

# Distribution and Microbiological Characterization of Dermatophytes Infection among Primary School Children in Ago Iwoye, Ogun State, Nigeria

Sanuth Hassan A <sup>1\*</sup>, Efuntoye Moses O.<sup>2</sup>

1. Lagos State Environmental Protection Agency (LASEPA), Alausa, Ikeja, Lagos, Nigeria

2. Department of Biological Sciences, Ogun State University, P.M.B. 2002, Ago-Iwoye, Nigeria  
[aitch\\_ay@yahoo.co.uk](mailto:aitch_ay@yahoo.co.uk)

**Abstract** Investigations were carried out on the distribution of dermatophytes infection among primary School Children in Ago-Iwoye, Ogun State, Southern Nigeria. Out of a total population of 1404, 274 representing 19.52% of the children were found to be infected by the disease. The commonest dermatophytes infection among the children was *Tinea capitis* accounting for 82.4% of the infection. The infection was common among the male than the female and found to be frequent among the children between ages of 7 and 10 years. It was prevalent among families whose socio-economic status is below average. Thirteen species of dermatophytes were isolated from the various forms of the infection, *Tinea capitis* has the highest number of fungal isolates and the most common causative organism is *Microsporium audouinii*. The sources of infection among the school children in this area were found to be the soil and domestic animals. [Researcher. 2010;2(6):95-99]. (ISSN: 1553-9865).

**Key words:** Dermatophytes, Children, Infections

## 1.0 Introduction

Dermatophytes are fungi that require keratin for growth. These fungi can cause superficial infections of the skin, hair, and nails. They are spread by direct contact from other people (anthropophilic organisms), animals (zoophilic organisms), and soil (geophilic organisms), as well as indirectly from fomites. (Barry L. Hainer, 2003). Dermatophytes infection usually refer to as "*Tinea*" are caused mostly by the genera *Epidermatophyton*, *Microsporium* and *Tricophyton*, and are classified into different types depending on the site infected on the human body; *Tinea capitis* (scalp), *Tinea corporis* (skin), *Tinea pedis* (foot) and others.

Variation in the distribution pattern of dermatophytes infection among different countries of the world are evident in the studies of Ayadi *et al.*(1993), Staats and Korstanje (1995), Weitzman *et al.* (1998), Ellabib and Khalifa (2001) and Anosike *et al.*(2005). This distribution pattern of dermatophytes infection in different part of the world has been attributed to factors of climate, life-style, and prevalence of immunodeficiency diseases in the community and also the reluctance of patients to seek treatment because of embarrassment or minor nature of disease unless the condition becomes sufficiently

serious to affect the quality of life (Hashem al sheikh 2009)).

While the report from dermatological clinics indicates that dermatophytes infection in Nigeria is endemic (Soyinka, 1978), Ajao and Akintunde (1985), reported that it was found to be more frequent among primary school children usually children between 5 and 10 years of age and more prevalent among the poor families having minimum of five children while it is less prevalence in the families having one to four children.

The aim of this study was to ascertain the incidence, prevalence, causative organisms, and source of infection as well as probable methods of transmission of the infection among the primary school children in Ago-Iwoye.

## 2. Materials and Methods

### 2.1 Samples Collection

Collection of samples was achieved through the selection and visitation of six primary schools during the period of study. Classes were randomly chosen, the total numbers of pupils in each chosen class was recorded, this was followed by examination

of the children for the clinical symptoms of the infection on different part of the body (head, hand, body and feet) and the observations recorded. Each of the children with infection was asked some questions from a prepared and a numbered questionnaire providing information about the age, sex, children playing habit and association with domestic animals and socio-economic status of parents.

The site of infection was identified and the lesion was cleaned with 70% alcohol. Scrapping was aseptically taken from the edge of the lesion using sterile razor blade. Each razor blade was used for a scrapping.

## 2.2 Laboratory Analysis of Samples

All necessary precautions were taken to avoid contamination during collection, transportation and laboratory analysis. The samples were cultured on Sabouraud Dextrose Agar (Oxoid Limited, London, UK). Samples were picked with a heat sterilized forceps and aseptically placed at the center of the Agar plates.

The inoculated plates were incubated at 30°C for two weeks, examined daily for growth, mycelia characteristics and changes in the medium of growth.

