EPIDEMIOLOGY OF DERMATOPYTOSES AMONG CHILDREN IN AKWA IBOM STATE

ISSN: 2141 – 3290

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ABSTRACT: A study of the epidemiology of dermatophytosis (ringworm) among children in Akwa Ibom State was carried out in six Local Government Areas namely: Essien Udim, Abak, Ikot Ekpene, Uyo, Eket and Oron. A total of 2,245 children aged between 5 – 15 years were subjected to direct microscopic examination using 40% KOH and cultural diagnosis on Sabouraud Dextrose Agar. Mycological analysis of the specimens has revealed that *Micosporum canis,M. audounii, M. nanum, Trichophyton tonsurans, T. rubrum, T. schoenleinii,, T. soudanense, Epidermophyton floccosum, Candida albicans and C. tropicalis*.as the etiological agents of ringworm in Akwa Ibom State. Based on the findings of the study, Eket and Oron had the highest incidence (97%) of dermatophytosis followed by Ikot Ekpene and Essien Udim (96.2%) while Uyo and Abak had 80% prevalence rate. Children of 5-8 years old were more infected with 73.6% incidence rate. The infection regime based on geographical location was statically significant ($P<0.05$).

INTRODUCTION

Dermatophytosis is a group of superficial fungal infections affecting the keratinize layer of the skin and its appendages. The nails and hairs are the commonest sites of infection (Rippon, 1974). Based on their reservoir, dematophytes can be categorized into anthropophillic, zoophillic and geophillic sources (Rebel and Taplin, 1974). Dermatophytes are the commonest aetiologic agents of dermatophytosis, fungal infections, commonly associated with man. It causes skin infection generally referred to as ringworm or tinea, and depending on the area of the body involved (Wright and Baird, 1971).

The disease is highly contagious and clinical presentation of tinea varies with the infecting organisms and affected part of the human body. Ringworm of the scalp is commonly caused by *Microsporum canis Trichophyton mentragrophytes. Trichophyton tonsurans* and *T. verrucosum* may also be associated with ringworm of the scalp which occurs in children below the age of puberty (Sneddon and Church, 1983). Ringworm occurs primarily in pre-pubatal children over the age of 6 month (Elewski and Hay, 1996). It is highly contagious and represent a significant public health problem, particularly among school children (Fatini and Alsamatou, 2000, Omar 2000, Higgins *et al*, 2000). Ringworm infection is not a reportable disease but it calls for concerns because of its contagious nature. It can be transmitted through body contacts (person to person transmission) mainly in refugee camps, prisons, school or through inanimate objects like clothes, combs or hair dressing equipments.

Ringworm is a common dermatophytic infection that constitutes an important public health problem among children worldwide, including Nigeria (Ogbonna *et al*, 1985). The disease remains endemic in Nigeria, largely because of lack of information on its prevalence and the absence of control measures.

The present study aimed to isolate, characterize and identify the aetiological agents associated with dermatophytic infections among children in Akwa Ibom State and to determine the distribution pattern of the infections according to sex and ages of children.

MATERIALS AND METHOD

A total of 2,245 children, aged between 5 and 15 years were examined from 6 locations in Akwa Ibom State.The samples were obtained based on previous reports of cases in the under listed hospitals.

Uyo	-	General hospital Anua in Uyo L.G.A
Abak	-	Mercy Hospital in Abak L.G.A
Eket	–	Immanuel hospital in Eket L.G.A
Oron	–	Equiter General Hospital in Oron L.G.A
IkotEkpene	-	General Hospital in Ikot Ekpene L.G.A
EssienUdim	–	St Mary's Hospital UruaAkpan in Essien Udim L.G.A

Prisons, remand homes and some diagnostic centers within the selected communities were also sampled. The consent and assistance of the headmasters and parents were obtained and each child was stripped and examined closely, physically with the help of hand lens from head to foot under light to separate infected children from non-infected ones. All those with dermatophytic lesions and other superficial mycotic features were identified for sampling. The specimens were collected into sterile envelops and put in a cellophane bags labeled and transported to the laboratory, clinical scrapping were collected from patients with evidence of dermatophytosis into sterile containers.

Prior to collection all lesion were swabbed with sterile cotton wool soaked in 40% $^{v}/_{v}$ ethanol or methylated spirit the samples were collected aseptically from them and transported to the laboratory.

Direct Examination of Specimens

A portion of each clinical specimen was transferred to a clean slide. A drop of 10% potassium hydroxide (KOH) was added to the specimen and covered with a clean cover slip for 10-30 minutes to be softened and cleared for easy identification. The preparation was gently warmed over the flame; Nails and hair scrapping were similarly mounted in 40% (KOH). Microscopical examination of the slides was done using the low power (x40) objective lens to detect the presence of hyhae and arthrospores. In the case of materials from scalp and lesions, the pattern of hair infection (that is ectothrix or endothrix) was also noted.

