



## PREVALENCE OF *TINEA CAPITIS* AMONG PRIMARY SCHOOL PUPILS IN ULI, ANAMBRA STATE, NIGERIA

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### ABSTRACT

A survey of tinea capitis, ringworm of the scalp was carried out on 1,020 pupils in four primary schools in Uli, Anambra State, Nigeria, between May and July 2005. Tinea capitis was provisionally diagnosed in 142 pupils using clinical assessment, giving a prevalence rate of 13.92%, with a male to female ratio of 2:1. Most of the infected pupils (71.13%) had dry non-inflammatory lesions compared to 28.87% with inflammatory lesions and the majority, (64.08%) were between ages 6 to 10 years. Attempt to isolate and identify the etiologic agents from scalp scrapings, gave positive results in 22 samples with the occurrence of the following dermatophytes: *Trichophyton tonsurans* (27.3%); *Microsporum audouini* (18.2%); *Trichophyton soudanense* (18.2%); *Microsporum gypseum* (13.6%); *Microsporum canis* (9.1%); *Trichophyton yaoundei* (9.1%) and *Trichophyton mentagropyhtes* (4.5%). This study recommends parental and community education on ways of preventing the spread of tinea capitis.

**Key words:** Tinea capitis, Pupils, Uli, Anambra State, Nigeria

### INTRODUCTION

Tinea capitis is a dermatophytic infection or ringworm of the scalp and hair caused by fungal species of the genera *Microsporum* and *Trichophyton*. The disease varies from a benign, scaly non-inflammatory sub-clinical colonization to an inflammatory disease characterized by the production of scaly erythematous lesion and alopecia or loss of hair (Duguid *et al.*, 1974). In Africans there could be keloid formation with permanent alopecia (Clark and Walker, 1953). Tinea capitis is infectious and common in warm, humid countries including Nigeria. Spread is promoted by poor-living unsanitary conditions with overcrowding (Adesotonye, 1977; Gugnani and Njoku-Obi, 1986). It is primarily an infection of children since it is spread through contact with infected household items such as soaps, combs, hair brushes, towels and barbers' clippers and children have the least awareness of personal hygiene. House-hold pets such as dogs and cats spread *Microsporum canis*. The frequency of tinea capitis is higher in boys than girls, often with a ratio of 2:1 (Kamalan and Thambia, 1980; Fathi and Al-Samarai, 2000).

Several other investigators have studied the prevalence of tinea capitis among school children

in Nigeria and different parts of the world (Mahgroup, 1968; Somorin *et al.*, 1977; Malhotra *et al.*, 1979; Maya, 1989; Oyeka, 1990; Dada *et al.*, 1994; Fathi and Al-Samaai, 2000). Prevalence rates may vary from 4.49% (Malhotra *et al.* 1979) to 10.2% (Oyeka, 1990) just as the etiologic agents vary from one location to another. Oyeka (1990) observed that *Microsporum audouini* was the most prevalent agent (38.0%) compared to prevalence of 5% for *Microsporum gypseum* in Awka, Anambra State.

This study was carried out to obtain baseline information on tinea capitis in Uli, which is presently a rural community but is fast changing into a busy town since the establishment of the Anambra State University.

### MATERIALS AND METHODS

#### STUDY POPULATION

Four Primary Community Schools in Uli, Anambra State, were studied between May and July 2005 and a total of 1,020 pupils (492 boys and 528 girls) were examined for clinical diagnosis of tinea capitis. The schools were located at four villages: (A) Umuanoro (334 pupils); (B) Amamputu (326 pupils); (C) Obodokoli (150 pupils); (D) Ubahudara (210 pupils). The classes studied in each school were randomly selected with the permission of the headmistress. The school children were between ages 4 to 15 years. Before examination and sample collection, the investigator had to educate the teachers and the pupils on the objectives of the

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study including the nature of tinea capitis, the clinical features, laboratory diagnosis and mode of transmission.

### SAMPLE COLLECTION

The following materials were taking to the schools: 70% (v/v) ethyl alcohol for cleaning the skin, sterile scalpels, sterile cotton wool, rubber gloves and sterile paper envelopes. Pupils were examined in their classes and their ages, sex and evidence of scaling, crusting, follicular inflammation and hair loss or erythema were recorded. Lesions were gently swabbed with 70% (v/v) ethyl alcohol and both hairs and scales from the active borders of the lesions were scraped with a scalpel into a labeled envelope and sealed. Samples were taken to the laboratory for analysis.

