

# Prevalence of Dermatophyte Infections Among Public Primary School Children in Bauchi Metropolis, of Bauchi State, Nigeria

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**Abstract:** Dermatophyte infections have been known to impact negatively on health and well-being of children. This study was undertaken to determine the prevalence, clinical types as well as the etiologic organisms of dermatophyte infections among primary school children aged 5-16 years in Bauchi metropolis. Out of 323 primary school children screened, 85 children had lesions suspected to be dermatophytosis. Samples collected from the suspected children were treated with potassium hydroxide (KOH) and examined under the microscope. A portion of each sample was inoculated into sabouraud dextrose agar supplemented with chloramphenicol and cycloheximide and incubated at room temperature for about 3 weeks. A total of 31 primary school children (9.6%) proved positive for dermatophytes. The species of dermatophytes isolated were: *M. audouinii* 12 isolates, *T. rubrum* 9 isolates, *M. canis* 3 isolates, *T. mentagrophytes* 4 isolates and *T. tonsurans* 3 isolates. The prevalence of dermatophytosis 9.6% is high in school children covered in this study. Tinea capitis was the most predominant infection and *M. audouinii* was the commonest etiologic agent, while *T. rubrum* was predominantly isolated from sites other than the scalp. Statistical analysis of the result of this study revealed a significant difference in the age distribution of the infection ( $P < 0.05$ ), while none exists between the sexes ( $P > 0.05$ ). We therefore recommend that control efforts should target this vulnerable group to reduce its prevalence.

**Keywords:** Prevalence, dermatophyte, dermatophytosis, Tinea, Bauchi.

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## Introduction

Dermatophytes are a unique group of fungi that infect keratinous tissues of lower animals and human (Weitzman *et al.*, 1995). Dermatophytosis is the medical term for fungal infection of the superficial layer of the skin, nail, hair and scalp. The infections are caused by specific fungal species known as Trichophyton, Microsporum and

Epidermophyton (Adefemi *et al.*, 2011). This group of infections were known as early as the 14<sup>th</sup> century and were then called *tinea* or ringworm because of the characteristic ring shaped lesions frequently produced and also because workers then thought that such lesions was caused by worms. The aetiologic agents were identified as fungi in the 19<sup>th</sup> century.

A simple description of ringworm infections is according to the anatomical sites. Hence these ringworm infections include *Tinea pedis* (athlete's foot), *Tinea corporis* (ringworm of the body), *Tinea capitis* (ringworm of the scalp), *Tinea cruris* (ringworm of the groin) and *Tinea unguium* (ringworm of the nails).

Dermatophytes are categorized as geophilic, zoophilic and anthropophilic depending on the habitat they are most likely to be found in. All the three groups, however, include species that can cause diseases in both animals and man.

Children are particularly susceptible to dermatophyte infections because of their poor personal hygiene habits and poor environment sanitation (Enweani *et al.*, 1996).

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## Materials and Methods

**Study Population:** All the public primary school children within Bauchi metropolis in the age range of 5 to 15 years formed the study population.

**Sample Size:** A total of 323 students constituted the sample size of this study. The choice of the sample size was based on sample size calculation using Fischer's formula:

$$n = \frac{z^2 pq}{d^2} \quad (\text{Araoye, 2003})$$

where,

n = desired sample size

p = previous prevalence of the disease in a community

q = (1 – p)

d = 0.05 (Degree of accuracy)

z = 1.96 (the standard corresponding to 95% confidence level)

**Sample Collection:** Samples were collected after approval by the Ethical Committee of Abubakar Tafawa Balewa University Teaching Hospital and the Heads of the respective schools.

The affected areas were thoroughly cleaned with 70% alcohol soaked in cotton wool to reduce the bacterial contamination. Sterile scapel blades were used to scrap the active edge of the lesions into sterile specimen bottles while the infected hairs were plucked from the follicle with sterile forceps and placed inside the specimen bottles. Data on the patients relating to the names, sex, age and prominent features of observed lesions were recorded.

**Sample Processing:** Specimens were transported to the laboratory and processed the same day after collection. Mounts of scrappings in 10% potassium hydroxide (KOH) were examined for fungal hyphae and arthrospores. A portion of each sample was inoculated on sabouraud dextrose agar supplemented with chloramphenicol (0.05mg/ml) and cycloheximide (0.5mg/ml).

Cultures were incubated at 28°C and regularly examined for four weeks before they were reported negative. Pure isolates were generated by sub-culturing on Sabouraud Dextrose and Potato Dextrose Agar.

**Identification of Dermatophytes:** The identification of the dermatophytes was based on a detailed study of the colonial morphology which included the texture, topography, surface colour, pigmentation on the reverse side of the plate and rate of growth.