Sabouraud Dextrose Agar (SDA) was used for the cultivation, isolation and identification of the fungi. The culture medium (SDA) was prepared according to the manufacturer's instructions and supplemented with chloramphenicol 0.05mg/ml and cycloheximidine 0.5mg/ml to inhibit bacterial and saprophytic fungal contamination. Infected specimens were deposited on the surface of SDA plates. Inoculated plates were incubated at room temperature (28± 2^{o}C) for 21 days and the developing fungal colonies were isolated, purified by repeated sub-culturing and stocked for characterization. Pure cultures of the isolates were identified based on the cultural and biochemical characteristics as described by Sutton *et al.* (1998), Larone (1995) and de-Hoog *et al.* (2000).

RESULTS

The cultural and morphological characteristics of dermatophytes isolated from children populations investigated are presented in Table 1. *Micosporum canis,M. audounii, M. nanum, Trichophyton tonsurans, T. rubrum, T. schoenleinii,, T. soudanense, Epidermophyton floccosum, Candida albicans and C. tropicalis* were identified as the common etiological agents associated with dermatophytoses among children in Akwa Ibom State. Photomicrograph of features of some of the isolate is shown in plates 1-6.

Table 1: The diagnostic features of the dermatophytic isolates

Isolate Code	colony colour	Types of hyphae	somatic Structure	A sexual Spores	Special Reproductive	Conidia head	Vesicle shape	Probable organism
RWP 1	White (young) Deep Yellow (old)	Septate hyphae	Filamentous spindle shape	Macroconidia Haploid conidia	Conidiosphores	Condidia head	Vesicel shape	*Microporum canis*
RWP 2	Glaborous White	Septate hyae	Filamentous spindle shape macro conidia	Nil	Nil	Nil	Nil	*Microporum audounii*
RWP 3	Grandular Folded Abundant	Septate branded	Filamentous Numerous microconidia arthroconidia	Stick like conidiosphores	Terminal vesicle with spine like projection			*Trichophyton tonsurans*
RWP 4	Flat wetty Creamy Colony with Blood red Pigment	septate hyphae	Filamentous Microconidia arthroconidia	Nil				*Trichophyton rubrum*
RWP 5	Brownish or whitish	Septate hyae	Filamentous Macroconidia arthroconidia	Nil Nil	Nil			*Epidermophyton sp*
RWP 6	Yellow-Orange Milky Colony	septate hyphae	Filamentous Arthroconidia	Nil	Nil	Nil		*Trichophyton soudanense*
RWP 7	Waxy Creamy White Colony	Septate hyae	Filamentous Conidia absent	Nil	Nil	Nil		*Trichophyton schoenleinii*
RWP 8	Creamy White Smooth Moist colony	Septate	Filamentous	Nil	Nil			*Candida albicans*
RWP 9	White Smooth membranous colony	Septate	Filamentous	Spindle	Nil	Nil		*M.nanum*
RWP 10	Creamy White milky colony	septate	Filamentous	Blastoconidia	Nil	Nil		*Candida tropicalis*

Table 2: Incidence of dermatophytosis in difference age group of children

Age-groups(yrs)	No. Examined	No. with clinically Suggestive lesion %	No. with Mycologically Positive (%)
5-8	763	564(74%)	562 (73.6%)
9-12	1,183	865(73%)	861 (72.7%)
13-15	299	196 (65%)	193 (64.5%)
Total	2245	1625(72%)	1616(72%)

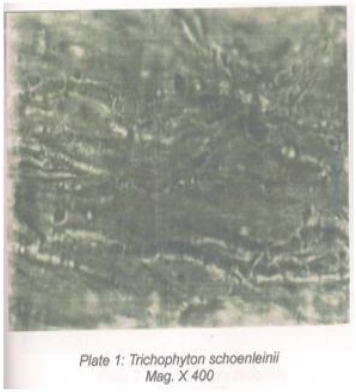
Plate 1: Trichophyton schoenleinii
Mag. X 400

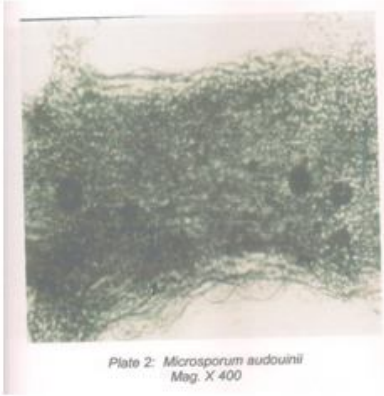
Plate 2: Microsporum audouinii
Mag. X 400

