



Original Research Article

Tinea epidemic in paediatric population - Clinical pattern with microbiological correlation

Bornali Dutta¹, Elmy S Rasul², Atul Bothra^{1,*}

¹Dept. of Dermatology, Gauhati Medical College and Hospital, Guwahati, Assam, India

²Dept. of Microbiology, Fakhruddin Ali Ahmed Medical College and Hospital, Assam, India



ARTICLE INFO

Article history:

Received 07-12-2021

Accepted 19-12-2021

Available online 30-03-2022

Keywords:

Dermatophyte paediatric

Trichophyton rubrum

Tinea

ABSTRACT

Background: Dermatophytoses are increasing at an alarming rate in the paediatric population. The trend is now shifting from the more familiar tinea capitis to involvement of the glabrous skin.

Aims and Objectives: To evaluate the various clinical manifestations, factors governing the clinical patterns, and causative species of fungus.

Materials and Methods: A prospective observational study was done on all cases upto 15 years of age presenting with a clinical picture characteristic/ suspicious of dermatophytic infections. Direct microscopy was done on all cases, fungal culture in select cases.

Results : Two hundred and seventy cases were found to be suffering from dermatophytoses. Three groups of presentation were seen. 68(25.1%) cases presented with tinea incognito, 80(29.6%) cases showed some alteration while 122(45.2%) cases presented with classical features. Direct microscopy was positive in 230(85%) cases, fungal culture in 60%. Maximum number of cases were tinea corporis with 57.4%, followed by tinea faciei in 33.1% cases. Family history was positive in 200(74%) cases, younger patients came earlier for consultation.

Limitations: Hospital based study where cases with minimal involvement might have been excluded.

Conclusion: Paediatric tinea is now presenting with adult patterns of presentation. They often mimic other dermatoses due to involvement of previously uninvolved sites and often evades diagnosis. Awareness, high index of suspicion and laboratory tools will result in early diagnosis and treatment.

This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

Dermatophytic infections are superficial fungal infections caused by Trichophyton, Epidermophyton, and Microsporum species. They have undergone an enormous change in the last decade and has changed from a mundane and innocuous infection to a recalcitrant communicable and widespread illness, affecting all age groups. The classical annular itchy lesions are often replaced by cases mimicking other dermatoses. This phenomenal change has become a matter of great concern

for the entire population, often causing error and delay in diagnosis. The paediatric population is seen to visit Paediatricians and General Practitioners more frequently than Dermatologists. It becomes imperative to identify the varying clinical manifestations of the disease in various body sites and treat adequately, thereby protecting them from undergoing undesirable therapeutic trials. We have made an attempt to identify the various clinical manifestations and also the factors governing the clinical patterns. The efficacy of laboratory methods in confirming clinical diagnosis and species identification has also been assessed. Though dermatophyte infections are very much rampant in this hot and humid part of the country, studies

* Corresponding author.

E-mail address: dratulbothra@gmail.com (A. Bothra).

on children are very few and far between.

2. Materials and Methods

A prospective observational cross sectional study was undertaken on all patients up to 15 years of age presenting with a clinical picture characteristic/suggestive of a superficial fungal infection attending the Dermatology outpatient department of a tertiary care centre. Institutional ethical committee clearance and parent's/guardian's consent was taken. Samples of skin scrapings and infected hair were collected from the patient and subjected to 10% potassium hydroxide mount at the first visit. All cases which showed fungal elements on direct microscopy were included in the first visit; cases with negative results on mycological examination were included after a positive therapeutic response to topical antifungal medications, assessed at 2 weeks. Fungal culture was done on 100 cases, and growth was identified from studying colony characteristics, pigment production and microscopic examination in lactophenol cotton blue preparation. Special tests such as hair perforation test, urease production and slide culture were performed using standard techniques whenever necessary.

2.1. Statistical analysis used

Data has been represented, using descriptive statistical methods.

