



## Epidemiology And Pattern Of Superficial Fungal Infections Among Pediatric Population In A Tertiary Care Hospital In Karnataka

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### Abstract

**Background:** Superficial fungal infection is showing a rising trend in the society, not only in adults but even in children. Several reasons including agent factor, host factors and environmental factors are responsible for this situation.

**Aim and Objectives:** This study was conducted in our tertiary care hospital to know the epidemiology and pattern of superficial fungal infection among pediatric population including knowledge regarding the environmental factors and OTC drugs.

**Materials and Methods:** Children of age group 0-18 yrs having superficial fungal infection were included in the study and details including epidemiological profile, personal hygiene, family history, site involved, knowledge about environmental factors, use of steroid creams, previous treatment taken were recorded.

**Results:** Most of the patients (53%) were in the age group 15-18 yrs with slight male preponderance. About 56% were from low socioeconomic status and 75% had history of poor personal hygiene. 69% patients had contact history with an affected family member. Tinea corporis was the most common pattern seen (30.5%). 83% patients did not have any knowledge about the disease. 28% patients had applied over the counter creams. 19% patients had consulted a non-dermatologist before visiting our hospital.

**Conclusions:** This study provides up-to-date information on the epidemiological factors and pattern of superficial fungal infection among children in our locality. It was also found that most of the patients were not aware of the environmental factors associated with the infection and also the harmful effects of over the counter drugs, emphasizing that regular health education should be provided to the general public.

**Keywords:** Superficial fungal infections, pediatric patients, epidemiology

### Introduction

Superficial fungal infection is posing a major health problem in the society and showing a rising trend due to several reasons including agent factor like drug resistance and host factors like age, race, decreased sebum production, immune status, any disruption in skin barrier and associated atopic dermatitis. [1][Flow chart 1]. Poor hygiene and sanitation,

overcrowding, low socioeconomic status, lack of health education are important predisposing factors. Further, risk of infection is high among the children as they are highly vulnerable population. Also, transmission of the disease occurs easily among them as they stay in close proximity with each other and frequently susceptible to fomite transmission too. This study was conducted in our hospital to know the

epidemiological features and pattern of superficial fungal infections like dermatophytosis, pityriasis versicolor, candidiasis in pediatric population. An attempt was made to assess the knowledge about the environmental factors contributing to disease and regarding Over The Counter (OTC) drugs in the patients and the parents.

### Materials and Methods

A 6-month study was conducted in the Outpatient Department of Dermatology in collaboration with Department of Pediatrics in a tertiary care hospital from July 2021 to December 2021. The aim of the study was to determine the epidemiological features of superficial fungal infection and its various clinical patterns, knowledge regarding environmental factors contributing to it, abuse of Over The Counter (OTC) drugs and compliance to treatment. Approval for the study was obtained from the Ethical Committee.

Children aged between 0-18 years having superficial fungal infections were included in the study after taking written informed consent from their parents. A thorough clinical examination was conducted in a well-lit room. Patient was examined from head to toe with minimal clothing. Skin scrapings or hair plucking depending on the site affected were collected from these patients and subjected to potassium hydroxide (KOH) mount. Patients with positive KOH mount were included in the study. Details of each of the patient regarding epidemiological profile, symptoms, duration, site, personal hygiene, presence of similar complaints in the family members, knowledge about the environmental factors contributing to the disease, use of steroid creams, history of previous treatment taken were recorded in a Interviewer administered questionnaire.

### Results

A total of 224 children having skin disease had visited the Dermatology OPD during the study period. Out of which, 36 patients had superficial fungal infection diagnosed on the basis of clinical manifestation and KOH examination, accounting to the prevalence rate of 16%. Majority of patients were in the age group of 15-18yrs (53%) with a slight male preponderance, male to female ratio being 1.57:1 [Table 1]. About 56% patients were from a low socioeconomic background and 53% patients were

from nuclear family. Most of the patients (75%) had history of poor personal hygiene maintenance like not taking bathe daily, not wearing clean clothes, wearing improperly dried clothes, sharing towels and clothes. About 69% of patients had contact history with an affected family member. In most of these patients (28%) both parents and siblings had the fungal infection.

The most common clinical pattern seen was tinea corporis in 11 patients (30.5%) followed by multiple site involvement (tinea corporis/tinea cruris/ tinea faciei) in 8 patients (22%) [Table 2] [Figures 1,2,3,4]. There were no cases of tinea manuum or onychomycosis among our patients. None of our patients had other concomitant complaints suggestive of immunocompromised state like recurrent bacterial infections, atopic dermatitis or primary immunodeficiency disorders.

Knowledge about the disease was present only in 17% patients. 83% patients and their parents did not know about how the infection spreads, what hygiene measures should be taken to prevent the spread or recurrence of the disease, what type of clothing is helpful in controlling the disease, what are the harmful effects of using Over the Counter (OTC) drugs like steroid or combination creams.

