

## Original Article

# A Clinico-epidemiological Study of Dermatophytosis in Children in a Tertiary Health Care in Karnataka

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**Background :** A superficial fungal infection affecting keratinized tissue is called dermatophytosis. A number of environmental factors are also contributing to the current pandemic in addition to the etiological ones. Additionally, dermatophyte infections among children have increased. The dermatophyte infection can be transmitted via direct skin-to-skin contact, exchanging objects with an infected individual or coming into contact with a contaminated surface.

**Material and Methods :** This is a Prospective and observational study was conducted in outpatient department of dermatology on 457 paediatric individuals over a period of 1 year. All the children visiting the outpatient department between 0-12 years, presenting with clinical features of dermatophyte infection were included in the study. Written informed consent was taken from the guardian of each patient aged less than 12 years.

**Result :** Out of 457 patients, 255 (55.8%) were males and 202 (44.2%) were females with a male to female ratio 1.2:1. A total of, 347 (75.9%) patients gave history of poor personal hygiene. Out of 457 patients, family members of 237 patients (51.9%) were also affected by dermatophytosis and 312 patients had overcrowding history. Out of 457 patients, Tinea corporis was the most common presentation seen in 217 patients (47.5%) followed by Tinea incognita in 96 patients (21%).

**Conclusion :** Hence, we suggest that the modification of these pre-disposing factors like maintaining good personal hygiene etc, along with regular treatment and follow up is very important. As well as health education/ awareness among public is utmost important thing in the preventing and controlling the dermatophytosis among them.

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**Key words :** Dermatophytosis, Tinea capitis, Children, Poor Hygiene.

A superficial fungal infection affecting keratinized tissue is called dermatophytosis<sup>1</sup>. The ability of various dermatophytes to invade hair and nails in vitro and the formation of genetically regulated expression of proteases with keratin specificity are illustrations of the keratinophilicity of dermatophytes. Ringworm species are molds that fall into one of three asexual genera: Epidermophyton, Trichophyton or Microsporum<sup>2</sup>. Whether the pathogenic organism is geophilic, zoophilic or anthrophilic determines the source of infection<sup>1</sup>.

While candidiasis and pityriasis versicolor are also examples of major superficial mycoses, dermatophytoses are the most common cause of fungal infection in men. In the recent years, dermatophyte infections are becoming as a serious concern for dermatologists. There's reason to be concerned as this

### Editor's Comment :

- Children are susceptible to dermatophytic infections because of their poor personal hygiene habits, hence modification of these predisposing factors & regular treatment and follow, as well as health awareness among public is important in the preventing and controlling the dermatophytosis among them.

common infection is now bringing in a period of resistance. A number of environmental factors are also contributing to the current pandemic in addition to the etiological ones. Additionally, dermatophyte infections among children have increased. The dermatophyte infection can be transmitted via direct skin-to-skin contact, exchanging objects with an infected individual, or coming into contact with a contaminated surface<sup>3</sup>.

Tinea infection is still a serious public health concern, with a number of risk factors for infection including inadequate hygiene, crowded living conditions and low socio-economic position<sup>4</sup>. Various studies have reported prevalence of superficial fungal infections in children, ranging from 11.3% to 40.57%<sup>5-8</sup>. The factors that are responsible for this increasing trend include aging, race, immune system function, lowered sebum production rate, skin barrier disruption and atopic

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dermatitis. The most significant risk factors are low socio-economic status, inadequate hygiene, crowded living conditions, inadequate sanitation, a lack of health education and awareness and inadequate medical facilities<sup>5</sup>.

One of the fungal infections of the skin, tinea capitis, mostly affects pre-pubescent children and is more common in boys than in girls<sup>6</sup>. Due to their poor environmental sanitation and personal hygiene habits, children are especially vulnerable to dermatophytic infections. Among the most prevalent skin disorders in kids are superficial tinea infections. Children's health and wellbeing are thus negatively impacted by it<sup>9</sup>. This study aims at determining the epidemiological factors and clinical pattern of dermatophytic infection among children.

#### MATERIALS AND METHODS

This is a Prospective and observational study was conducted in outpatient department of dermatology, Mandya Institute of Medical Sciences, Mandya, Karnataka over a period of 1 year. All the children aged between 0-12 years with dermatophytosis, attending the Department of Dermatology, Venereology and Leprosy, at Mandya Institute of Medical Sciences, Mandya.