3. Results

A total number of 270 cases were found to be presenting with dermatophyte infections in our study population over a one year period extending from July 2016 to June 2017. A total number of 611 children presented with dermatological manifestations, of which 270 cases presented with dermatophyte infections accounting for a prevalence of 44.1%.



Fig. 1: Photomicrograph showing tinea corporis in a neonate



Fig. 2: Photomicrograph showing tinea faciei in a child

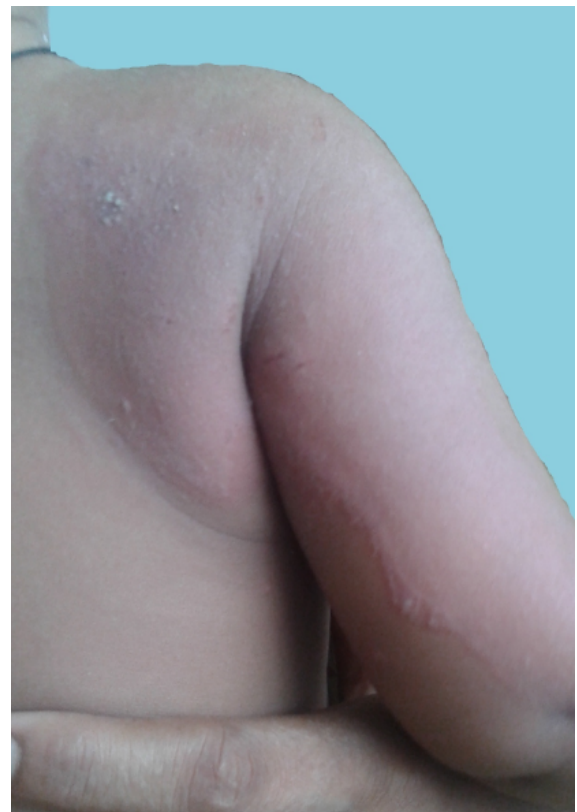


Fig. 3: Photomicrograph showing large scaly patch



Fig. 4: Photomicrograph showing hypertrichosis and telangiectasia



Fig. 5: Photomicrograph showing nummular eczema like presentation



Fig. 6: Photomicrograph showing atopic eczema like presentation

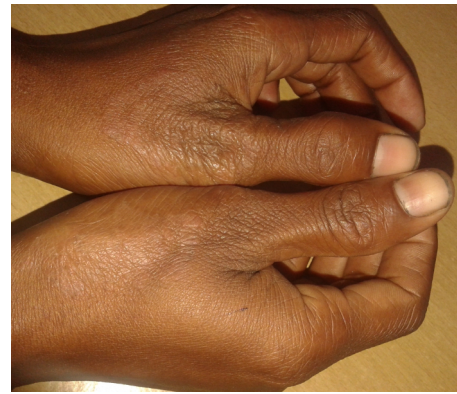


Fig. 7: Photomicrograph showing granulomaannulare like presentation.

Age ranged from one month of age to 15 years. The maximum number of cases were in the 11 to 15 years age group comprising of 170(62.9%) cases, followed by the 1 to 5 years age group with 45(16.7%) patients. Twenty one (7.8%) cases were less than 1 year of age, with the youngest being a month old.

There were 146(54%) males and 124(46%) female cases with a male: female ratio of 1.17:1.

Patients presented as early as 4 days to as late as one year from onset of illness. A large number of 75(27.7%) cases presented within 15 days, 121(44.8%) cases presented by 6 weeks of illness. Twenty nine (10.7%) cases presented to us with a one year history, and mostly belonged to the 11-15 years age group.

Family history was positive in 200(74%) cases. Most of our patients had parents from lower to medium socioeconomic status working as farmers, manual laborers, carpenters and painters. In 240(88.9%), Out of the 270 cases, 210(77.8%) cases had history of applying topical medications. Topical corticosteroids ranging from moderate to high potency accounted for 174(82.85%) of the cases. The remaining 36 cases had used ayurvedic and OTC non steroidal preparations. None of our cases had applied calcineurin inhibitors.

