

## SPECIES OF FUNGI ASSOCIATED WITH SKIN DISEASES OF DIFFERENT AGE GROUPS IN PLATEAU STATE, NIGERIA

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A survey was carried out on the species of fungi associated with skin diseases of thirty subjects of different age groups in Plateau State, Nigeria. The age groups included 1-10, 11-20, 21-30, 31-40 and 41-50 years, accounting for 27%, 38%, 23%, 8% and 4% of total number of individuals with fungal infections respectively. The skin diseases involved included ringworms, dermatitis, burns, impetigo and boils. The fungal isolates included *Microsporium canis*, *M. audouinii*, *M. ferrugineum*, *Trichophyton mentagrophytes*, *T. megninii* and *Aspergillus niger*, with frequencies of occurrence in the subjects being 80%, 60%, 40%, 60%, 60% and 20% respectively. The implications of the results are discussed.

Keywords: fungi, skin disease, age groups, Plateau State

### INTRODUCTION

Cohen and Theodore (1) compare the skin as a biologic boundary between an organism and the physical environment to a psychologic mediator between a person and society, which for the emotionally stable person is an accurate register of feelings. Thus a person's attitude towards self and people's reaction to him may be greatly distorted as a result of a diseased skin. This malady is more accentuated in children and adolescents who depend largely on the love and security given them by parents.

The normal skin is known to harbour numerous non-pathogenic and potentially pathogenic bacteria and fungi, which remain harmless unless the skin is broken (2). These normal flora in different age groups, as reported by Somerville (3), include *Sarcina*, *Diphtheroids*, *Staphylococci* and *Micrococci*, and *Dermatophytes*.

Various types of skin diseases affect school children but ringworm of the scalp is the most common (4). The causative organisms are able to feed on the keratin material of the hair, either from within the hair tuft or from outside and are accordingly termed *endothrix* and *ectothrix* hair

infection. Somorin *et al* (5) reported 63 (1.8%) of 3,540 school children surveyed in Lagos in 1977 to be infected with dermatophytes of which 60.3% were males and 30.7% were females.

These organisms are present in the soil and are also known to cause ringworm in domestic animals and cattle. For example, *M. canis* has been reported to cause ringworms in dogs and cats while *T. mentagrophytes*, *T. verrucosum* and *T. equium* have been reported to cause ringworm in cattle and horses (6).

The present survey was designed to determine the species of fungi associated with skin diseases of different age groups in Plateau State and the factors that enhance their spread.

### MATERIALS AND METHOD

For the survey, 30 subjects aged 1-50 years with various skin diseases were randomly selected. The skin diseases include dermatitis, ringworms, boils, burns and impetigo. Specimens from those with ringworms were collected by skin scraping from the active growth area of lesion with the use of sharp sterile blades, and placed in normal saline. From deep wound and burns, specimens were collected with sterile cotton swabs

and placed in a test tube containing one ml transport medium (Phosphate buffer saline, pH 7.2). All samples were transported to the laboratory immediately for processing.

The samples were examined first by wet film microscopy and then plated on plain Sabouraud dextrose agar (SDA) and SDA containing chloramphenicol (0.05g/L) and cycloheximide 0.4 g/L (7). Sets of plates were incubated at 25°C and at 37°C for 7 to 28 days. Fungi colonies were subcultured to obtain pure cultures and identification was done according to Domsch *et al* (8), Samson *et al* (9) and Rippon (10).

## RESULTS

The species of fungi isolated from different skin diseases examined included *M. canis*, *M.*

**Table 1: Species of fungi isolated from different skin lesions**

Fungi isolates	Types of skin disease					Total	% occurrence
	B	Bn	R	D	IM		
<i>M. canis</i> (Bodin)	-	+	+	+	+	4	80
<i>M. ferrugatum</i> (Ota)	-	-	+	+	-	2	40
<i>M. audouinii</i> (Gruby)	-	-	+	+	+	3	60
<i>T. mentagrophytes</i> (Robin)	-	+	+	+	-	3	60
<i>T. megninii</i> (Blanchard)	-	-	+	+	+	3	60
<i>A. niger</i> (Van Tieghem)	-	-	+	-	-	1	20

R = Ringworm, B = Boil, Bn = Burns, D = Dermatitis, M = Impetigo, + = present, - = absent

**Table 2: Colonial characteristics of the fungal isolates**

Species	Colonial appearance	Microscopy of colony
<i>M. canis</i>	SDA: White, usually silk with radiating hyphae. Reverse: Deep yellow	Macroconidia: mature with one or more septa, immature appears aseptate Microconidia: Hyphae Other: Racquets seen
<i>M. ferrugineum</i>	SDA: Bright orange-yellow, heaped, may be folded. Reverse: No special feature	Macroconidia: Roundish, pear-shaped oval. Microconidia: Rough-walled, fusiform, multicellular. Other: Chlamydo spores are present and hyphae appeared distorted
<i>M. audouinii</i>	SDA: Grey, buff or pale orange, dense and sometimes grooved. Reverse: Buff, pale orange or pink.	Macroconidia: Rough walled, fusiform, multicellular. Microconidia: Roundish, oval, pear-shaped, along the hyphae. Hyphae: ramified and septated usually quite straight
<i>T. mentagrophytes</i>	SDA: Pale to buff or pink, flat falty or granular. Reverse: Buff or yellow-orange to brown	Macroconidia: Seen in some strains. Microconidia: Many Other: Often spiral hyphae and sometimes tangled hyphae.
<i>T. megninii</i>	SDA: Velvety surface, spoke-like grooves proceeding from a central button; upper side pink. Reverse: deep purple to dark violet, no diffusion of pigment into agar	Conidia: Borne in chains on the sterigma Conidiophores: Borne laterally on the hyphae, non-septate; numerous sterigma proceed from the apical cub-shaped swellings (head-shaped fructification organs) Hyphae: Septate