## 2.3 Characterization and Identification of Isolates

Developed cultures were identified base on mycelia and microscopic morphology (Yousef Al-doory, 1980). Using the mycelia texture, rate of growth, and changes in the coloration of the medium due to alkaline production by the dermatophytes. The isolates were observed under a light microscope using lacto-phenol cotton blue stain. Characteristics features of conidia such as the shape, sizes as well as the septate pattern of the conidia and hyphae and some special features including chlamydospores and antler shaped hyphal formation were taken to consideration in identification.

## 3.0 Results

### 3.1 Field Survey Results

Table 1: The prevalence of dermatophytes infection among the school children in Ago-Iwoye

School	School Population	No. of infected children	% Infection
Ako Muslim Primary School	176	29	16.48
St. Paul (Ang.) Primary School	178	34	19.10
Imere Muslim Primary School	152	21	13.82
Imosos Methodist Primary School	190	32	16.84
Idode Wesley Primary School	266	47	17.67
Igan Wesley Primary School	442	111	25.11
<b>Total</b>	<b>1404</b>	<b>274</b>	<b>19.52</b>

Table 2: Distribution of dermatophytes types in the school

School	<i>Tinea capitis</i>	<i>Tinea corporis</i>	<i>Tinea pedis</i>	Mixed	Total
Ako Muslim Primary School	28	1	-	-	29
St. Paul (Ang.) Primary School	31	2	-	1	34
Imere Muslim Primary School	21	-	-	-	21
Imosos Methodist Primary School	27	3	-	2	32
Idode Wesley Primary School	38	3	4	2	47
Igan Wesley Primary School	81	9	18	3	111
<b>Total</b>	<b>226</b>	<b>18</b>	<b>22</b>	<b>8</b>	<b>274</b>
%	82.4	6.51	8.03	2.91	

Table 3: Sex distribution of dermatophytes infection

Sex	<i>Tinea Capitis</i>	<i>Tinea corporis</i>	<i>Tinea pedis</i>	Mixed	Total	%
Male	172(76.11%)	12(66.67%)	19(86.36%)	3(37.5%)	206	75.18
Female	54(23.99%)	6(33.33%)	3 (13.64%)	5 (62.5%)	68	24.82
	226	18	22	8	274	

$X^2 = 8.373$ , Degree Of Freedom= 3

Table 4: Class and Mean Age Distribution of Dermatophytes Infection among the Studied Primary School Children

Class	Mean Age	Total No. Examined	<i>Tinea capitis</i>	<i>Tinea corporis</i>	<i>Tinea pedis</i>	Mixed	Total	% Infection
1	7	352	55	3	-	1	59	16.76
2	8	219	59	4	8	3	74	33.78
3	9	206	49	6	7	2	64	31.07
4	10	209	38	2	5	-	45	21.53
5	11	225	16	2	1	2	21	9.33
6	12	193	9	1	1	-	11	5.70
Total		1404	226	18	22	8	274	

Table 5: The Relationship between Dermatophytes Distribution and Socio-Economic of the Infected Children

Schools	Socio-economic status			Total
	Under average	Average	Over average	
Ako Muslim Primary School	16	7	6	29
St. Paul (Ang.) Primary School	17	6	11	34
Imere Muslim Primary School	6	9	6	21
Imosos Methodist Primary School	9	14	9	32
Idode Wesley Primary School	21	13	13	47
Igan Wesley Primary School	48	33	30	111
<b>Total</b>	<b>117</b>	<b>82</b>	<b>75</b>	<b>274</b>
%	42.70	29.93	27.37	

**Under average:** parents are farmers and reside mainly in the village

**Average:** parents are traders/technician/civil servants but with part-time farming. They reside in town during the weeks and villages in the weeks and villages in the weekends

**Over average:** parents are civil servant to traders that reside mainly in the town.

### 3.2 Laboratory Results

Out of total of 274 infected children 76 samples were collected, this is due to the uncooperative attitude of teachers and children base on their local taboo. 62 of the samples are positive for culture of dermatophytes while the remaining cultures were suspected to be contaminant since they yielded such fungi as *Rhizopus* species, *Aspergillus* species and other unidentified isolates. Of these

positive dermatophytes cultures, 48.39% belong to the group *Microsporium* while 51.6% belong to *Trichophyton* group. But no *Epidermophyton* group was recorded in samples collected. The commonest of the isolates is *Microsporium audouinii* which was isolated 14 times and this was followed by *M. gypseum* and *Trichophyton soudanese* which were isolated 8 and 7 times respectively (Table 6).

