Incidence of *Tinea capitis* among school age children in Runjin Sambo Area of Sokoto State

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**ABSTRACT**

The Investigations were carried out on incidence of dermatophytes infection among primary school children in Runjin sambo area of Sokoto state, Nigeria. Two methods of identification were used for this study microscopy and culture method. The result from our finding showed that 40.0% of the children were found to be infected by the disease. Four 4 species of fungi were associated with the infections. They are *Trichophyton rubrum* which appears twice both male and female, *Trichophyton megginii* and *Trichophyton tonsurans*. The infection was common among the male than the females and found to be frequent among children between the ages of 7 - 10 years. The sources of infection among the school children in this area were found to be the soil and domestic animals. The children and their teachers were not aware of the existence of disease; hence infected children represent a persistent and hidden source of infection. Conclusively, personal cleanliness and health education should be mounted in the study area as preventive measures.

**INTRODUCTION**

*Tinea capitis* is a fungal infection of the scalp. It is also called “ring worm” of scalp. Ringworm is a common name for superficial skin lesion caused by certain fungi. *Tinea* is a common infection among primary school children throughout the world [1] also this disease is very common in children aged between two to eleven years [2]. Ringworm infections are common in areas with high levels of immigration and that usually occurs in Tropical regions, rural and suburban areas. Most of the cases are always reported in children and are more common in individuals with lower socio economic status [3]. Generally, the head is mostly affected in 13.7% of cases, the most common causative organism are *T. saudanense, Microsporum ferruginous* with causes involving *T. tonsurans* occurring less frequently. Epidemics of Tinea capitis due to *T.tonsurans* are associated with subclinical infection and fomites, while those are due to *M. canis* are associated with cats and dogs [3]. The high incidence are mostly attributed to low levels fungi static fatty acids in these children, frequent contact at school and at play and exposure to domestic animals and pets [4] increasing the incidence of the infection may not be unrelated to the reported increase in asymptomatic carriers among adults [5].

In Nigeria, ringworm infections are common among pediatric age groups which are endemic in many part of the country; the morbidity associated with these diseases is enormous that the world health organization (WHO) has to paid special attention to their control under auspices of its special programmed and research [6].
MATERIALS AND METHODS

Study Area
Runjin sambo is an area in Sokoto north local government Area in Sokoto state- Nigeria. The state has an area of 51km$^2$ and a population of 232,846 at the 2006 census [7]. The rainy season start from June to October during which showers rarely last long and are far from the regular terrestrial rain known in wet tropical regions, from late October to February is the cold season. The climate is dominated by the Cold wind blowing Sahara dust over the land with an average temperature of 28.3°C (82.9°F). Sokoto on the whole is a very hot area [8]. The local government area is predominantly inhabited by Hausa Fulani, who engage mostly on agriculture animal husbandry and trading.

Study Population
All schools used for this study were public schools with crowded classrooms and inadequate facilities. Majority of the pupils are between 4-14 years and hailed from low income socioeconomic class. Pupils were compensated with sweets and later antifungal cream was applied in the scribed infected area for their participation in the study.

Sample Collection
By simple random sampling Two (2) primary schools were selected in the study area. A total of 10 infected hairs were collected from infected pupils with clinical manifestation of Dermatophytosis. The sites of the infection were first cleaned with 70% ethanol and light scraping and applied antifungal cream in affected area (hair samples were taken from the active age of lesion. All the sample was labeled appropriately in a coded brown envelops and transported to mycology laboratory of Usmanu Danfodiyo University Sokoto for analysis.

Sterilization Techniques
Petri dishes, conical flask and universal bottles, were washed thoroughly with detergent and raped all over. By the used of aluminum foil and sterilized using a hot air oven at 160°C for one hour be allowed to turned back 0°C before the Petri dishes are been allowed to be taking out in the oven [9].