Mounts were made in Lactophenol cotton blue and examined under the microscope for presence or absence of chlamydospores, arthrospores, macroconidia and microconidia. The form, size and arrangement of macroconidia and their relative abundance were observed

## Results

In this survey, 323 primary school children were screened, 85 children had skin lesions suspected to be dermatophytosis. Out of the 85 suspected samples. 31 children consisting of 21 boys and 10 girls proved positive for dermatophytes.

**Table 1:** Prevalence of dermatophytes according to ages

Ages	No. Screened	No. Infected (%)	No. Uninfected (%)
5-8	63	6 (1.9)	57 (17.6)
9-12	160	17 (5.3)	143 (44.3)
13-16	100	8 (2.5)	92 (28.5)
<b>Total</b>	323	31 (9.6)	292 (90.4)

Out of 323 children screened, 31 of them were infected with dermatophytes, representing 9.6% prevalence rate. The highest prevalence is between the ages of 9-12 years and the lowest prevalence is between the ages of 5-8 years.

**Table 2:** Prevalence of dermatophytes according to sex

Ages	No. Screened	No. Infected	Males (%)	Females (%)
5-8	63	6	4 (1.2)	2 (0.6)
9-12	160	17	12 (3.7)	5 (1.6)
13-16	100	8	5 (1.6)	3 (0.9)
<b>Total</b>	323	31	21 (6.5)	10 (3.1)

In the **Table 2** above, 21 males representing 6.5% were infected with dermatophytes while 10 females representing 3.1% were also infected indicating higher prevalence in males.

**Table 3:** The Percentage of dermatophytes according to sites

Clinical Types	No. Examined	Males infected (%)	Females infected (%)	Total
<i>Tinea capitis</i>	35	10 (11.8)	5 (5.9)	15 (17.7)
<i>Tinea corporis</i>	25	6 (7.1)	3 (3.5)	9 (10.6)
<i>Tinea pedis</i>	15	3 (3.5)	1 (1.2)	4 (4.7)

<i>Tinea unguium</i>	10	2 (2.4)	1 (1.2)	3 (3.5)
<b>Total</b>	85	21 (24.8)	10 (11.8)	31 (36.5)

Out of the 31 positive dermatophytes identified, 15 of them representing 17.7% were responsible for *Tinea capitis*, 9 were responsible for *Tinea corporis*, 4 responsible for *Tinea pedis*, and 3 representing 3.5% were responsible for *Tinea unguium*.

**Table 4:** Species of dermatophytes isolated with respect to sex

Species	No. Isolated	Males (%)	Females (%)
<i>Microsporum audouinii</i>	12	8 (25.8)	4 (12.9)
<i>Trichophyton rubrum</i>	9	6 (19.4)	2 (6.5)
<i>Microsporum canis</i>	3	2 (6.5)	1 (3.2)
<i>Trichophyton mentagrophytes</i>	4	3 (9.7)	1 (3.2)
<i>Trichophyton tonsurans</i>	3	2 (6.5)	2 (6.5)
<b>Total</b>	31	21 (67.7)	10 (32.3)

From the above table, 5 different species of dermatophytes were isolated. The most frequently isolated species were *M. audouinii* and *T. rubrum*, while the less frequently isolated species were *Microsporum canis*, *T. mentagrophytes* and *T. tonsurans*.

## Discussion

The study has shown that a variety of dermatophytes are responsible for dermatophytosis in Bauchi metropolis. Two out of the five (5) species identified are zoophilic and they are *M. canis* and *Trichophyton mentagrophytes*.

These organisms have been known to cause human infections in Nigeria (Gugnani and Njoku-Obi, 1995), hence their isolation in some of the cases was not unexpected.

*T. rubrum* was found to be the predominant cause of dermatophytic lesions on sites other than the scalp. This agrees with the findings of previous investigators of dermatophytosis in Nigeria (Nwadiaro and Ogbonna, 1998).

*M. audounii* was the highest isolate and frequently isolated from *Tinea capitis*. This finding is in agreement with other investigators (Eme, 2006; Adefemi, 2011).

The observed prevalence of 9.6% is high compared to 7.0% prevalence among children in North-eastern Nigeria by Nweze (2001). This can be attributed to the poor hygiene habits and lower socio-economic status of the children from the area under study. It has been observed that children are particularly susceptible to dermatophytic infections because of their poor personal hygiene habits and poor environmental sanitation (Enweani, *et al.*, 1996).

## **Conclusion**

This research work has shown that the prevalence of dermatophytes among primary school children in Bauchi metropolis is highly significant. Therefore, control efforts should be targeted at this vulnerable group to reduce its prevalence.

## **Recommendations**

- To prevent dermatophyte infections, good personal hygiene and proper environmental sanitation are paramount.
- Sharing of clothes and foot wears should be discouraged since the infection can be transmitted through those items.
- Touching infected pets with unprotected hands should be avoided.
- Public enlightenment on the disease and its mode of transmission should be carried out in schools.
- Most importantly, infected pupils should be treated properly to avoid transmission to other children since it is contagious.

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