*ferrugineum*, *M. audouinii*, *T. mentagrophytes*, *T. megninii* and *Aspergillus niger*, with frequency of occurrence in the subjects as 80%, 40%, 60%, 60%, 60% and 20% respectively (Table 1). The general colonial characteristics of the fungal isolates are shown in Table 2. Plates 1 (a-c) shows colonies of *M. canis*, *T megninii* and *M. ferrugineum*. The frequency of occurrence of fungal lesion in the different age groups is shown in Table 3. Age group 11-20 years had the highest frequency with 38% followed by 1-10 years 27%, 21-30 years 23%, 31-40 years 8% and 40-50 years 4%. Plate 3 shows the leg of a female student with ringworm; Plate 4 shows dermatitis of the face in a student and Plate 5 shows a housewife with ringworm of the leg.

**Table 3: Frequency of occurrence of fungi isolates in skin diseases of various age groups**

Age groups (years)	No sampled	No with fungi isolated	% occurrence
1-10	9	7	27
11-20	11	10	38
21-30	6	6	23
31-40	3	2	8
41-50	1	1	4
	<b>30</b>	<b>26</b>	<b>100</b>

Plates 1 (a-c), 2, 3 and 4

## DISCUSSION

The result obtained from the survey has shown that fungal species are associated with some skin diseases in Plateau State. Of the fungal isolates, *M. canis* occur most frequently in all the lesions, followed by *M. audouinii*, *T. mentagrophytes*, *T. megninii* and *Aspergillus niger* the least. This is in conformity with the report of Fakete (11) who found 2, 230 cases out of 8,013 patients in dermatological clinic at Kaduna and Zaria to have fungal diseases due to *M. canis*, *T. megninii* and *T. mentagrophytes*. Also in a survey by Egere and Gugnani (12) in Eastern Nigeria, 351 (34.1%) of 1030 specimens of scraping, hair and nail clippings were positive for dermatophytes with *T. mentagrophytes* being the most frequently isolated fungal species 30.4%, followed by *M. canis* 22.5%, *T. rubrum* 17.1%, *Epidermophyton floccosum* and *M. audouinii* each with 6.5%.

When the percentage of occurrence of fungal isolates was compared with age, the highest frequencies of occurrence were in the 1-10 and 11-

20 year age groups with 27% and 38% respectively. These age groups include school pupils and students and infection susceptibility in these groups could stem from prevailing nutritional level, low standard of hygiene and quality of medical care available (13). These factors act inter-relatedly and although individual can do little or nothing to modify the climate to suite his condition, nutrition-wise, a lot can be done.

Previous reports have shown that about 50% of the world's populations are undernourished (14) with about 75% of these being in the developing countries, Nigeria inclusive. Although, the nutritional standards of the average Nigerian can be said to be fairly good when compared to some other African countries, it is rather very poor when compared to the developed countries. There are still certain erroneous beliefs and practices with respect to food and nutrition in certain communities in Nigeria where children are given less meat in their food for fear that they might begin to steal if given sufficient meat to eat (15).

These children grow up lacking essential nutrients needed for strong body defense to infectious agents including fungi.

The sanitary condition of the average Nigerian is also poor. A close observation of Jos, Plateau State show most drainage systems to be frequently blocked thereby leading to floods after rains. Most of the pathogenic fungi are present in the soil and are carried in drainage water which overflows in such blocked drainage system. In a study by Ogbonna and Pugh (16) on soil sample in Jos, *M. gypseum*, *T. ajelloi* and *M. canis* were isolated. Since these fungi are common in the soil and with children usually playing with flood water, this could be one source of fungal infection. The subjects within the age group 21-30 years were found to have 23% frequency of fungal infection in the study. This group comprises students of high institutions of learning and some of them are known to use medicated soap and creams thereby subjecting their skin to damage and easy colonization or infection by pathogenic bacteria or fungi.

Many families are also known to share rooms with domestic animals and pets, some of which can be potential source of dermatophytes. Direct contact with infected animals can be another source of fungal skin infection (17). Since mice and guinea pigs and other rodents are reservoir of *T. mentagrophytes*, efforts at controlling fungal skin diseases should take into consideration the elimination of these reservoirs (18). Domestic animals and pets with such fungal reservoir or infection can be treated with antifungal agent such as Griseofulvin. A suspension of natamycin applied by sponging to 83 horses with ringworm infection caused by *T. equinum* successfully eliminated the fungi within four weeks (19). Continuous and meticulous cleaning of surroundings will minimize

contamination of the environment by potentially pathogenic microbes.

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