Media Preparation
Three (3) media were used for the study:

Nutrient Broth
Nutrient Broth was used for this research and it was prepared in accordance with the manufacturer’s instructions. Twenty five gram (25g) of nutrient broth was weighed and dissolved into 1 liter of distilled water in a conical flask. The preparation was heated using a hot plate to dissolve completely. Cotton wool was placed to cover it and wrapped with aluminum foil. After which the solution was autoclaved at121°C for 15 minute. It was allowed to cool and dispensed into slant bottle and later we put the specimen inside the media and live it for about 2-4 weeks for the specimen to grow.

Sabouraud Dextrose Agar (SDA)
Sabouraud Dextrose Agar Was also used for the research, where sixty five gram (65g) of the SDA was weighed and dissolves into 1 liter of distilled water in a conical flask the preparation was heated using a hot plate to dissolve completely. Cotton wool was placed to cover it and wrapped with aluminum foil. After which the solution was autoclaved at 121°C for 15 minutes, it was allowed to cool and dispensed into sterile Petri-dishes [10].

Potatoes Dextrose Agar (PDA)
About 39g of PDA was weighed and 1g of streptomycin was added in order to inhibit bacterial growth and 1 liter of distilled water was also added and mixed inside a conical flask, all this was done according to manufacturer’s instruction. The preparation was heated using a hot plate to dissolved completely cotton wool was then placed to cover it and wrapped with aluminum foil. After which the solution was autoclaved at 121°C for 15 minutes, allowed to cool and dispensed into sterile Petri- dishes [10].

Pouring of Media
Media was poured into various Petri dishes after it have been allowed to cool for some minute. Ethanol, cotton wool, masking tapes, lamp and lighter was used in pouring the media. The mouth of conical flask was sterilized by the used of spirit lamp after which was then poured into the various Petri dishes. Before which was first sterilized by
using ethanol and cotton wool the media was left to solidified for overnight and been labeled according to the media used. All these were done inside the incubating room at 32°C.

Inoculation
A needle, spirit lamp, ethanol, cotton wool, masking tape was used in incubation process, the inoculation needles was sterilized using spirit lamp. After which the surface was also sterilized by ethanol and cotton wool. Some portion of specimens was then paced into various media.

Microbial Analysis:
Culture method
After 2 to 3 weeks of inoculation at room temperature of (28-32°C) the plate were observed for colony and the colony types were noted and recorded [10]. A fresh SDA and PDA were then prepared and used to subculture from the primary plates to obtain a pure culture using sterilized inoculating needles a colony from the primary culture was cut and inoculated into the fresh culture media plates. The inoculating needle was then sterilized by flaming to red hot after each cut to avoid the yield of mixed cultures. The plates were then incubated for another 2 weeks at room temperature after 2 weeks of inoculation the plates were observed for pure colony growth [10].

Microscopy
Using the sterilized inoculating needles, a colony from each of the pure culture plates obtained was picked and placed on to a clean grease free slide containing a drop of normal saline and smeared, cover glass slip to fix and increase the refractive index of the glass the inoculating needles were sterilized by heating over a flame until red-hot. Few drop of lacto phenol cotton blue were added at the edge of the glass slide enhance clarity. The prepared was mount was observed under microscope using 40 objectives for possible identification of the isolated organism include. The appearance of the micro and macro conidia, whether smooth or rough the shape and their arrangement on the hyphae.wether are borne or singly in pairs or clusters. septate or non septate, hyphae colour of mycelia, size, type of spore and appearance of the sporangiosphere.

Statistical Analysis
A statistical analysis using chi-square test (p>0.05) was used to determined the significant differences on the incidence of Tinea capitis among primary school children in the study area with respect to their sex, age and socio economic status, tables are also drown.

RESULTS

Tinea Capitis Profile
Table 1 shows the result of incidence of Tinea capitis; out of ten (10) specimens collected three (3) species were identified by culture method. (3) Different species of the fungi belonging to the genera Trichophyton were isolated these include: Trichophyton rubrum, Trichophyton megnimii and Trichophyton Tonsurans.the results of the identified isolates are presented in table 1.

