



Original Research Article

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Clinicomycological study of *Tinea capitis* infections among School children

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Abstract

The common cause of skin infections are dermatophytes. *Tinea capitis* (Scalp ringworm) is the most common dermatophyte infection of the scalp affecting mainly children below 10 years of age particularly children who live in crowded conditions in urban areas. *Tinea capitis* results in a diffuse and itchy the scalp, which resembles dandruff. The hair and skin of the scalp are associated with symptoms and signs of inflammation and hair loss. It is closely related to the socio-economic and hygienic conditions typical of the lower strata of rural and urban population. The study was undertaken to demarcate clinical and mycological profile of *Tinea capitis* among school going children. A total of 560 school children were included in this cross sectional study. Scalp skin scrapings and hair stubs were collected from each child. The samples were then wrapped with sterile parafilm and transported to laboratory for analysis. The specimens were treated for 15-30 minutes with 1-2 drops of 20% KOH before being examined microscopically for fungal hyphae. Fungal cultures were done on Sabouraud's Dextrose Agar (SDA) media slopes containing chloramphenicol. The cultures were incubated at room temperature for 4-6 weeks and observed regularly for growth. Among the children screened, 154 (28%) showed the clinical evidence of *Tinea capitis*. The most prevalence rate was reported in age groups 4 to 8 years old, and the lowest prevalence was related to age group 12 to 14 years old. Grey patch was the commonest clinical type (63%). The dermatophytes *Microsporum canis* was the commonest species isolated among school children followed by *Trichophyton violaceum*, *Microsporum audouinii* and *Trichophyton rubrum*. The results of this study revealed that *Tinea capitis* is very common in children with a low socioeconomic profile. Hence, the personal and community hygiene and economic status of people living in the country should be improved.

Keywords: Fungi, Dermatophyte, *Tinea capitis*, *Microsporum canis*

Introduction

Fungal infections are quite widespread and have affected a growing number of people in recent years. Most fungal infections are located on the skin's outermost layer (epidermis). Dermatophytes are pathogenic fungi that have a high affinity for keratinized structures like nails, skin or hair, causing superficial infections known as dermatophytosis in both humans and animals¹⁶.

Dermatophytes are considered as group of closely related filamentous keratinophilic fungi belonging to the genera *Trichophyton*, *Epidermophyton* and *Microsporum*. The distribution of dermatophytes varies among different countries and exhibits geographical and seasonal variations depending on several factors, including life style, type of the population, migration of people and climatic conditions⁴.

Dermatophytosis (dermatomycosis or ringworm infection) has been reported to be encouraged by hot and humid conditions and poor hygiene and occur throughout tropical and temperate regions of the world^{1, 5}. The most frequent type of dermatophytosis are *Tinea capitis*, *Tinea cruris*, *Tinea pedis* and *Tinea unguium*. *Tinea capitis* (Scalp ringworm) is a common superficial fungal infection found essentially in school children in developing and under developing countries. *Tinea capitis* is a worldwide public health problem that affects children below 15 years of age and requires identification of the specific causative fungal agent. As per data by WHO has revealed that 7-33% of children of various age groups are affected¹⁴. It is commonly affect boys than girls and uncommon in adults. The source of this fungus is typically animal contact, person to person contact, or by sharing contaminated towels, hats, pillows, brushes and combs.

Tinea capitis commonly shows the following symptoms are severe itching of the scalp, dandruff, typically single or multiple patches of hair loss, sometimes with a black dot pattern (often with broken-off hairs), that may be accompanied by inflammation, scaling, pustules, and itching. Poor hygiene, low standards of living, sharing of hair devices or garment, climate conditions and overcrowding are some of the predisposing factors contributing to frequent transmission of the infection. In Africa and other regions of the world, the incidence of *Tinea capitis* is increasing. There are very less research studies are available on prevalence and etiological agents of *Tinea capitis* infection in children in Tanzania. Thus, the purpose of this study was to determine clinical and mycological profile of *Tinea capitis* in Luqman Islamic

Seminary Secondary school children in rural area of Dar-Es-Salaam in Tanzania..