### DIRECT EXAMINATION

Standard procedure was followed (Lennette *et al.*, 1985). Fragments of skin scrapings were placed in a drop of 10% (w/v) KOH on a slide and covered with a cover slip. The slide was gently heated for a few seconds over a small flame from a spirit burner before it was examined under the low power of the microscope.

Hyphae and arthroconidia and the location of the latter on hair shafts, whether endothrix or ectothrix invasion was observed.

### CULTURE OF SAMPLES

Samples were placed on Sabouraud dextrose agar plates containing 0.05g chloramphenicol L<sup>-1</sup>. Plates were incubated at room temperature (25 to 28°C) for 7-14 days and examined daily for growth.

### MORPHOLOGICAL STUDY OF CULTURES

For identification of the dermatophytes, cultures were examined both for growth characteristics and

microscopic morphology. The extent of growth, texture, color of colony and pigment production by the fungus was noted. Wet mounts were prepared in lactophenol cotton blue and examined under the microscope at low power for the types of microconidia and macroconidia and mycelia (Lennette *et al.*, 1985).

### RESULTS

Table 1 shows that out of 1,020 pupils randomly examined at four Community Schools in Uli, 142 pupils (93 males and 49 females) were clinically diagnosed with tinea capitis with an average prevalence of 13.92%. More pupils (71.13%) had dry non-inflammatory lesions while 28.87% had wet inflammatory lesions.

Table 2 shows distribution of the 142 cases of clinically diagnosed tinea capitis with regards to sex and age. More boys (93) were clinically diagnosed than girls (49) giving a male to female ratio of 2:1. The difference was statistically significant,  $\chi^2=1.96$ ;  $P < 0.05$  (Hirsch and Riegelman, 1991). Most of these pupils (64.08%) were in the 6 to 10 years old age group compared to 14.8% for the 11 to 15 years age group and 21.1% for those below 6 years.

**TABLE 1: PREVALENCE OF TINEA CAPITIS AMONG PUPILS EXAMINED BY CLINICAL DIAGNOSIS**

School	No. of Pupils	No. infected (Infl./Non-Infl.)	Prevalence (%)
A	334	52 (12/40)	15.57
B	326	48(15/33)	14.72
C	150	18 (5/13)	12.00
D	210	24 (9/15)	11.43
Total	1020	142 (41/101)	13.92

**TABLE 2: DISTRIBUTION OF CLINICALLY DIAGNOSED TINEA CAPITIS BY SEX AND AGE AMONG PUPILS EXAMINED**

School	Total Examine M/F	Total Infected M/F	Age (Years)		
			<6 M/F	6-10 M/F	11-15 M/F
A	165/169	33/19	6/4	24/3	3/2
B	151/175	35/13	7/2	22/8	6/3
C	78/72	11/7	3/1	6/4	2/2
D	98/112	14/10	3/4	9/5	2/1
	492/528	93/49	19/11	61/30	13/8

### ETIOLOGIC AGENTS OF TINEA CAPITIS

Success rate in culturing and examination of scalp scrapings from 142 pupils was low, 22 out of 142 (15.5%). Twenty two samples grew on the mycological agar with identifiable growth

characteristics and only 17 samples had arthroconidia on wet mount with equal distribution of endothrix and ectothrix spores among samples from each school. School A had 7 positive samples, B had 4, C had 3 and D had 3. It could

be deduced that some of the dry lesions had almost healed, hence the lack of growth and recovery of arthroconidia. The various species of etiologic agents were identified from both cultural and microscopic examination as shown in Table 3.

Out of the 22 positive cultures, 6 isolates were identified as *Trichophyton tonsurans* (31.82%), 4 as *Microsporum audouini* (18.18%), 4 as *T. soudanense* (18.18%), 3 as *M. gypseum* (13.64%), 2 as *T. yaoundei* (9.09%) and 2 as *M. canis* (9.09%).