#### Sample size estimation :

Records from the previous year show that approximately 457 children with dermatophytosis attended Outpatient Department, Department of Dermatology, Mandya Institute of Medical Sciences, Mandya. Hence sample size is taken as 457.

#### Inclusion criteria :

(1) Children age between 0-12 years with clinical features of dermatophytosis visiting outpatient department.

(2) Patient who gives informed assent to participate in the study and parents of the patient who give informed consent to participate in study.

#### Exclusion criteria :

(1) The parents of patient who have not given the consent for the study.

(2) Severely ill and debilitated patients.

#### Collection of data :

This study was conducted on 457 paediatric individuals over a period of 1 year. All the children visiting the outpatient department between 0-12 years, presenting with clinical features of dermatophyte infection were included in the study. Written informed consent was taken from the guardian of each patient aged less than 12 years.

The patients were studied with regards to their epidemiological profile like patient's age, sex, address, and Socio-economic status according to the modified BG Prasad classification, duration, site, symptoms, personal hygiene and history of similar complaints in the family members. The diagnosis of dermatophytosis was based on detail review of history, clinical features, physical examination including skin and Potassium Hydroxide (KOH) mount. When necessary diagnosis was confirmed by Wood's lamp and fungal culture as needed.

#### Statistical analysis :

The data collected were entered in Microsoft excel and analysed using Statistical Package for Social Sciences (SPSS) software version 23.0 trial version. Descriptive statistics like frequency, percentage, mean, standard deviation and other relevant statistical tests were used as applicable.

#### RESULT

Most of these children were in the age group of 6-12 years (44.8%) and males were slightly more affected in the study group with a male: female ratio of about 1.2:1 (Fig 1). Majority of the patients belonged to a rural background (56.2%) and were from a low Socio-economic background (45.1%). About 51.9% of patients reported contact history with an affected family member, of which the most common source was found to be the mother followed by a sibling. About 68.3% patients had overcrowding history. Personal hygiene was found to be poor in most of our patients (75.9%) which included not taking bath daily, not wiping afterbath, sharing of fomites, use of synthetic garments and use of waist/ ankle band (Fig 2).

Out of 457 patients, 127 (27.8%) patients had history of steroid application. Among them 89 patients (70.1%) bought them Over The Counter, while 38 patients (29.9%) applied steroids after being prescribed by doctor and only 50 patients (10.9%) had similar complaints in the past. About 240 patients (52.5%) showed KOH positivity (Fig 3).

Out of 457 patients, Tinea corporis (Fig 4) was the most common presentation seen in 217 patients (47.5%) followed by Tinea incognito, Tinea faciei, Tinea capitis and Tinea cruris (Fig 5). Other types include Tinea manuum, Tinea unguium (Fig 6), Tinea pedis (Table 1). Out of 43 patients with Tinea capitis, non-inflammatory type was the most common type of Tinea capitis seen (Figs 7,8) (Table 2).

#### DISCUSSION

In our study, we found the 6-12 years age group constituted the maximum number (44.8%) among the

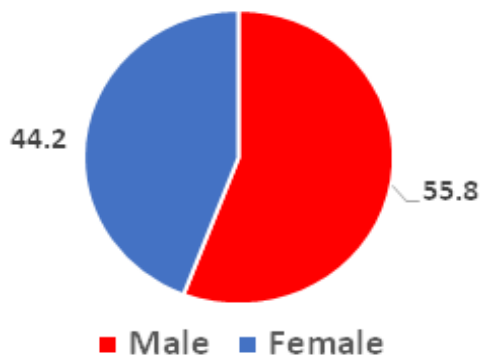


Fig 1 — Pie Chart Showing Distribution according to Sex of the Study Subjects

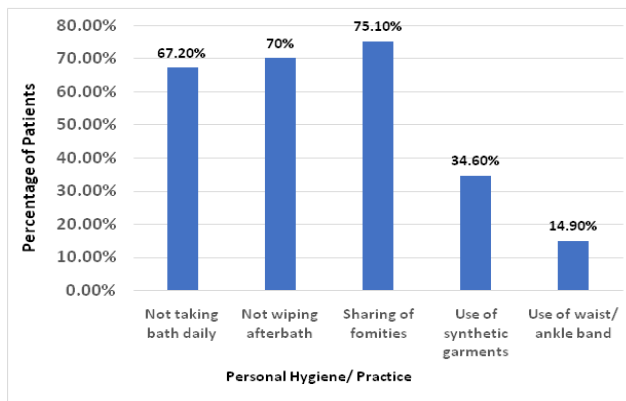


Fig 2 — Graph Showing Distribution according to Poor Personal Hygiene/ Practices among Study Population