Table 6: Distribution of Dermatophytes Isolates with Sites of Infection.

Isolates	<i>Tinea capitis</i>	<i>Tinea corporis</i>	<i>Tinea pedis</i>	Total	%
<i>Microsporum audouinii</i>	11	3	-	14	
<i>M. gypseum</i>	5	3	-	8	
<i>M. nanum</i>	4	-	-	4	
<b>Total</b>	<b>20</b>	<b>6</b>	<b>-</b>	<b>26</b>	48.15
<i>Trichophyton erinaci</i>	-	-	1	1	
<i>T. gallinae</i>	1	1	-	2	
<i>T. concentricum</i>	1	-	1	2	
<i>T. schoenlainii</i>	3	-	2	5	
<i>T. verrucosum</i>	5	-	-	5	
<i>T. mentagrophyte</i>	1	-	1	2	
<i>T. violaceum</i>	2	2	-	4	
<i>T. soudanese</i>	4	2	1	7	51.85
<b>Total</b>	<b>17</b>	<b>5</b>	<b>6</b>	<b>28</b>	
<i>Rhizopus</i> species	7	-	-	7	
<i>Aspergillus</i> species	2	-	1	3	
Unidentified isolates	4	-	-	4	
<b>Total</b>	<b>13</b>	<b>-</b>	<b>1</b>	<b>14</b>	

#### 4.0 Discussion

Dermatophytes infection is said to rank highest among the incidence of skin diseases in Nigeria, closely followed by bacterial skin diseases (Okoro, 1973). Soyinka (1978) reported 55.1% dermatophytes infections the highest among skin diseases of school children; Ogbonna et al (1985) reported 3.4% of dermatophytes infection in four primary schools studied in Jos while a recent investigation studies by Anosike et.al (2005) recorded 21.1% infection amongst primary school children in northern Ebonyi State of eastern Nigeria

From the results of this study, the incidence of dermatophytes infection was found to be 19.52% (table 1), this is similar to the findings of Anosike et.al (2005). Majority of the organisms isolated belong to the genera *Microsporum* and *Trichophyton*, and no member of the genus *Epidermophyton* was isolated in this study. *Microsporum gypseum* which is attributed to be geophilic, constitute 10.52% of total isolates but majority of the isolates including *Microsporum audouinii*, *Trichophyton rubrum* and *T. violaceum* are anthropophilic in nature. However, the interview conducted with the questionnaire noted some children especially of average family status sharing their residential houses with domestic animals such as cat, dog, goat and sheep and this could be the source of zoophilic organisms such as *T. mentagrophyte* and *T. verrucosum*.

Furthermore, it is clearly shown from the result of this study (table2) that tinea capitis was the commonest form of dermatophytes infection. These forms of dermatophytes infection have 84.42% incidence and it was prevalent especially among children below 12 years of age as shown in table 4. It was noted that most of the infected children do not have their hair cut short and the questionnaire revealed that they mostly have their bath twice per week. They thereby create humid conditions which favoured the growth of the dermatophytes spores. This finding is in agreement with the result of Ajao and Akintunde (1985), that tinea capitis was more frequent among children between ages 5 and 10 years and more prevalent among the poor than the rich. This is further corroborated by results obtained by Ogbonna *et al* (1985) and Ameh and Okolo (2004).

The statistical analysis of independence variables on dermatophytes infection distribution with sex(table 3) , using contingency test showed the calculated chi-square ( $X^2$ ) to be 8.3739. This value is higher than the tabulated chi-square ( $X^2$ ) value at 0.05 level of probability and 3 degree of freedom which is 7.815. Indication from this is that dermatophytes infection distribution and sex are not independent; hence there is association between the dermatophytes infection distribution and sex. The table showed that the distribution is higher in male than in female with 24.82% infection. This result compared with findings of Enemuor and Amedu (2009), Ameh and Okolo (2004) and Ajao and

Akintunde (1985) shows that among the children of primary school age, boys are most susceptible to dermatophytes infection especially infection of the scalp. The higher susceptibility of boys could be due to their frequent contact with soil as a result of farm work and football. Moreover, it was found that there is positive relationship between dermatophytes infection and poverty (table 5) and this was corroborated by earlier report by Fekete (1978) that there is correlation between skin disease and poverty in Nigeria.

