris



**Fig 5:** Steroid Modified Tinea with Striae



**Fig 6:** *Trichophyton Mentagrophytes*



**Fig 7:** Spiral Hyphae in LPCB



**Fig 8:** *Trichophyton Rubrum*



**Fig 9:** Tear Drop Shaped Microconid

**Discussion**

In the present study, chronic dermatophytosis (>6 months) was recognised in 60% which was almost similar to Vineetha *et al.*,<sup>6</sup>. This chronicity may be due to inadequate dose of anti-fungal medication, poor compliance to treatment and application of topical corticosteroids, which only reduces the inflammation and pruritus but help in proliferation of fungi by modifying their microenvironment. Chronic dermatophytosis was more common in 21-30 years (37.5%). Studies conducted by Noronha *et al.*,<sup>7</sup> and Sumana *et al.*,<sup>8</sup> also showed a higher prevalence in the same group. This may be due to the fact that this age group of population takes part in maximum outdoor activities which predispose them to acquire infection from environmental source. We noted male preponderance in chronic cases, which correlates with others studies by Vineetha *et al.*,<sup>6</sup>. The increased prevalence in males may be due to their nature of work such as farmers and labourers who have increased perspiration which favours the growth of the dermatophytes. Furthermore, reduced prevalence in females may be due to non-reporting because of social stigma in rural populations. Of the 72 chronic cases analysed, tinea corporis 18% was the most common clinical presentation followed by tinea cruris 16%, which was similar to Bindu *et al.*,<sup>9</sup> Sudha *et al.*,<sup>10</sup> studies. However in a study by Lyngdoh *et al.*,<sup>11</sup> tinea pedis was found to be the most common type.

Multiple site involvement was observed in 54.1% which was consistent with the Noronha *et al.*,<sup>7</sup> (34%). Among those with multiple site affected, tinea corporis et cruris was the commonest type with 53.8%. This may be due to poor hygienic practices, delay in seeking treatment and lack of health awareness.

Topical corticosteroids application was frequently seen in chronic patients 53.2% which was consistent with the Pathania *et al.*,<sup>12</sup> study. Steroids reduce the Th1 response and this reversion of immune response takes 3 weeks after stopping steroids if used for 2–4 weeks, thus promoting chronicity and explains the lack of response during first few weeks of anti-fungal treatment.

In this present study, positive family history was noticed in 72% which was compatible with Pathania *et al.*,<sup>12</sup> study. This explains that untreated family members are being constant source of infection and transmission also occurs through sharing of fomites 60%, *Trichophyton rubrum* survive on towels upto 12 weeks and *Trichophyton mentagrophytes* for 25 weeks. Wearing of occlusive dress in 77%, changing trend in clothing which was unsuitable to our climates creates damp environment which favour the dermatophyte growth. Associated finger or toe nail onychomycosis observed in 32% of chronic cases which was almost compatible with Prasad PVS *et al.*,<sup>15</sup> study, showed onychomycosis (28%) was responsible for chronicity.

In this study, potassium hydroxide examination was positive in 77.5%. Previous study by Mahajan *et al.*,<sup>13</sup> had reported similar findings 79.6%. In the present study, culture positivity was recognised in 56% which was compatible with Mahajan *et al.*,<sup>13</sup> 52.4%. Various previous reports show a variance ranging from 24 to 87%. The difference in rates among different studies may be due to the factors involved in the collection, transport and inoculation of the specimens, culture conditions, severity and type of disease and effect of anti-fungal agents.

In the present study, *Trichophyton mentagrophytes* 50.8% was the predominant cul-

ture isolate followed by *Trichophyton rubrum* 44.3% which was consistent with Agarwal *et al.*,<sup>14</sup> but in contrast to the Prasad PVS *et al.*,<sup>15</sup> study conducted at the same institution during the year 2005 where *Trichophyton rubrum* was the most common isolate. The higher isolation rate of *Trichophyton mentagrophytes* may be due to changing trend in the prevalence of dermatophyte species.

### Limitations

Anti-fungal susceptibility testing cannot be done due to lack of availability, which will provide a insight to the emerging resistance and supportive evidence to the chronic dermatophytic infection.

### Conclusion

Chronicity is the major problem encountered in treating a case of dermatophytosis. In our study, we observed that higher incidence of interfamilial infections, injudicious use of topical steroid anti-fungal combination creams as over the counter medication, poor compliance to treatment, poor hygiene and lack of health awareness were associated with the chronicity and poor response to treatment. Thus this changing trend in dermatophytosis is a menace, posing a great emerging health hazard to the community.

### References

1. Lakshmanan A, Ganeshkumar P, Mohan S R, Hemamalini M, Madhavan R. Epidemiological and clinical pattern of dermatomycoses in rural India. Indian J Med Microbiol 2015;33, Suppl S1:134-6.
2. Grzybowski A, Pietrzak K. Robert Remak (1815-1865): discoverer of the fungal character of dermatophytoses. Clin Dermatol 2013;31(6):802–805.
3. Sahoo AK, Mahajan R. Management of tinea corporis, tinea cruris, and tinea pedis: A comprehensive review. Indian Dermatol Online J 2016;7:77-86.
4. Bhatia VK, Sharma PC. Epidemiological studies on dermatophytosis in human pa-

- tients in Himachal Pradesh, India. Springer Plus 2014;3:134.
5. Verma S, Madhu R. The great Indian epidemic of superficial dermatophytosis: An appraisal. Indian J Dermatol 2017;62:227-36.
  6. Vineetha M, Sheeja S, Celine M I, Sadeep M S, Palackal S, Shanimoole P E, Das S S. Profile of dermatophytosis in a tertiary care center. Indian J Dermatol 2018;63:490-5.
  7. Noronha TM, Tophakhane RS, Nadiger S. Clinico-microbiological study of dermatophytosis in a tertiary-care hospital in North Karnataka. Indian Dermatol Online J 2016;7:264-71.
  8. Sumana V, Singaracharya MA. Dermatophytosis in Khammam (Khammam district, Andhra Pradesh, India). Indian J Pathol Microbiol 2004;47:287-9.
  9. Bindu V, Pavithran K. Clinico-mycological study of dermatophytosis in Calicut. Indian J Dermatol Venereol Leprol 2002;68:259-61.
  10. Sudha M, Ramani CP, Anandan H. Prevalence of dermatophytosis in patients in a tertiary care centre. Int J Contemp Med Res 2006;3:2399-401.
  11. Lyngdoh CJ, Lyngdoh WV, Choudhury B, Sangma KA, Bora I, Khyriem AB. Clinico-mycological profile of dermatophytosis in Meghalaya. Int J Med Public Health 2013;3:254-6.
  12. Pathania S, Rudramurthy SM, Narang T, Saikia UN, Dogra S. A prospective study of the epidemiological and clinical patterns of recurrent dermatophytosis at a tertiary care hospital in India. Indian J Dermatol Venereol Leprol 2018;84:678-84.
  13. Mahajan S, Tilak R, Kaushal SK, Mishra RN, Pandey SS. Clinico-mycological study of dermatophytic infections and their sensitivity to antifungal drugs in a tertiary care center. Indian J Dermatol Venereol Leprol 2017;83:436-40.
  14. 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.
  15. Prasad P V S, Priya K, Kaviarasan P K, Aanandhi C, Sarayu L. A study of chronic dermatophyte infection in a rural hospital. Indian J Dermatol Venereol Leprol 2005;71:129-30.