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Patterns of Dermatophytosis in Jos North, Plateau State of Nigeria

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With 5 tables and 10 references

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ABSTRACT

Background: Cutaneous fungal infections also known as dermatophytosis involve the keratinized tissues of the body. The infection starts by the colonization of the stratum corneum of the skin by these homogenous group of keratinophilic fungi. Although the distribution of infection is worldwide, the prevalence of infection varies considerably with geographic location. The changing distribution pattern has been attributed to factors of climate, life style and prevalent immunodeficiency. The present study examined the distribution pattern of dermatophytosis among rural and urban human populations in Jos North, Plateau State, Nigeria.
Methods: The distribution pattern of dermatophytosis was studied among 1004 rural children, 1000 semi-urban children and 406 urban populations at guided random sampling in Jos North, Plateau State of Nigeria. The ages of the children ranged between 6 - 12 years while the young and older adults were from 14 - 50 years. Skin scrapings were collected from affected body areas after visual examination with the aid of sterile blades. The areas were cleaned with 70% alcohol following standard procedure. The scrapings from the edge of lesions which included hair and scales of skin were inoculated unto Sabouraud dextrose agar supplemented with antibiotics before incubation.
Results: Dermatophytosis was more common among the males than the females in both urban and rural populations. There seemed to be a correlation between the socioeconomic status of families of infected children. The rural (27.2%) and sub-urban (2%) children were significantly more infected than urban dwellers (0.7%) ($p<0.05$). Tinea capitis was the most prevalent infection in children. The organisms implicated in the infections include *Microsporum audounii* (66%), *Trichophyton mentagrophytes* (33%), *T. soudonense* (33%) and *M. ferrigineum* (10%). Among the adults tinea pedis was the most common infection followed by the groin infections (*Tinea cruris*). The organisms most frequently isolated within the adult infections include *Epidermophyton flocossum an T. soudanense.*
Conclusion: Geographical distribution of dominant species aggress with previous findings.

Key words: Dermatophytosis, *Microsporum audounii, Trichophyton mentagrophytes, Epidermophyton flocossum.*

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Introduction

The distribution of species of dermatophysis varies with different geographical locations. Some species are ubiquitous whereas others are restricted to certain parts of the world [Ajello, 1960]. Other species may be of sporadic but worldwide distribution. Dermatophytes found endemic within a particular population are carried by

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the human population to new places by immigration, social habits and rapid worldwide travel of the jet age [Kim, 2006], and this has led to the changing distribution pattern of ringworm infections. Among anthropophilic species, *Microsporum ferrigium* is found in Japan and adjacent areas [Rippon, 1974], while *Trichophyton concentricum* is found in the South Pacific areas and parts of Central and South America [Rippon, 1974]. *T. youndel* and *T. soudanense* are prevalent in Central and West Africa [Gugnani and Njoku-Obi, 1986], while *T. mentagrophytes* (var. *interdigitale*), *M. canis*, *M. nanum* and *Epidermophyton flocossum* are found worldwide [Rippon, 1974]. On the other hand, *M. audounil* is found in Europe, North America and Africa. Most zoophilic species are, however, of worldwide occurrence. Due to their proximity to humans these dermatophytes have also been isolated as human pathogens. Among the geophilic species, *M. gypseum* has been isolated from human infections [Ekanem and Gugnani, 1987]. The present study was undertaken to obtain additional information on the distribution pattern of dermatophytes in Jos North, Plateau State of Nigeria.