**TABLE 3: CULTURAL CHARACTERISTICS AND MICROSCOPIC DESCRIPTION OF ISOLATES**

Incubation Period	Cultural Characteristics	Microscopic Description	Isolate Out of 22 (%)
3-5 days	Greyish colony of closely matted mycelia. Central knob with radiating and folded surface	Short segmented and reflective hyphae present	<i>M. audouini</i> 4 (18.2%)
2-4 days	Wooly or cottony white with flat colonies and radiating edges	Rough, thick walled and multiseptate macroconidia	<i>M. canis</i> 2 (9.1%)
5-9 days	Brown to tan waxy colony with brownish powdery aerial mycelia, colonies matted to plate	Few macroconidia, numerous microconidia, sessile, hyphal swelling, terminal chlamydospore	<i>T. tonsurans</i> 6 (27.3%)
3-5 days	Red flat granular colonies with cream tinted center	Numerous microconidia, rounded and pear shaped, born singly or in clusters. Spiral hyphae present	<i>T. mentagrophytes</i> 1 (4.5%)
3-5 days	Greyish colonies	Numerous macroconidia	<i>M. gypseum</i> 3 (13.6%)
4-7 days	Yellowish colonies, folded with radiating edges	Short segmented and reflective hyphae	<i>T. soudanense</i> 4 (18.2%)
4-7 days	Moist heaped-up colonies of chocolate brown color	Numerous rounded microconidia & chlamydospores	<i>T. yaoundei</i> 2 (9.1%)

### DISCUSSION

The prevalence of 13.92% for clinically diagnosed tinea capitis observed in this study among primary school pupils aged 4-15 years in a rural community, falls within the observations of previous workers both in Nigeria (Adesotoye, 1977; Somorin *et al.*, 1977; Ajao and Akintunde, 1985; Gugnani and Njoku-Obi, 1986; Oyeka, 1990; Dada *et al.*, 1994) and other parts of the world, where the living conditions of the people are lower than that of the Western World (Mahgoup, 1968; Kamalan and Thambia 1980; Maya, 1989; Simpanya, 1989). Ajao and Akintunde (1985) reported a prevalence rate of 14.02% for clinical infection of school children in Ile-Ife and Simpanya (1989) found a rate of 16.8% in urban and rural schools in Lusaka, Zambia.

It is noted that lower prevalence rates are recorded for tinea capitis when prevalence is based on mycological diagnosis. Fathi and Al-Samarai (2000) working on school children in Iraq, reported that only 120 cases out of 204 clinically diagnosed tinea capitis tested positive for fungi, giving an overall prevalence rate of 2.7%. The isolation rate for dermatophytes in our study was

also relatively low, 22 positive cases out of 1,020 pupils, giving a mycologically proven prevalence rate of 2.2%. This is attributable to difficulty in sample collection and the dry nature of some lesions, which could have healed from treatment by parents of affected children. Hair scrapings for culturing could be brushed directly onto the agar plates in the classrooms. Oyeka (1990) reported a higher average prevalence of 10.2% for mycologically proven cases of tinea capitis in young children ages 4 to 18 years at Awka, Anambra State. The observation was highest, 12.0% in younger children aged 4-10 years in Awka, compared to a rate of 3.8% for those over 15 years of age. Our observations agree with these findings on the influence of age. However, this investigator isolated *Microsporum audouini* as the most prevalent etiologic agent (38.0%) whereas *Trichophyton tonsurans* was the most prevalent in this study (27.3%) although followed by *M. audouini* (18.2%). These and the other dermatophytes commonly isolated from cases of tinea capitis are definitely endemic in Nigeria (Adesotoye, 1977; Somorin *et al.* 1977; Gugnani and Njoku-Obi, 1986; Dada *et al.* 1994).

This study also confirmed the observations of other workers that prevalence of tinea capitis is influenced not only by age but also by sex with a ratio of 2:1 between boys and girls (Fathi and Al-Samarai, 2000): One of the factors responsible for the greater prevalence in male pupils is the fact that boys get hair cuts more frequently than girls and are exposed to contaminated combs and clippers used by barbers who may not wash or sterilize these items. Secondly young boys play more with pets and mingle much more than girls and are not as conscious over personal hygiene as little girls.

With the HIV/AIDS pandemic still raging on in Sub-Saharan Africa, it is of paramount importance that the Uli community especially parents, primary school teachers, barbers and workers in salons be informed and enlightened on the prevention of tinea capitis, since it could be transmitted in the same way as HIV through the use of non-sterile sharp objects. This study recommends the enforcement of regular inspection of school children by teachers for tinea capitis and early notification of their parents.

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