Laboratory analysis from the 62 positive and identified cultures (table 6) shows that 48.15% of the infection was caused by *Microsporum* species while 51.85% were by *Trichophyton* species. It was found that the most ubiquitous organism was *Microsporum audouinii* which was isolated 11 times from scalp infection and 3 times from corporis infection. *M. audouinii* had been reported by workers (Ogbonna, 1985 and Anosike et. al., 2005) as the commonest isolate from tinea capitis infection.

Conclusively, this study shows that dermatophytes infection is prevalent among the poor than the rich. Hence, to control the prevalence of the disease, the standard of living of people in this environment should be raised. There should be avoidance of overcrowding at home and in school and maintenance of general hygiene. All this could be achieved by provision of health care services, regular water supply and health education to school children and parents as well

#### Correspondence to:

Sanuth Hassan A.  
Lagos State Environmental Protection Agency  
(LASEPA), Alausa, Ikeja, Lagos, Nigeria  
Telephone: +2348028543040  
Emails: [aitch\\_ay@yahoo.co.uk](mailto:aitch_ay@yahoo.co.uk)

#### References

- [1] Ajao A.O. Akintunde C. Studies on the prevalence of *Tinea capitis* infection in Ile-Ife, Nigeria. *Mycopathologia* 1985; 89(1): 43-48.
- [2] Ameh I.G. and Okolo R. U. Dermatophytosis Among School Children: Domestic Animals as Predisposing Factor in Sokoto, Nigeria, Pakistan J.Biol.Sci. 2004; 7(7):1109-1112.
- [3] Anosike J C, Keke I.R, Uwaezuoke J.C, Anozie J.C, Obiukwu C.E, NwokeB.E.B, Amajuoyi, O.U. Journal of Applied Sciences & Environmental Management 2005;9( 3): 21-25
- [4] Ayadi A, Borgi N, Makni F. Prevalence of Superficial mycoses in Prevailing fungi and pattern of infection. *Dermatol.* 1993; 190: 39-42.
- [5] Barry L. Hainer. *American Family Physician* 2003;67(1):101-108
- [6] Ellabib M.S, Khalifa Z.M. Dermatophytes and other fungi associated with skin mycoses in Tripoli Libya, *Ann. Saudi Med.* 2001; 21: 3-4
- [7] Enemuor S. C. and A. S. Amedu. *African Journal of Microbiology Research* 2009; 3(2): 062-065
- [8] Fekete. The pattern of disease of skin in Nigeria guinea savannah. *Int. J. of Dermatol.* 1978; 17(4):331-338
- [9] Hashem al sheikh. Epidemiology of Dermatophytes in the Eastern Province of Saudi Arabia *Research Journal of Microbiology* 2009; 4(6): 229-234
- [10] Ogbonna C.I.C, Robinson R.O., Abubakar J.M. The distribution of ringworm infections among primary school children in Jos Plateau State of Nigeria. *Mycopathologia* 1986; 89: 101-106.
- [11] Okoro A. N. Skin Diseases in Nigeria, *Trans. St. John's Hosp. Derm.* 1973; Soc. 58(1): 68
- [12] Soyinka F. Epidemiologic study of dermatophytes infections in Nigeria (Clinical Survey and Laboratory Investigations). *Mycopathologia* 1978; 63(2): 99-103
- [13] Staats C.C., Korstanje M.J. Fungal infections in the Netherlands: an urban ecosystem in Sifax (Tunisia), *Bull. Soc. Pathol. Exotique* 1995; 86:188-9.
- [14] Weitzman I, summer bell RC. The dermatophytes. *Clin. Microbiol Rev.* 1995; 8:240-59.
- [15] Yoursef Al-doory In: *Laboratory Medical Mycology*, Lea and Febiger Pub. Philadelphia 1980:219-245.

6/2/2010