<table>
<thead>
<tr>
<th>Names of Schools</th>
<th>No. Examined</th>
<th>T.rubrum M F</th>
<th>T.megnimii M F</th>
<th>T.tonsurans M F</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gidan salihu Pri. Sch.</td>
<td>5</td>
<td>0(0.00) 1(20.0)</td>
<td>0(0.00) 0(0.00)</td>
<td>0(0.00) 0(0.00)</td>
<td>1</td>
</tr>
<tr>
<td>Mu‘d zako Pri. Sch.</td>
<td>5</td>
<td>0(0.00) 1(20.0)</td>
<td>1(20.0) 0(0.00)</td>
<td>0(0.00) 1(20.0)</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>0 2 1 1 0 1 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi-square =1.331, DF=2, P<0.05

Incidence of Tinea Capitis in relation to sex and age group distribution
The influence of risk factor (age and sex) on the prevalence of Tinea capitis infection is shown in Table 2 and Table 3 respectively. In table 2 female children in Gidan salihu have the highest prevalence rate of 60.0% while male children have 40% also in the same table male children in Muhammad zako have 80.0% of prevalence while female with only 20% of prevalence. While in Table 4 male children between the ages of 7-9 years of age have the highest percentage of 80.0% while children between the ages of 10-12 years of age have 20.0% of prevalence and children between the ages of 4-6 years of age shows no sign of the infection as the prevalence was 0.00%.

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TABLE 2: Sex distribution and incidence of T. capitis, among primary school Children in the study area

<table>
<thead>
<tr>
<th>Schools</th>
<th>No. Examined</th>
<th>NO. POSITIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Gidan salihu Pri. Sch.</td>
<td>2(40.0)</td>
<td>3(60.0)</td>
</tr>
<tr>
<td></td>
<td>1(20.0)</td>
<td>2(40.0)</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Chi-square = 2.602, DF=1, P<0.05

TABLE 3: Incidence of T. capitis in relation to age distribution among school Children in the study area

<table>
<thead>
<tr>
<th>Schools</th>
<th>No. Examined</th>
<th>Age group (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4-6</td>
<td>7-9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>0(0.00)</td>
</tr>
<tr>
<td>Muh’d zako Pri. Sch.</td>
<td>5</td>
<td>2(40.0)</td>
<td>1(20.0)</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

Chi-square = 4.132, DF=3, P<0.05

Incidence of T. capitis in relation to occupation of parents

Table 4 highlights the occurrence of T. capitis in relation to occupation of parents in which the highest prevalence rate (60.0%) was recorded among school children whose parents were business men in Gidan salihu model primary school while the lowest prevalence rate (20.0%) was recorded among school age children whose parents were civil servants and also among those children whose parents engage in farming activities in both Gidan salihu model school and Muhammad zako model primary school respectively.

TABLE 4: Incidence of T. capitis in relation to occupation of parent in the Study Area

<table>
<thead>
<tr>
<th>Schools</th>
<th>No. Examined</th>
<th>NO. OF POSITIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Civil servant</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gidan salihu Pri. Sch.</td>
<td>5</td>
<td>1(20.0)</td>
</tr>
<tr>
<td>Muh’d zako Pri. Sch.</td>
<td>5</td>
<td>1(20.0)</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>2</td>
</tr>
</tbody>
</table>

Chi-square = 3.20, DF=3, P<0.05

Incidence of T. capitis in relation to body hygiene among primary school in the study area

Table 5 shows the summary of the prevalence of T. capitis in relation to body hygiene among school children in the study area. It was found that the children whose body are fairly neat in Muhammad zako model primary school recorded the highest prevalence rate of 80.0% followed by those children whose body are dirty in Gidan salihu model primary school recorded the prevalence of 40.0% and least prevalence rate was recorded among school children attending Gidan salihu model primary school with the prevalence rate of 0.00%.