Materials and Methods

A cross-sectional descriptive study was undertaken to establish the prevalence of *Tinea capitis* scalp infections among school children in Luqman Islamic Seminary Secondary school children in rural area of Dar-Es-Salaam in Tanzania. This study includes 560 School going children including 300 (54%) were Boys and 260 (46%) were Girls and their age groups are 3 to 14 years old (**Table 1**). The school children were interviewed and examined in day light. Scalp skin scrapings were collected from each child. The specimens were collected and processed according to the standard procedure. The scalp was first sterilized with 70 % alcohol and skin scrapped by sterile surgical blades and hair stubs collected into dry Petri dishes. The samples were then wrapped with sterile parafilm and transported to laboratory for analysis. The specimens were treated for 15-30 minutes with 1-2 drops of 20% KOH before being examined microscopically for fungal hyphae. Direct microscopic examination of the scrapings and hairs was carried out by mounting with 1-2 drops of 10% - 20% Potassium hydroxide (KOH) for 15-30 min. Fungal cultures were done on Sabouraud's Dextrose Agar (SDA) media and each specimen was inoculated on two separate SDA slopes containing chloramphenicol⁹. The cultures were incubated at room temperature for 4-6 weeks and observed regularly for growth. The fungal isolates were identified on the basis of duration of growth, surface morphology, pigment production on the reverse, microscopic examination in lacto phenol cotton blue preparation and slide culture. Data will be analyzed by using SPSS.

Table 1. Gender among School children

S. No	Gender	Total Children n = 560	Percentage (%)
1.	Boys	300	54%
2.	Girls	260	46%

Inclusion criteria:

Children with clinical features of Tinea capitis, aged between 3-14 years old age were included in this study.

Exclusion criteria:

Children without clinical features of Tinea capitis were excluded from this study.

Results and Discussion

This cross-sectional study was performed on 560 school children. Of the 560 children screened, 154

(28%) showed the clinical evidence of Tinea capitis and 406 (72%) of children haven't infections (**Table 2**). The most prevalence rate was reported in age groups 4 to 8 years old, and the lowest prevalence was related to age group 12 to 14 years old (**Table 3**). The prevalence rate ranged in males (59%) was more than females (41%). Grey patch (63%) was the most predominant clinical type, followed by Black dot (20%), Kerion (11%) and Seborrhoeic (6%) type (**Table 4**).

Table 2. Prevalence of Tinea capitis infections among School children

S. No	Contents	Total Numbers	Percentage (%)
1.	Total case study	560	100%
2.	Presence of dermatophytes species	154	28%
3.	Non dermatophytes species	406	72%

Table 3. Tinea capitis positivity with the age (n = 154)

S. No	Student Age Group	Total Boys n = 91 (59%)	Total Girls n = 63 (41%)
1.	3 - 5	49	33
2.	6 - 8	23	19
3.	9 - 11	12	8
4.	12 - 14	7	3

Table 4. Clinical types of Tinea capitis

S. No	Clinical types	Total no of cases n = 154	Percentage (%)
1.	Grey patch	97	63%
2.	Black dot	31	20%
3.	Kerion	17	11%
4.	Seborrhoeic	9	6%

In this study showed dermatophyte *Microsporum canis* was the major isolates found in both boys (48%) and girls (46%), followed by *Trichophyton violaceum* was found (22%) boys, (19%) girls, *Microsporum audouinii* was found (16%) boys, (14%) girls and *Trichophyton rubrum* was found (14%) boys, (21%) girls students (Figure 1 & 2). In this study identified two genera of dermatological agents causing Tinea capitis.

These species included; *Microsporum canis*, *Trichophyton violaceum*, *Microsporum audouinii* and *Trichophyton rubrum* (Figure 3 & 4). Maximum numbers of cases were isolated from grey patch. Hence, the dermatophytes *Microsporum canis* was the most predominant isolates followed by *Trichophyton violaceum*, *Microsporum audouinii* and *Trichophyton rubrum* among School children.

Figure 1.