Materials and Methods

A total of 1000 children made up of 550 boys and 450 girls were examined in semi-urban Angwan-Rogo area of Jos Plateau State, 406 pupils comprising 207 boys and 199 girls from the University of Jos primary School (urban) and 1004 children from rural Bassa Local Government Area covering five villages namely; Buhit, Mafara, Binchi, Idira-Kisari and Igbak. Children ranged between the ages of 6 - 12 years. The sampling also included 240 adults at guided random sampling from varied socio-economic backgrounds in Jos metropolis. Out of this, 130 were males and 110 females. Skin scrapping were taken with the aid of sterile blades from the following infected areas of the body: head, shoulders, nails, feet, fold of the buttocks and groin. Such scrapings were collected into sterile folded paper packets, and later incubated an Sabouraud dextrose agar to which 0.05 mg/ml chloramphenicol and 0.5 mg/ml cycloheximide had been added in order to suppress the growth of bacterial contaminants at 37°C. The resulting dermatophyte species isolated were identified with reference to existing stock cultures. References were made to Rippon [1974], and Campbell and Stewart [1980] whenever necessary slide cultures were made. Confirmatory identifications were carried out at the Veterinary Research Institute, Vom, Plateau State., Nigeria

Statistical analysis

Data collected from each population was analyzed statistically and the analysis of variance (ANOVA) was used to test for significant differences.

Results

Results of findings show that there seems to be significant difference in the incidence of infections among children in the various villages of Bassa Local Government Area (LGA) of Plateau State (Table 1). The total infection rate among the children was 63 (27.2%). Incidence of tinea capitis was higher in the children. (Table 2). ($p>0.01$) with 19 cases of shoulder infection due to the *candida sp Pityosporum ovale*. The dermatophyte species implicated in the scalp infection include *Trichophyton soudanense, Microsporum audounii* and *T. mentagrophytes*.

Table 1. Occurrence of ringworm infections among children in Bassa LGA of Plateau State, Nigeria

Location	Total No. examined	No. infected	% infected
Buhit	161	4	2.5
Mafara	241	11	4.6
Binchi	256	30	11.7
Idira-Kisari	162	9	5.5
Igbak	184	9	4.9
Total	1004	63	27.2

In sub-urban Angwan-Rogo pupils, infection of *Tinea capitis* (2%) yielded *M. audounii* while among the University of Jos primary School pupils there was 0.7% infection rate and *M. audounii* and *M. ferrigineum* were the organisms implicated. (Tables 3 and 4).

In the guided random sampling in Jos metropolis, cultures yielded *T. mentagrophytes* (33%), *M. audounii* (33%) and *T. soudanense* (16%) from scalp infections in children, while *Epidermophyton flocossum* (16%) was recovered from lesions taken from the groin (tinea cruris), interdigital infections (tinea pedis) and others. (Table 5).

Table 2. Distribution of ringworm infection in children in Bassa LGA of Plateau State, Nigeria

Village	Total No. examined	No. infected	Number of isolates from					
			Scalp	Shoulders	Hands	Groin	Toe-web	Others
Buhit	161	4	4	0	0	0	0	0
Mafara	241	11	7	3	1	0	0	0
Binchi	256	30	11	15	4	0	0	0
Idira-Kisari	162	9	7	1	1	0	0	0
Igbak	184	9	9	0	0	0	0	0
Total	1004	63	38	19	6	0	0	0

$X^2 = 40.08$; $p = 0.01$; $40.08 > 26.22$

Table 3. Incidence of dermatophyte infection among primary school children in Jos metropolis and Angwan Rogo semi-urban area of Plateau State, Nigeria

School	Total No. sampled	Total males	Total females	Total No. infected	Male +ve	Female +ve	Organisms
Angwan Rogo Primary School	1000	550	440	20	10	10	*M. audounii*
Univ. of Jos Primary School	406	207	199	3	2	1	*M. audounii*/ *M. ferrigineum*

Table 4. Distribution of dermatophyte infection among children in Jos and environs of Plateau State, Nigeria

Location	Total sampled	Total infected	% infection
Angwan Rogo Primary School	1000	20	2.0
Univ. of Jos Primary School	406	3	0.7
Bassa LGA of Rukuba	1004	63	27.2

Table 5. Sites of dermatophyte infection among male and female primary school pupils in Jos metropolis, Plateau State, Nigeria