The distribution of lesions varied; male patients showed a predominance of lesions over the extremities (M:F=2:1) while female patients showed maximum lesions over the face (M:F=1:2).

Our cases had three forms of presentation (Table 1). We had 270 cases, of which maximum number of cases were tinea corporis with 156(57.8%) cases, followed by tinea faciei with 84(31.1%) cases, tinea cruris with 22(8.14%) cases, tinea pedis with 5(1.8%) and tinea capitis with 3(1.1%)cases. Out of 270 cases, 122(45.2%) cases presented with classical features (Table 1), 80(29.6%) cases showed some diversion in appearance while 68 (25.1%) cases presented with morphological atypia(tinea incognita).

The first group presented as classical (Figure 1) well margined annular and arcuate lesions over glabrous skin, alopecia and /or swelling over hairy skin. The presenting site was as tinea corporis in 68, tinea faciei (Figure 2) in 32 cases, tinea cruris in 18 cases, tinea capitis in 3 cases and tinea pedis in a single case. It was an interesting observation that out of the 174 cases, 29 cases retained their classical features even after prolonged steroid use and presented in this category.

The second group presented with some alteration in respect to size, colour, margin, surface and scaling, but retained characteristics of a dermatophyte infection. Morphologically they appeared as, diffuse scaling in 32, large scaly patches (Figure 3) in 13, pseudoimbricata in 8, hyperpigmented scaly patches in 7, hypopigmented scaly patches in 3, scaling over ears in 10, and with associated atrophy in 2, striae/telangiectasia in 4, and hypertrichosis & telangiectasia (Figure 4) in 1 patient. They were all cases with history of topical mid and high potency steroids. According to site of involvement, there were 58 cases of tinea corporis, 16 cases of tinea faciei, 4 cases of tinea cruris and 2 cases of tinea pedis.

The third group comprised of 68 cases of tinea incognito, the majority of 65 cases following potent topical steroid abuse while 3 cases presented with 15 days of onset, and denied history of applying any topical product. As per their distribution, they appeared over sites of tinea corporis in 30 cases, tinea faciei in 36 cases, and tinea pedis in 2 patients. Morphologically, they resembled the following conditions: nummular eczema (Figure 5) in 10, atopic eczema (Fig 6) in 7, seborrheic dermatitis in 8, pityriasis alba in 6, contact dermatitis in 8, infectious eczematoid dermatitis in 2, insect hypersensitivity in 2, PLE in 6, malar rash in 4, pityriasis rosea in 4, granuloma annulare (Figure 7) in 2, psoriasis in 2, papulopustular lesions in 2, Borderline tuberculoid Hansen's in 2, prurigo nodularis in 2 and pyoderma in 1 patient.

Out of the 174 cases who had history of topical steroid application, 29(16.7%) cases did not show any alteration in morphology. Eighty (45.9%) cases showed few alterations in surface, scaling, size, colour and margin. Tinea incognito was the presenting pattern in 65(37.3%) cases.

Direct microscopy was positive in 230(85%) cases. Fungal culture could be done in 100 cases only. The positivity rate was 60%. The culture positivity showed the following pattern; *Trichophyton rubrum* in 36(60%) cases, *Trichophyton mentagrophytes* in 19(31.7%) cases, *Trichophyton tonsurans* in 3(5%) cases, *Epidermophyton floccosum* in 1(1.6%) case, *Microsporum canis* in 1(1.6%) cases respectively. (Table 1)

4. Discussion

Our cases showed a prevalence trend of 44.1%. The prevalence of dermatophyte infections in children have been

found to range from 11.3% to 48.5% in various studies.¹⁻⁴

Age ranged from one month of age to 15 years. The maximum number of cases were in the 11 to 15 years age group comprising of 170(62.9%) cases, followed by the 1 to 5 years age group with 45(16.7%) patients. This was similar to studies from Eastern and Southern India who reported 51% and 56% cases in the same age group.^{2,5} Twenty one (8%) cases were less than 1 year of age, with the youngest being a month old.