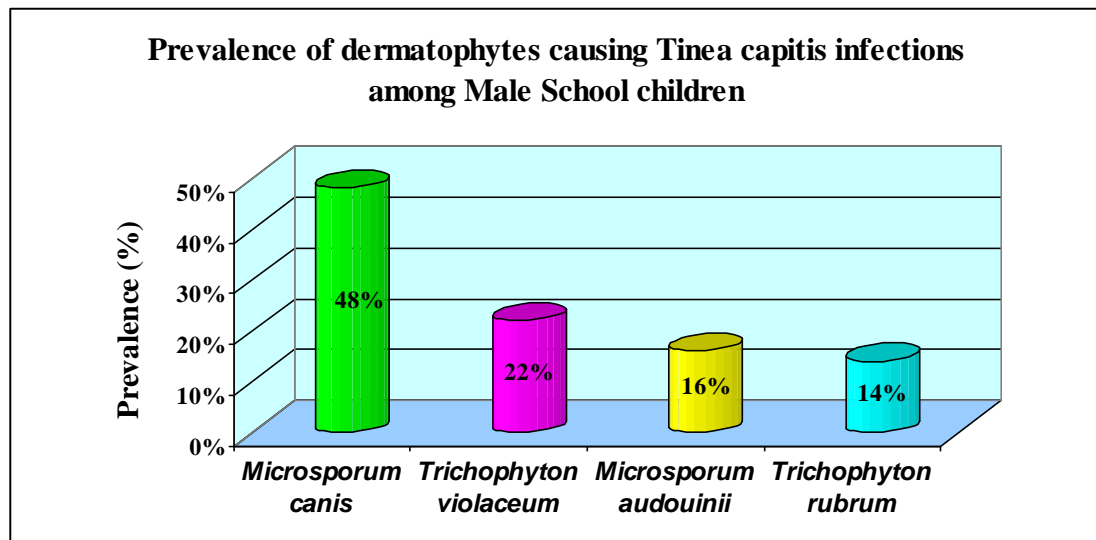


Figure 2.

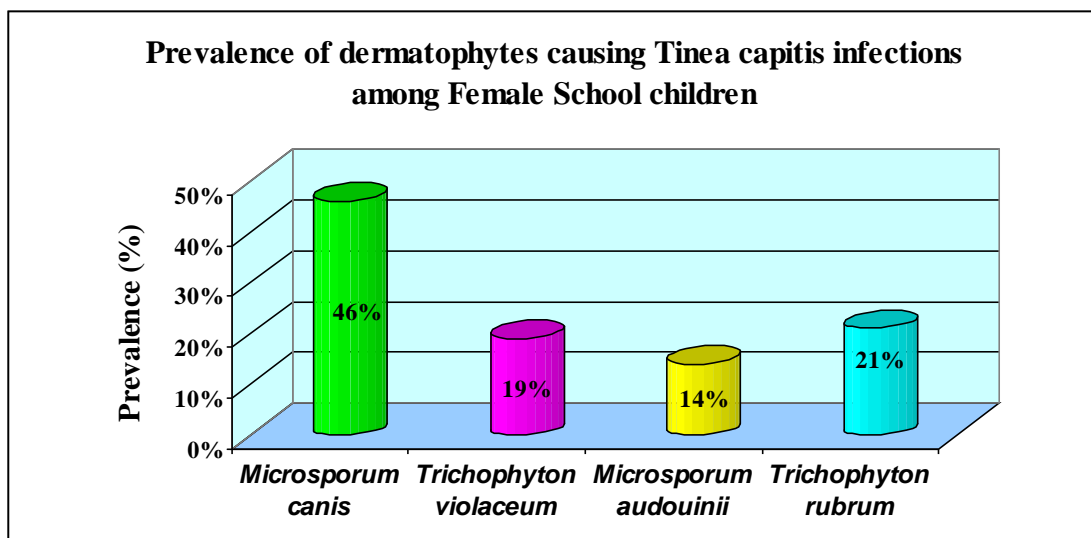


Figure 3.

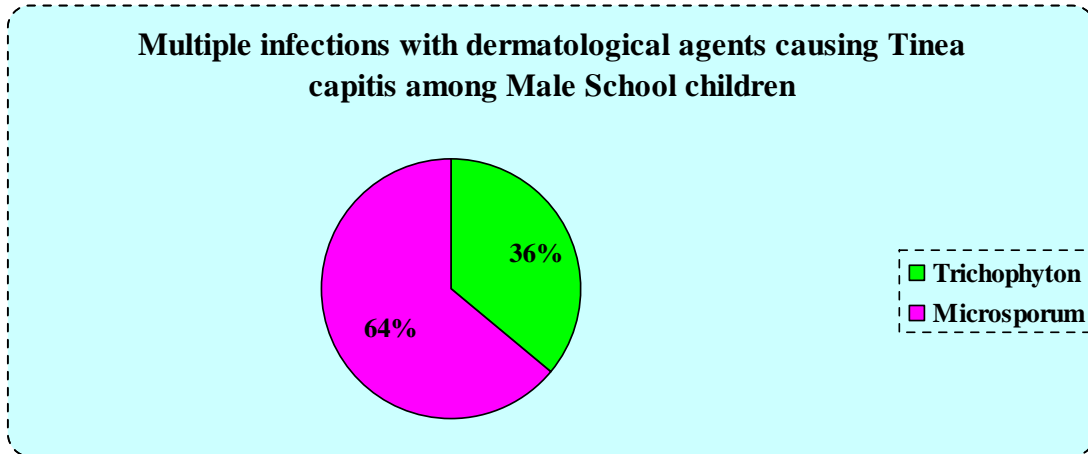
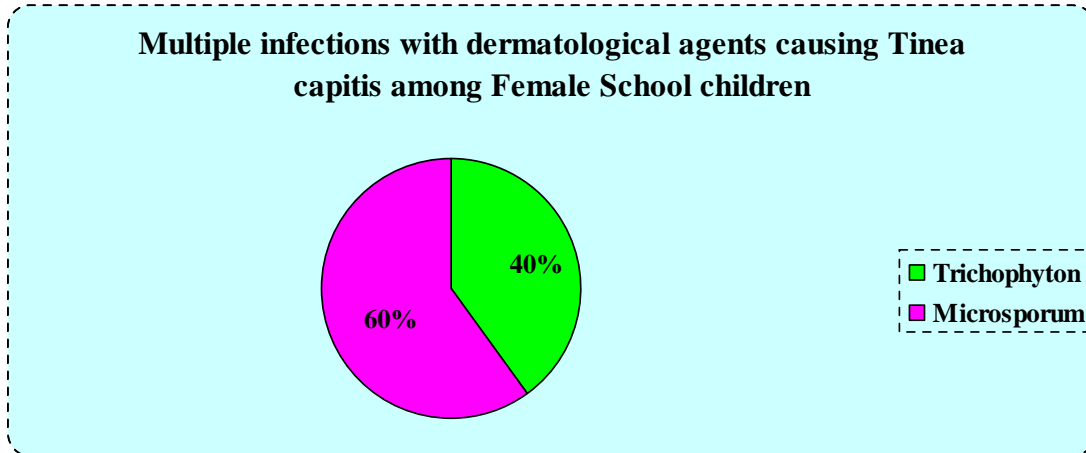