Sex	Sites of infection							
	Scalp	Face	Nails	Shoulders	Body	Feet	Groin	Others
Male	30	0	0	40	0	30	30	0
Female	10	0	20	20	0	10	10	20

Discussion

Scalp infection was found in this survey to have the highest frequency of occurrence amongst children. In Bassa Local Government Area the incidence seem to be higher (27.2%) as compared to (2%) in Angwan-Rogo semi-urban

and (0.7%) in University of Jos urban primary school. Similar low findings of 3.4% have been reported by Ogbonna *et al.* [1985] in Jos metropolis and 5.7% by Ekanem and Gugnani [1987] in Calabar, Cross Rivers State of Nigeria. This high rate could be attributed to the fact that Bassa is a rural area as compared to Jos and Calabar urban areas. Body interactions especially among children in rural environments is usually more. This includes rubbing of heads together while playing. There are also improved and better hygienic conditions and practices in urban areas. It is not uncommon therefore to have contaminated barbing instruments containing viable spores of dermatophytes being used on several children in barbing salons. The socioeconomic, individual personal hygiene and nutrition of the children may all play important roles in determining the occurrences and severity of the scalp infection. Other conditions such as over-crowded classrooms as was observed in the rural and semi-urban schools may also promote the spread of infections.

The isolation of *T. soudanense* from the scalp and *E. flocossum* in the groin agrees with previous findings of Egere and Gugnani [1982]. While *M. ferrigineaum* had been reported as the dominant species causing *Tinea capitis* in Northern savannah of Mali, North Africa and Zaire respectively. In Nigeria it has been reported [Gugnani and Njoku-Obi 1986] as an occasional dermatophyte causing infection in children. The etiologic agent seems to vary in different parts of Nigeria and also between rural and urban dwellers. In the Eastern parts of Nigeria, Gugnani and Njoku-Obi [1986] working in Nsukka, Anambra State isolated *M. audounii* as the dominant species, for *Tinea capitis* among school children. Similarly, Somarin *et al.* [1977] implicated the same organism as being predominant in scalp infections in Western Nigeria. In the Northern part, however, Jacyk *et al.* [1962] identified *T. shoelenii* followed by *M. audounii* in urban towns of Kaduna and Zaria. Ogbonna *et al.* [1985] have also identified *T. mentagrophytes* and *T. rubrum* from scalp infections in Jos.

The absence of the virulent scarring form of *Tinea capitis* (Favus) in this population is worthy of note. In Nigeria Jacyk *et al.* [1962] and Shrank *et al.* [1966] identified a few cases of favus among Hausa-Fulani children attending Koranic schools in Kaduna and Zaria towns of Northern Nigeria. The geographical Middle belt location of Jos North local government confers on it a Mediterranean climate condition being one of the highest elevations in Nigeria. The cultural and social habits are significantly quite distinct from their core Northern neighbours.

The World Health Organization observed the influence of race on the incidence and causation of *Tinea capitis* in Africa and showed that 40% of primary school children may be infected. [WHO, 1986]. The anthropophilic species of *T. soudanense, T. violaceum, M. audounii* and *T. tonsurans* are the endemic species [Ellis, 2008]. In European children they stated that the zoophilic *Trichophyton* species and *M. canis* are of more significance. It was also shown that twice as many males than females have *Tinea capitis* among African, Indian and Caribbean ethnic groups. This sex distribution is not particularly marked in European groups.

In conclusion, dermatophytosis is still a health problem among rural, urban and semi-urban populations in Jos and its environs. The *Anthropophilic* species of *M. audounii, T. soudananse* and *T. mentagrophytes* being the endemic species. Twice as many males were found to be infected than females. Health education should be directed at ensuring awareness and observance of hygienic practices. The search for effectiveness of local concoctions for the treatment against strains of dermatophytes prevalent in the particular area is strongly advocated for the control of dermatophytosis.

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