Before visiting our OPD, 22 (61%) patients had already taken treatment [Table 3]. Out of which, 10 (28%) had not visited any doctor but just applied Over The Counter (OTC) drug. 7 (19%) patients were treated by non-dermatologists. Of whom, 6 (86%) patients were prescribed combination creams and only 1 (14%) patient was prescribed antifungals but dosage was inadequate and treatment course was not completed. 5 (14%) patients had visited dermatologist and were treated with proper dosage of antifungal medicines but the treatment course was not completed.

### Discussion

Skin fungal infection is not a reportable disease, but it is a cause for concern because of its contagious nature. The variation in the epidemiology of the infection is dependent on the people's habits, standards of hygiene, climatic conditions, and levels of education. [2] Superficial fungal infections are commonest type of cutaneous infections. [3] Superficial fungal infections include dermatophytic

infection caused by Trichophyton, Epidermophyton, Microsporumspecies, and nondermatophytic infections like pityriasis versicolor, candidiasis, tinea nigra, white and black piedra.

Fungal infections which were quite rare at the beginning of this century are now increasingly growing at a rapid rate even among children. This is probably due to the result of the increase in number of immunocompromised children. Normally children have strong natural immunity to fungi. Only a couple of fungi out of thousands are pathogenic. Fungi are very good at taking advantage of some abnormality in the human host and, thus, virtually every fungal infection is opportunistic. [4]

The prevalence of superficial fungal infections in children was found to vary between 11.3% to 40.57% in different studies. [2,5,6,7] In our study it was found to be 16%, indicating a rising trend of superficial infection among children, which is a major concern in the society.

In our study it was observed that infection was more common in the age group 15-18 yrs, while in other studies it was found to be more common in children of age less than 14 yrs. [2,5,6,7,8] This finding was unexpected. Superficial fungal infection is more common in younger children as they lack the fungistatic properties of fatty acids of short and medium chains found in postpubertal sebum. Also, younger children are poorer in hygiene compared to teenagers who are more concerned with their outlook and are neater. [9] As expected males were more affected than females in our study too, as males do not maintain proper hygiene compared to females.

Fungal infections were more commonly seen in patients with rural background and from a lower socioeconomic status (56%) as seen in other studies too. This is due to lower standards of hygiene, overcrowding, lower levels of education and poor healthcare facilities available in this class. Another unexpected finding in our study was that more number of patients were from nuclear family (53%) and not joint family. But most of these patients had positive contact history (69%) with all the family members being Infected. Personal hygiene was found to be poor in 75% of patients in our study. Personal hygiene plays a vital role in preventing the occurrence, transmission and recurrence of the infection.

The most common pattern of fungal infection found in our study was tinea corporis (30.5%) consistent with the findings of the study conducted by Gandhi et al. [8] The clinical patterns of dermatomycosis reported by different authors have been varied, depending on the climate conditions, humidity and hair care practices in different places.

Knowledge about the disease was present only in 17% patients. 83% patients and their parents were not aware of the various environmental factors affecting the disease and had no knowledge about the harmful effects of using OTC drugs like steroid or combination creams. Patients should be educated about the role of personal hygiene in tackling the fungal infections. They should be advised to follow the general measures like taking bath regularly, wash their clothes separately in hot water, thoroughly dry the clothes in sun, avoid wearing damp clothes, avoid sharing towels, clothes and other fomites, should wear loose fitting cotton clothes. All these measures help in preventing recurrence and transmission of the infection.

Treatment of superficial fungal infections is a big challenge to the dermatologists because of the increasing drug resistance and recurrence. Various treatment protocols have been followed to tackle this problem. Some of the reasons for the treatment failure are inadequate dose and duration of antifungal treatment. Many patients rely on the OTC drugs like steroids avoiding going to the doctor or visiting hospital especially with this prevailing COVID 19 pandemic and also the cost of treatment will be less. In our study 28% patients had not visited any doctor and had just applied combination creams and 19% patients had visited either a local general practioner or nonallopathicpractioner indicating these 17 patients who did not visit a dermatologist were probably not diagnosed properly and definitely not treated appropriately. People should be educated about the need to seek advice from the qualified professionals so that they are diagnosed correctly and treated adequately with the correct dose and duration of therapy. This will definitely bring down the number of cases of drug resistance and treatment failure. Among 5 patients who had taken treatment from dermatologist before coming to us, none of them had completed the course of therapy. So, it is also important that dermatologists should counsel the patients not just about the general measures but also

emphasize on completing the course of the treatment to prevent drug resistance, recurrence and treatment failure.

### Conclusion

Superficial fungal infection is not life-threatening but it is definitely creating a menace in the society because of its contagious nature on one hand and irresponsible behavior of the patients on the other hand. Highlights of our study are as follows:

1. Males were affected more than females.
2. Majority of the patients were from a lower socioeconomic status with poor personal hygiene.
3. Most of the patients had history of contact with affected family members.
4. Lack of knowledge about the disease and its transmission, and also adverse effects of OTC drugs.
5. Lack of insight about seeking specialist consultation.
6. Lack of treatment compliance.