There were 146(54%) males and 124(46%) female cases with a male female ratio of 1.17:1. Male predominance was also observed in other studies showing a ratio of 1.27:1, 1.13:1 and 1.8:1.^{1,5,6} Male predominance has been observed by authors outside the country also.⁷ Boys are found to be more engaged in outdoor activities both through work and play, causing earlier implantation of spores. Females are often more conscious of their appearances and practice better personal and hair hygiene.

Patients were brought early by their parents/guardians with a majority of 121(44.8%) cases presenting by 6 weeks of illness. A smaller group of 21(10.7%) cases, belonging to the 11-15 years age group, presented late.

Family history was positive in 200(74%) cases. A positive family history and/or close contact was seen in (83.84%) and 83% cases by Dash et al and Gandhi et al, who found the most common source of infection to be the mother.

A large majority of 240(88.9%) patients, had parents from lower to medium socioeconomic status working as farmers, manual labourers, carpenters and painters. Other studies have also reported low socioeconomic status in 64% and rural background in 39.39% (1.5).

We had 270 cases, of which maximum number of cases were tinea corporis with 156(57.8%) cases, tinea faciei with 84(31.1%) cases, tinea cruris with 22(8.14%) cases, tinea pedis with 5(1.8%) and tinea capitis with 3 (1.1%) cases. We did not come across any case with nail involvement. Our study differed slightly in respect to pattern of distribution compared to previous studies on paediatric cases where tinea corporis with 45%, 47.4%, 53.12% was closely followed by cases of tinea cruris with 28% 31.25% to 50% cases. Our study had a similar presentation with a study on paediatric tinea incognito, where 46.3% cases corresponded clinically to tinea corporis and 38.9% cases to tinea faciei.^{1,4,5} We had higher number of cases with tinea faciei compared to other studies. The increasing number of cases on the face is a feature more commonly seen in modified / tinea incognito. A large number of our cases had used topical steroids on the face because misdiagnosis was commonest on the face accounting for 36(52.9%) cases of tinea incognito. It also reflects the importance of having a high index of suspicion in cases of lesions involving face which can very easily masquerade common paediatric dermatoses like atopic eczema, seborrheic dermatitis and

Table 1: Total number of cases for each type of clinical presentation with their site of distribution, direct microscopy results and fungal culture positivity

Clinical presentation	Number of cases	Site of presentation	Direct Microscopy	Fungal culture Positive cases
1. Characteristic				
Annular patches	119	Face 32, trunk 22, groin 18, buttocks 15, arms 17, legs 14, feet 1	106	T rubrum (10) T mentagrophytes (6) E floccosum (1) M canis (1)
Alopecia / Boggy swellings	3	Scalp 3	2	T. mentagrophytes (1) T tonsurans (1)
2. Slightly Modified				
Diffuse Scaly	32	Face 8, legs 6, trunk 9, buttocks 7, feet 2	28	T rubrum (4) T mentagrophytes (1)
Large patches	13	Arms & forearms 8, legs 5	10	T mentagrophytes (2) T rubrum (1)
Pseudoimbricata	8	Face 5, forearm 3	7	T mentagrophytes (1)
Hyperpigmented scaly patches	7	Trunk 5, legs 2	6	T mentagrophytes (1)
Hypopigmented scaly patches	3	Trunk 2, groin 1,	2	T rubrum (1)
Atrophy	2	Face 2	1	nil
Scaling over ear	10	Ears 10	9	T mentagrophytes (1)
Striae telangiectasia	4	Groin 3, thigh 1	3	
Hypertrichosis & telangiectasia	1	Face 1	1	Nil
3. Tinea Incognito				
Nummular eczema	10	Trunk 3, thigh 6, legs 1	8	T rubrum (2) T mentagrophytes (2)
Atopic eczema	7	Face 7	6	T rubrum (2) T mentagrophytes (1)
Seborrhoeic dermatitis	8	Face 6, trunk 2	6	T rubrum (2)
Pityriasis alba	6	Face 6	5	T rubrum (3)
Contact dermatitis	8	Hands 3, feet 2, face 3	6	T rubrum (1) T tonsurans (1)
IED	2	Face 2	1	T rubrum (1)
Insect hypersensitivity	2	Face 1 Chest 1	1	T rubrum (1)
Pyoderma	1	Legs 1	1	T tonsurans (1)
Granuloma Annulare	2	Face 1, trunk 1	2	T rubrum (2)
P Rosea	4	Trunk 4	3	T mentagrophytes (1)
Psoriasisiform	2	Leg 1, trunk 1	2	T rubrum (1)
PLE	6	Face 4, arm 2	5	T rubrum (1) T mentagrophytes (1)
Malar rash	4	Face 4	3	T rubrum (2)
Papulopustular	2	Lower abdomen 1, thigh 1	2	T rubrum (1)
Prurigo nodularis	2	Legs 2	2	T mentagrophytes (1)
BT Hansen's	2	Face 2	2	T rubrum (1)