Fig 3 — Endothrix on KOH Mount on Direct Microscopic Examination



Fig 4 — Tinea Corporis on Buttock



Fig 5 — Tinea Cruris in an Infant



Fig 6 — Tinea Unguim

Table 1 — Distribution according to overall distribution of clinical Types among study population		
Type of Tinea	Number	Percentage (%)
Other types	13	2.8
T capitis	43	9.4
T corporis	217	47.5
T cruris	41	9.0
T faciei	47	10.3
T incognito	96	21.0
Total	457	100

Other types include Tinea manuum, Tinea unguium, Tinea pedis

Table 2 — Distribution according to Types of Tinea Capitis among Study Population		
Type of Tinea capitis	Frequency	Percentage (%)
Inflammatory type	7	16.2
Non-inflammatory type	36	83.7
Total	43	100



Fig 7 — Inflammatory Type of Tinea Capitis



Fig 8 — Non-inflammatory type of Tinea Capitis

study population. This is probably because of younger children are more exposed to infection from their family members. However, Gandhi, *et al* noted higher numbers in 10-14 years of age group (56%)<sup>3</sup>. A study conducted by Sharma H, Chawla R K showed that the dermatophytosis was most prevalent in age group of 8-10 years<sup>10</sup>.

Male patients outnumbered the female patients (1.2:1) in our study. This is almost in accordance with the study done by Dash M, *et al*<sup>6</sup> which may be due to greater exposure to external environment and contact with pets are some predisposing factors that make male children more vulnerable to acquiring the infection. But in the studies conducted by Alemayehu A, *et al* and Patro N, *et al* reported female predominance<sup>11,12</sup>.

In the present study 2.4% of patients had associated systemic illness. Among them 8 patients

(1.8%) were obese, 1 patient (0.2%) had Type 1 Diabetes Mellitus, 1 patient (0.2%) with Cerebral palsy, 1 patient (0.2%) with Down syndrome. A study conducted by Bindu V, *et al* noticed Diabetes Mellitus in 10.6%, Atopic diathesis in 10%, and HIV infection in 2% of patients<sup>13</sup>.

In the present study 52.5% of patients showed KOH positivity. In a study done by Kashyap P, *et al* observed 76.67% samples were positive for filamentous hyphae under KOH mount, which is approximately similar to the KOH positivity in the study by Mishra, *et al*<sup>9,14</sup>.

In our study family members of 51.9% of patients were also affected by dermatophytosis. Transmission in family members can be due to direct contact or through fomites or denovo infection. A study conducted by Pathania S, *et al* observed increased frequency of history of dermatophytosis in close contacts<sup>15</sup>.

Most of our patients (75.9%) had history of poor personal hygiene which included not taking bath daily (67.2%), not drying the skin after bath (70%), sharing of fomites like towel, soap etc (75.1%), use of synthetic garments (34.6%), use of waist/ ankle band (14.9%). These factors play an important role in causing the spread of infection, leading to its persistence and its recurrence which are important factors in treatment failure. 81% of patients had poor personal hygiene in a study conducted by Gandhi, *et al*<sup>8</sup>.

In this study, Out of 457 patients, Tinea corporis was the most common presentation seen in 47.5% of patients followed by Tinea incognito in 21% of patients, Tinea faciei in 10.3% of patients, Tinea capitis in 9.4% of patients and Tinea cruris in 9% of patients. Other types (2.8%) include Tinea manuum, Tinea unguium, Tinea pedis was seen in 0.4%, 0.7%, 1.8% respectively. Similarly, Tinea corporis was the most commonly reported seen in about 45% of patients. This was followed by Tinea cruris (28%), Tinea capitis (11%), and Tinea faciei (8%) in the study conducted by Gandhi S, *et al*<sup>8</sup>.

### CONCLUSION

Dermatophytosis is emerging as a public health problem with increasing frequency of familial infection. Children are particularly susceptible to dermatophytic infections because of their poor personal hygiene habits and poor environmental sanitation. Since there is a rise of dermatophytic infection among children which is a cause of concern because of its public health importance. It is very important to modify these predisposing factors so that the development of dermatophytosis can be controlled among them. Hence, we suggest that the modification of these predisposing factors like maintaining good personal hygiene etc along with regular treatment and follow up is very important. As well as health education/

awareness among public is utmost important thing in the preventing and controlling the dermatophytosis among them.

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