TABLE 5: Incidence of T. capitis in relation to body hygiene among school Children in the study area

<table>
<thead>
<tr>
<th>Name of Schools</th>
<th>No. Examined</th>
<th>Neat %</th>
<th>Fairly neat %</th>
<th>Dirty %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gidan salihu Pri. Sch.</td>
<td>5</td>
<td>0(0.00)</td>
<td>3(60.0)</td>
<td>2(40.0)</td>
</tr>
<tr>
<td>Muh’d zako Pri. Sch.</td>
<td>5</td>
<td>1(20.0)</td>
<td>4(80.0)</td>
<td>0(0.00)</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>1</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

Chi-square = 3.14, DF=2, P<0.05

DISCUSSION

Dermatophytes is said to be rank highest among the incidence of skin disease in Nigeria. These diseases remain endemic in Nigeria, largely due to lack of information on its prevalence and absence of control measures [4]. Our examination of incidence of Tinea capitis among children in runjin sambo area of Sokoto north local government reveals a prevalence rate of 40.0%. This is relatively high compared to other surveys which have shown a rate of 5.0% among primary school children in Libya and finding of [11] who recorded 2.7% among school children in Iraq.

We believe that the high prevalence of infection in the school we surveyed may be attributed to a failure for a routine practice of strict inspection of children by their teacher for any manifestation of scalp lesions. The higher
incidence may also be attributed to failure of frequent washing of head with soap and water among the children, might be a reason for higher incidence of *T. capitis* among the school children, overcrowding and poor hygiene are factors which increase susceptibility to *Tinea capitis* infection.

In our study, male children were commonly more infected then females which are in the ratio of 2:1.our study was in line with that of [12]. [12] And [13]; who show male children are more commonly infected then the female counterpart. However, this is not always the case [11] reported work of [14] who reported that in the age group 11-15 years the dermatophytes was more commonly isolated from females. The reason for a high rate of scalp infection in males has been attributed to an easy inflammation of spores because of short hair, the frequent sharing of combs, brushes and caps and visit to barbers whose unhygienic practices may lead to the transmission of infection from person to person. Dermatitis is mainly pre pubertal disease and results of these study shows that higher rate of infection in children under 11 years of ages, this agree with other studies of [11], Dermatitis infection among children in Iraq.

The frequency and severity of dermatitis is likely to be linked to personal cleanness. In our study we observed that those children that are fairly dirty recorded the highest prevalence rate of injection. The higher prevalence rate among those children may be attributed to the fact that poor hygiene is a reflection of a low standard of living and a low level of education within the family. A high level of parental education appears to be an important contribution factor in lowering the prevalence of *Tinea capitis*. Maternal education plays major role in these regard, since it is true that children with uneducated mothers, in particular seem to be at a very high risk of infection in an unhealthy environment. It is also evident that maternal literacy or even simple education may contribute to the reduction of the infection irrespective of the quality of the environment in which the children lives.

The findings of these research also shows the association between the prevalence of dermatophytes and the occupation of parents in which the highest infection rates was recorded among school children whose parents engage in business with the highest prevalence rates of 60.0% rather than civil servants. This may be due to the fact that the parents of the children lack the general knowledge of simple health promotion behavior. This report contradicts that of [11] who earlier reported the prevalence of *Tinea capitis* among primary school children in Iraq.

In conclusion, this study shows high prevalence rates of *T. capitis* among school age children in Rinjinsambo area of Sokoto state. The control measures include upgrades in standard of living of people in the area. Also avoidance of overcrowding at home and in school and maintenance of general hygiene, the study also recommends Adequate and quality health education should be maintained in the study area in particular and Nigerian schools at large. Parents should be advised to ensure their children maintain both personal and environmental hygiene at homes. Also, playing with animals by school children should be discouraged. Government and private organizations should provided good learning infrastructure at schools, especially rural schools.

**REFERENCES**


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