pityriasis alba.

We had fewer number of cases with tinea cruris as compared to previous studies. This could be because of the tendency of self medication of such sites either due to inhibition or due to the familiarity owing to the very high prevalence. There were 3 cases presenting with Tinea capitis (Kerion 2, black dot 1); all were male patients. In earlier studies, authors have found tinea capitis to be the most common pattern.^{2,8} But the present trend is to follow an adult pattern, with less number of Tinea capitis.^{6,9}

Out of 270 cases, 68(25.1%) cases presented with morphological atypia (tinea incognito), 80(29.6%) cases showed some diversion in appearance while 122(45.2%) cases presented with classical features (Table 1). Though the majority of 65 cases, showed morphological atypia following topical steroid abuse, some cases presented as mimickers of other dermatoses from the outset. Though the term tinea incognito was originally described in 1968 by Ive and Marks, for the atypical clinical presentation of dermatophytic infections following use of topical or systemic steroids. Atzori et al opines that clinical atypia may be due to variable dermatophyte invasive capacity, the site of invasion, physiology of the individual, and acquired factors such as excessive washing or sun exposure.^{10,11} Conversely, it was seen that prolonged steroid use did not alter the morphology in 29 out of 174 cases.

Direct microscopy was positive in 230(85%) cases, similar to studies on children which showed a positivity of 91.5% and 93.8% respectively. Fungal culture could be done in 100 cases only. The positivity rate was 60%. The culture positivity showed the following pattern; Trichophyton rubrum in 36(60%) cases, Trichophyton mentagrophytes in 19(31.7%) cases, Trichophyton tonsurans in 3(5%) cases, Epidermophyton floccosum in 1(1.6%) case, Microsporum canis in 1(1.6%) cases respectively.(Table 1)

In an earlier study on dermatophytoses, culture was positive in 85.1%, showing maximum cases of Trichophyton mentagrophytes, followed by Trichophyton rubrum, and Trichophyton violaceum.^{2,12} A study on tinea incognito in children also showed a similar pattern showing fungal culture positivity in 85.2% cases] where Trichophyton mentagrophytes was isolated in 44.4% of the cases, Trichophyton rubrum in 13% and Microsporum canis in 7.4% of cases.³ These studies show that the culture positivity and the organisms isolated are almost similar in studies on dermatophytoses as well as in tinea incognito, which has been observed in the older population also.

