The Changing Scenario of Dermatophytosis in Children

Superficial dermatophytosis of the glabrous skin has emerged as a major public health problem in India, with increased prevalence of chronic, recurrent, recalcitrant and steroid modified, difficult to treat tinea, over the last few years.[1] Rampant abuse of irrational topical corticosteroid (TCS)-antifungal-antibacterial combination creams, increasing trend of antifungal resistance to terbinafine and shift in the etiological agent from *Trichophyton rubrum* to *Trichophyton mentagrophytes* have been considered to be the most important factors contributing to treatment failure. This sea change seen in the clinical presentation among the adults, of an infection once easily amenable to treatment, has reflected on the epidemiology and clinical scenario of this infection in children. “Dermatophytosis in children” was almost synonymous with “Tinea capitis”, in the yester years, as it was the most common clinical form of tinea seen among the children. In the clinico-mycological study on dermatophytosis done by Noronha TM et al.[5] during 2007-2008, 54.1% of children in the age group between 0 and 20 years had tinea capitis as against 13.1% with tinea corporis, 6.5% with tinea faciei and 21.3% with mixed type of infection. While tinea corporis and tinea cruris were less common among infants and young children, the obese adolescent children were understandably more susceptible. But the current scenario is entirely different, wherein even neonates, infants and toddlers present with dermatophytosis of the glabrous skin and it is not at all uncommon to see chronic widespread/steroid-modified tinea among children.[3]

Global warming has adversely affected the climatic conditions in India, with rise in temperatures and humidity, leading to increased susceptibility to develop dermatophytosis, almost throughout the year.[4] Sharing of fomites with the infected family members or close contacts, use of tight synthetic garments such as jeans and leggings, synthetic uniforms and track pants, poor personal hygiene, increased physical activity and overcrowding result in a perfect milieu for the multiplication of dermatophytes, especially among the adolescents. In the study on pediatric dermatophytosis by Ray et al.,[3] published in this issue, the mean duration of infection was observed to be higher in children who gave history of irregular bathing, overcrowded environment and more than four infected family members. Various studies on dermatophytosis in children, have documented the contact history with infected family members or close contacts to range from 62.2% to 91.9%.[5‑9] Mother has been reported to be the primary source of infection for younger children by Gandhi et al. and Ray et al.[5,8] The shift in the etiological agent from the more common *Tr. rubrum* to the virulent *Tr. mentagrophytes* complex observed among the adults has been reflected in children too. Clinico-mycological studies on pediatric dermatophytosis conducted by Poojary S et al. and Ray et al. revealed *Trichophyton mentagrophytes* complex to be the predominant etiological agent (73.7%, 73.18%).[5,9]

In the recent years, use of TCS creams, either alone or in combination with antifungal and antibacterial components, procured over the counter or as per prescription, in children has become a very common phenomenon. Parents tend to apply these potent steroid creams on children, totally ignorant of the serious implications of use of corticosteroids, inclusive of the suppression of the hypothalamic-pituitary-adrenal axis. Studies have documented the abuse of TCS creams in children to be in the range of 51% to 94%.[7‑9] Clobetasol propionate, a Group I potent TCS, which is not recommended in children below 12 years, is unfortunately being used even in neonates. Author has observed tinea incognito in a neonate, and steroid modified tinea in infants, toddlers, and young children [Figure 1], due to the application of this potent steroid cream. Mishra et al.[7] had reported the use of TCS cream containing clobetasol propionate in as high as 86% of children. It was also observed in this study that application of potent TCS for long duration resulted in the occurrence of extensive lesions of dermatophytosis [Figure 2]. It is not uncommon to see adolescents with extensive striae [Figure 3], atrophy, telangiectasia and sometimes low cortisol levels.

There are very few Indian studies on pediatric dermatophytosis. These studies have documented dermatophytosis of the glabrous skin to be common in the age group between 11 and 16 years. Zacharia et al. and Sharma et al. reported 18% and 33.3% of the study

![Figure 1: Active steroid modified tinea corporis with depigmentation in a child](image)
group to be students respectively, in their studies on chronic and recurrent dermatophytosis.\cite{10,11} On the other hand, Kar and Sardar reported tinea corporis in 10.2% and tinea faciei in 1.8% of neonates admitted in neonatal care unit during 2017-2018.\cite{12} Rizvi and Alkeswani et al. have reported tinea corporis and tinea faciei, in 8-day old and 12 – day-old neonates, respectively, both with the onset of lesions on day 2 of life.\cite{13,14} In the recent study by Ray et al., infants and toddlers constituted 11.48% and in the study by Mishra et al., infants comprised 8.9% of the study group.\cite{5,7} Dermatophytosis of the glabrous skin observed in neonates and infants speaks volumes of the gravity of the current epidemic-like scenario of dermatophytosis in India. Male preponderance is seen among the children, as in adults. Sex ratio has been observed to range from 1.27:1 to 1.8:1 in different studies.\cite{5-9} Though hospital-based studies report increased prevalence of dermatophytosis among children belonging to lower socioeconomic status, it is very much prevalent in middle and upper socioeconomic pediatric population, especially the adolescents.