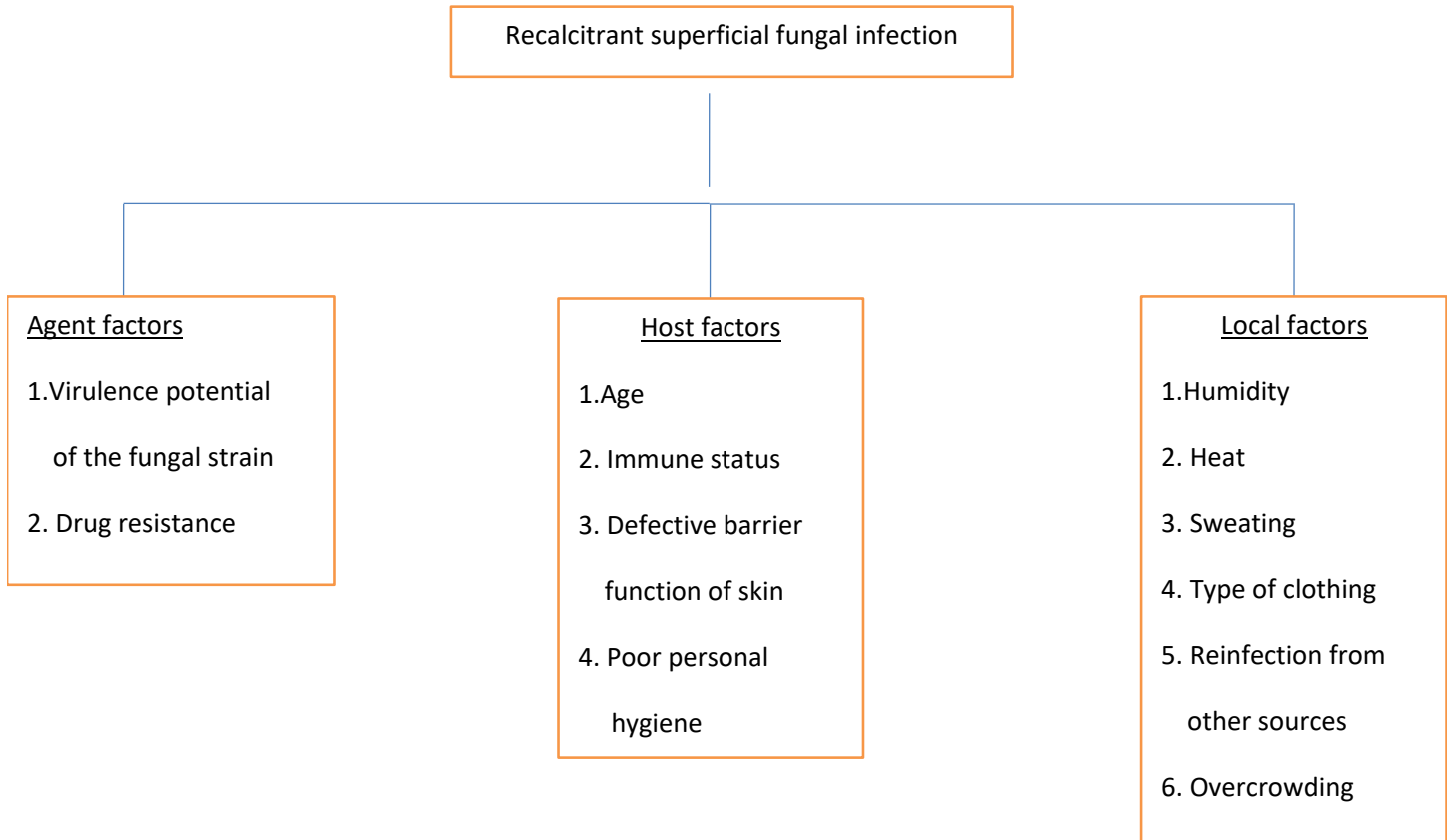
This study shows that superficial fungal infection is definitely increasing among children and poor personal hygiene, lower socioeconomic status and lack of knowledge about the disease or its treatment is worsening the problem. Findings from this study will provide up-to-date information on superficial fungal infections for evidence-based action aimed at reducing the morbidity of the infection. Regular health education about the fungal infections that highlights their morbidities, modes of spread, importance of good personal hygiene, seeking specialist treatment, avoiding OTC drugs, compliance to the antifungal regimen prescribed by the dermatologist and regular follow-up should be provided to the general public, in order to reduce the prevalence and burden of superficial fungal infections in the society. School based dermatological services for students will also be a vast support in this concern.

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**Flow chart 1: Reasons for recalcitrant superficial fungal infections**



**Figure 1: Tinea corporis**



**Figure 2: Tinea corporis**



**Figure 3: Tinea capitis, gray patch variety**



**Figure 4: Tinea faciei**