5. Conclusion

Dermatophytoses have undergone a paradigm shift in children and are increasingly involving sites more commonly seen in adults. The dermatophytoses can present atypically from the outset and also under the influence of immunosuppressive drugs. It becomes imperative to have

a very high index of suspicion, specially in sites like face which more commonly present with other paediatric dermatoses. An early diagnosis and treatment will prevent the child from troublesome symptoms, spare them from cosmetic embarrassment and protect them from the harmful side effects of hepatotoxic drugs. The silver lining here is the tendency of parents to seek early consultation for their children. This group of patients should be considered a target population whereby we can not only counsel patients and guardians on the importance of early reporting but show them the therapeutic efficacy of adequate and appropriate treatment. The vicious cycle of steroid abuse and recalcitrant dermatoses, which arises from ignorance and negligence can be broken, ensuring a breakthrough in combating this manmade menace of steroid abuse not only in the paediatric population but across all generations.

6. Conflict of Interest

The authors declare that there is no conflict of interest.

7. Source of Funding

None.

References

1. Dash M, Panda M, Patro N, Mohapatra M. Sociodemographic profile and pattern of superficial dermatophytic infections among pediatric population in a tertiary care teaching hospital in Odisha. *Indian J Paediatr Dermatol.* 1911;18(3):191-5. doi:10.4103/2319-7250.206047.
2. Ogbu CC, Okwelogu IS, Umeh AC. Prevalence of superficial fungal infections among primary school pupils in Awka South local government area of Anambra state. *J Mycol Res.* 2015;2(1):15-22.
3. Oke OO, Onayemi O, Olasode OA, Omisore A, Oninla O. The prevalence and pattern of superficial fungal infections among school children in Ile-Ife, South-Western Nigeria. *Dermatol Res Pract.* 2014;p. 842917. doi:10.1155/2014/842917.
4. Reddy VS, Anoop T, Ajayakumar S. Study of clinical spectrum of pediatric dermatoses in patients attending a Tertiary Care Center in North Kerala. *Indian J Paediatr Dermatol.* 2016;17(4):267-72. doi:10.4103/2319-7250.188424.
5. Gandhi S, Patil S, Patil S, Badad A. Clinicoepidemiological study of dermatophyte infections in pediatric age group at a tertiary hospital in Karnataka. *Indian J Paediatr Dermatol.* 2019;20(1):52-6. doi:10.4103/ijpd.IJPD_35_18.
6. Mishra N, Rastogi MK. Gahalaut Pet al. Clinicomycological study of dermatophytoses in children: presenting at a tertiary care centre. *Indian J Paediatr Dermatol.* 2018;19(4):326-30. doi:10.4103/ijpd.IJPD_98_17.
7. Kalu EI, Wagbatsoma V, Ogbaini-Emovon E, Nwadike V. Age and sex prevalence of infectious dermatoses among primary school children in a rural South-Eastern Nigerian community. *Pan African Med J.* 2015;20:182. doi:10.11604/pamj.2015.20.182.6069.
8. George IO, Altraide DD. Dermatophyte infections in children: A prospective study from Port Harcourt, Nigeria. *Niger Health J.* 2008;8:52-6.
9. Naglot A, Shrimali DD, Nath BK. Recent trends of dermatophytosis in Northeast India (Assam) and interpretation with published studies. *Int J Curr Microbiol Appl Sci.* 2015;4(11):111-20.
10. Atzori L, Pau M, Aste N, Aste N. Dermatophyte infections mimicking other skin diseases: A 154-person case survey of tinea atypica in the district of Cagliari (Italy). *Int J Dermatol.* 2012;51(4):410-5.

11. Ive FA, Marks R. Tinea incognito. *Br Med J.* 1968;3(5611):149–52. doi:10.1136/bmj.3.5611.149.
12. Boz JD, Crespo V, Rivas-Ruiz F, Troya MD. Tinea incognito in children: 54 cases. *Mycoses.* 2011;54:254–262.

Elmy S Rasul, Professor and Head

Atul Bothra, Senior Resident

Author biography

Bornali Dutta, Associate Professor

Cite this article: Dutta B, Rasul ES, Bothra A. Tinea epidemic in paediatric population - Clinical pattern with microbiological correlation. *IP Indian J Clin Exp Dermatol* 2022;8(1):1-7.