Figure 4.



In the present study the rate of Tinea capitis was 28%. Varying prevalence rates of Tinea capitis ranging from 4.6% - 39.6% have been reported previous studies carried out in Nigeria, Nepal and Iran^{7, 8, 12}. This study has documented the current spectrum of skin diseases among school children in an urban setting of a developing sub Saharan African country. The prevalence of Tinea capitis was high and still comparable to that of a previous study (55%) among school children in rural Tanzania¹⁰.

Isolation of different species of dermatophytes varies from one ecological niche to researcher. In

this study showed *Microsporum canis* was the commonest species isolated and similar findings have been noted in studies by Amer Abu El-Enin *et al*². In an Iranian study conducted one and a half decades ago, Khosravi AR *et al* also found the highest frequency with *Microsporum canis* (19%) followed by *Trichophyton rubrum* (16.5%) and *Epidermophyton floccosum* (15%)¹³. In somewhere else the etiological agents of Tinea capitis vary from one geographical location to another. In Sub-Saharan West Africa, *Microsporum audouinii* and *Trichophyton soudanense* have been isolated³.

Tinea capitis is a common fungal infection in children of school age, particularly among those living in unhygienic crowded conditions. The results also showed that the infection occurred more in younger children below 10 years old than in older children. Similar findings have been noted in studies by Grover C *et al*¹¹. However in a study by Ayanbimpe GM *et al* from Nigeria, the prime age group children affected was 10 to 14 years old⁶. In addition, the comparison result showed that male children have more susceptible to Tinea capitis infections than the female children except *Trichophyton rubrum* which infect female children than male children in this study. The results of this study revealed that Tinea capitis is very common in children with poor personal hygiene. This was similar to a previous study, which found an association between the presence of dermatophytosis infection and the habit of hygiene¹⁵. Children brought up in clean environments with less crowding and reliable water supply are less suffers from dermatophytes. Further, there is need for implementation of mycological culture as the diagnostic procedure for Tinea capitis in public and private schools, health centres and hospitals for both symptomatic and asymptomatic cases in order to determine the specific causative agent of Tinea capitis and prevent transmission due to asymptomatic carriage.

Conclusion

Superficial fungal infections are most common in tropical and subtropical countries. The study result showed that the prevalence and intensity of superficial fungal infection of Tinea capitis was 28% and grey patch was the most frequent clinical type found predominantly in children. In tropical countries, a warm and humid climate, crowded living and poor sanitary conditions augment the spread of this infection. The results also indicate that poor personal hygiene, low socioeconomic conditions, animal contact or by sharing contaminated towels, hats and combs to be powerful determinants of these infections. Early identification of itching, dandruff, block dot in the scalp symptoms are helps in the early detection of Tinea capitis infection which helps in effective treatments those who infected these

fungal infections. Hence, there is epidemiological surveillance and Government health education program activities should be carrying out among school children in frequently manner. Further, oral antifungal drugs such as **Griseofulvin**, **Itraconazole**, **Terbinafine** and **Fluconazole** or other fungicidal drugs were prescribed to those who were found to be positive for the Tinea capitis infection.

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