In the past, single site involvement was common, with limited area being affected. But, now, infection of multiple sites with widespread infection has become the norm. There has been an increasing trend of multiple site involvement from 16.2% observed by Dash et al. (2014-2015) to 52.2% (Poojary S et al. - 2017-2018) and 55.2% (Ray et al. 2022).\cite{5,6,9} Extensive body surface area involvement is more often seen in adolescents. Tinea corporis and tinea cruris are the common clinical presentations. Various morphologies of tinea corporis include polycyclic lesions, annular, eczematous/erythematous/psoriasiform lesions, pustules, tinea pseudoimbricata [Figure 4], tinea incognito, and tinea recidivans. While there has been an increase in the prevalence of tinea faciei [Figure 5], surprisingly there is a decreasing trend of tinea capitis in the recent studies on pediatric dermatophytosis [Table 1]. Non-inflammatory types such as gray patch, black dot and seborrhoeic form are more common than the inflammatory types like kerion, agminate folliculitis and favus. Trichophyton violaceum, T.tonsurans, T.mentagrophytes, T.rubrum, and Microsporum species have been isolated in different
It is interesting to note that the prevalence of dermatophytic infection of hair and nails has not increased during this epidemic-like state. Onychomycosis in children is uncommon as they are less prone for trauma and have thinner nail plates with faster growth. Literature states that the prevalence is 0.14%, which most commonly includes those with genetic susceptibility and immunosuppressive states. Children mostly present with distal and lateral subungual onychomycosis, with toe nails being more frequently affected than finger nails. But, in those with genetic susceptibility, finger nails are more affected. *Trichophyton rubrum*, *T. mentagrophytes*, *Candida* species, and non-dermatophyte molds are the various causative agents of onychomycosis in children. High degree of clinical suspicion and confirmation by potassium hydroxide wet mount is required in children with tinea incognito and uncommon presentations. Isolation of the dermatophyte and antifungal susceptibility testing are being done more for academic purpose, but if done in cases of chronic recalcitrant dermatophytosis, it would facilitate a better understanding of the epidemiological profile and susceptibility pattern of dermatophytes.

The most important step in the management of dermatophytosis of glabrous skin in children is the identification and treatment of the primary source of infection. Adherence to general measures like avoidance of wearing of synthetic clothes and sharing of fomites, in addition to maintenance of good personal hygiene, plays a pivotal role in ensuring the clearance of dermatophytes, and prevention of recurrence. Lifestyle modification and weight reduction should be advised for obese children. Application of topical corticosteroids should be stopped. Monotherapy with topical antifungals is useful in the treatment of localized naïve tinea. Application of emollients facilitates...
the repair of barrier dysfunction and provides good relief of symptoms. Extensive naive tinea, chronic, recurrent, and steroid modified tinea need to be treated with combination of topical and systemic antifungals, following the “Rule of Two” for the topical application. [3] This rule refers to the recommendation of application of topical antifungals twice daily (except bifonazole and luliconazole), for 2 cm beyond the margin of the lesion, continued for two weeks beyond clinical resolution. [3,17] In children aged below two years, fluconazole is a safe option, while in those above two years of age, griseofulvin, terbinafine or itraconazole may also be used. [18] Longer duration of treatment than that is mentioned in the standard regimens, may be necessary in children with chronic/steroid modified/recalcitrant dermatophytosis, based on the clinical response. Antihistamines may be continued depending on the presence of itching.

This changing scenario of pediatric dermatophytosis is a cause of major concern, as this infection interferes with the quality of life of school and college students, resulting in absenteeism and negative impact on academics. Infection of multiple family members causes remarkable financial burden, leading to incomplete treatment. We, from IADVL could collaborate with the Indian associations of pediatrics (IAP) and medicine (IMA) to spread the strong message against the use of TCS in dermatophytosis, and pediatric population in a tertiary care teaching hospital in Odisha. Indian J Paediatr Dermatol 2017;18:191-95.

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