Sir,

Chronic and recurrent dermatophytosis causes significant distress to the patients socially, emotionally, and financially. Multiple factors, such as geographic area, climate, immunocompetence of the host, pathogenicity of the agent, and availability of the treatment may affect the incidence and chronicity of fungal infection within a population.[1] Raipur city has a tropical wet and dry climate. In summers, the temperature can go up to 50°C. Therefore, this study was planned to bring out various factors associated with chronic dermatophytosis (CD) in patients of Raipur, Chhattisgarh.

A retrospective cross-sectional study was planned based on the records of patients suffering from CD (duration of disease more than six months and no clinical remission during the course of disease) from May 2017 to March 2019. Data of CD patients were assessed including demographic details, clinical diagnosis, duration of disease, family history of similar complaints, treatment history, and history of any comorbidity. Clinical samples from patients were subjected to potassium hydroxide (KOH) examination and culture on Sabouraud’s dextrose agar with 0.05% chloramphenicol and 0.5% cycloheximide and incubated at 25°C up to 4 weeks. Causative agents were identified microscopically.

During the study period of twenty-three months, a total number of 93 patients with CD presented to our clinic. The important demographic features have been listed in Table 1. The mean age of patients was 30.8 years with the youngest patient being 1.5 years old and the oldest being 72 years old. The study revealed maximum occurrence of CD in the 3rd decade of life (40.9%). Males were more commonly affected (male to female ratio: 2.9:1). The duration of the disease varied from 6 months to 6 years, with approximately 81% suffering for a period of 6 months to 1 year.

Most common clinical form of CD was multiple site involvement (64.5% patients) in the form of tinea corporis with tinea cruris (43% patients), followed by tinea corporis, corporis, and face in 21.5% patients [Figures 1-3]. Pseudoimbricata pattern was seen in three patients, who had history of applying topical steroids [Figure 4]. Nail involvement in the form of distal and lateral subungual onychomycosis was seen in six patients (6.4%).

History of similar cutaneous lesions in close contacts or family members was present in 34.4% patients. Two patients had uncontrolled diabetes mellitus; injectable and oral steroids had been given in three patients for dermatophytosis; 62.4% patients gave history of topical medication in the form of topical steroid combination with antifungal/antibiotic; and 32.2% cases in our study had taken oral antifungals for variable duration with only partial response.

KOH preparation was positive in 70.97% of cases and positive culture was obtained in 73.12% (68/93) cases [Table 2]. Out of the culture positive cases, 57.35% (39/68) patients were positive for Trichophyton mentagrophytes, 25% (15/68) patients were positive for Trichophyton rubrum, followed by Trichophyton verrucosum (10.29%), Microsporum species (4.41%), and Trichophyton tonsurans (2.94%). Lactophenol cotton blue staining was done of smears from culture-positive slants to detect presence of macro and microconidia [Figures 5 and 6].

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Table 1: Prevalence of various demographic features in chronic dermatophytosis patients

| Characteristics          | Number (n) | Percentage |
|--------------------------|------------|------------|
| Sex                      |            |            |
| Male                     | 69         | 74.2       |
| Female                   | 24         | 25.8       |
| Duration of disease      |            |            |
| 6 months to 1 year       | 75         | 80.6       |
| 1 year to 2 years        | 13         | 13.9       |
| >2 years                 | 5          | 5.4        |
| Positive family/contact history | 32    | 34.4       |
| Clinical diagnosis       |            |            |
| Tineacorporis et cruris  | 40         | 43         |
| Tineacorporis, cruris et faciei | 20  | 21.5       |
| Tineacruris              | 12         | 12.9       |
| Tineaunguim             | 6          | 6.4        |

Table 2: Prevalence of various etiologic agents causing chronic dermatophytosis patients included in the study

| Number of patients (n) | Percentage |
|------------------------|------------|
| No. of cases positive by microscopy | 66 | 70.97 |
| No. of cases positive by culture     | 68          | 73.12   |
| Species isolated          |            |          |
| T. mentagrophytes         | 39         | 57.35    |
| T. rubrum                 | 17         | 25.0     |
| T. verrucosum             | 7          | 10.29    |
| Microsporum species       | 3          | 4.41     |
| T. tonsurans              | 2          | 2.94     |

Most common age group involved in our study was 20–30 years which is not in concordance with 5th decade as previously reported by Vineetha et al.[2] and 4th decade as previously reported by Sivaprapasam et al.[3] These authors gave the hypothesis that CD is more common in late middle age due to waning immunity and other comorbidities. In chronic cases, Vineetha et al.[2] noted a male predominance similar to the finding in our study but Sivaprapasam et al.[3] noted more female cases. Philpot[4] suggested that males may be more vulnerable to infection due to the higher exposures in the army, school, and sporting activities and due to the types of shoes and socks used.

Most common clinical presentation in our study was multiple site involvement which is in concordance with 64.6% cases reported by Pathania et al. who had studied the epidemiological and clinical patterns of recurrent dermatophytosis in their study.[5] The large percentage of multiple site involvement observed in our study may be due to chronicity of infection and delay in seeking treatment. Pathania et al.[5] has reported positive family history in 28% of chronic cases while we found even higher rate of positive family members and contacts (34.4%). Patients with immunocompromised status, diabetes mellitus, atopy, and intake of systemic corticosteroids are predisposed to CD.[6] On the contrary, most of the patients in our study were immunocompetent.

In accordance with our study, previous studies had also reported very high rate of topical steroid abuse in chronic and recurrent dermatophytosis (53.3% by Pathania et al.[5] 63% by Vineetha et al.[2] and 70.6% by Mahajan et al.[7]). Few predisposing factors for CD particularly relevant to India are wide over-the-counter availability and rampant use of topical steroid and antifungal...
In today’s scenario, clinical resistance of dermatophytosis despite appropriate antimicrobial therapy is a cause for concern and can be attributed to incorrect diagnosis, immunosuppression, and suboptimal dose or duration of therapy. Insufficient treatment encourages growth of the most resistant strains, which may lead to hard-to-treat fungal infections.

The isolation rate in our study was higher compared to previous studies. In chronic cases, Vineetha et al. could isolate in only 12% and Sivaprakasam et al. could isolate fungus in 52% in their study. The isolated species in our study are in concordance with findings by Pathania et al. who reported T. mentagrophytes complex as the most common species isolated in 36 (40%) patients, followed by T. rubrum in 29 (32.2%) patients. This does not coincide with the findings of earlier studies where T. rubrum was found to be the most common pathogen for CD. Vineetha et al. had reported T. rubrum as the most frequent isolate in patients with CD followed by T. mentagrophytes complex. Venkatesan et al. have reported in their study that T. rubrum accounted for 81.8% of chronic cases of infection followed by T. mentagrophytes complex (18.2%). In accordance with our study, few other Indian studies have also reported an increase in T. mentagrophytes complex as a leading causative agent. Recently, there has been a major shift in the epidemiology with T. mentagrophytes complex emerging as the dominant pathogen overtaking T. rubrum.

Our study suggests that CD commonly presents with multiple site involvement and a high rate of affected contacts. Injudicious use of topical steroids was found combinations by the patients themselves or unrestricted prescription of these products by quacks and general practitioners.
in alarming numbers in our study. The isolation rate was high with \textit{T. mentagrophytes} complex as the most common pathogen.

\textbf{Declaration of patient consent}

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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\textbf{Conflicts of interest}

There are no conflicts of interest.

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