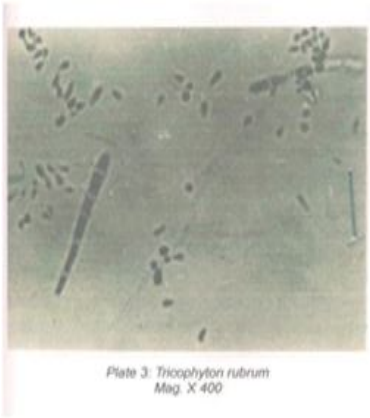
Plate 3: Tricophyton rubrum
Mag. X 400


Plate 4: Epidermophyton floccosum
Mag. X 400

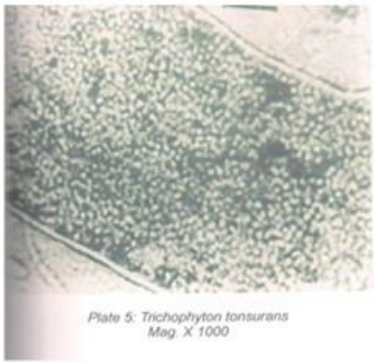
Plate 5: Trichophyton tonsurans
Mag. X 1000


Plate 6: Microsporum canis
Mag. X 400

From the examined populations, 1625 cases (72.4%) exhibited clinically suggestive lesions and 1616 cases (71.98%) were found with mycologically positive lesion. The distribution of dermatophytoses among the different age groups of children is presented in Table 2. The occurrence of dermatophytes was relatively high (73. 6%) in children between the ages of 5 and 8 years. This was followed by those within the age range of 9-12 years, with 72.7% incidence rate. The least was within the age range of 13-15 years with 64.5% prevalence rate.

The difference in the incidence of dermatophytosis between children of age group 5-8 years (73.6%) and 9-12 years (72.7%) was statistically significant ($P<0.05$) in infection regime.

The results presented in Table 3 revealed variations in the incidence of dermatophytosis between study localities. Eket and Oron Local Government Areas had the highest incidence rate of 97%. This was closely followed by Ikot Ekpene and Essien Udim with 96.2% incidence rate while the least affected localities were Uyo and Abak with 80% incidence rate.

Table 3: Incidence of dermatophytosis in children according to study location

Locality	No. Examined	No. with Clinically Suggestive Lesion%	No. with mycologically positive Lesion%
Uyo & Abak	623	605(97%)	601 (80%)
Eket & Oron	760	751(98.8%)	758 (97%)
Ikot Ekpene & Essien Udim	862	841 (97.6%)	830(96.2%)
Total 2245	2197(97%)	2089(92%)	

Table 4 revealed slight variation in the incidence of etiological agents of dermatophytosis with the age and sex of children. Most of etiological agents were encountered in children between 9

and 12 years old and *Trichophyton tonsurans, T. rubrum, T. schoenleinii,, T. soudanense* were common in both sexes. On the other hand, *Candida albicans, C. tropicalis* and *Microsporum manum* were more commonly associated with female children. On the body sites most infected, the head or scalp was the most affected with 67.9% positive rate (Table 5)

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Table 4: Distribution of dermatophytic fungi cccording to age and sex of children

Species of Dermatophyte	Total No. of those Infected	No. According to Age Group			No. According to sex	
	1616	5-8	9-12	13-15	Male	Female
Microsporum canis	48(3%)	13	19	16	17(35.4%)	31(64.5%)
Microsporum audouinii	113(7%)	31	32	40	52(46%)	61(53.9%)
Trichophyton tonsurans	210(13%	58	133	19	103(49%)	107(50%)
Trichophyton rubrum	162(10%)	43	101	18	70(43.2%)	92(57.5%)
Epidermophyton floccosum	81(5%)	5	46	30	39(48.1%)	42(5.9%)
Trichophyton schoenleinii	178(11%)	19	101	58	85(47.8%)	93(52.2%)
Trichophyton soudanense	517(32%)	147	362	8	149(28.8)	368(71.2%)
Candida albicans	65(4%)	13	34	18	27(41.5%)	38(58.5%)
Microsporum nanum	129(8%)	22	71	36	32(24.8%)	97(75.2%)
Candida tropicalis	113(7%)	27	58	28	40(35.4%)	73(64.6)

Table 5: Species-specific distribution according to body sites in children

Species	No. infected	Site of Lesion H/S	F	B/T	E	LH
1. *Microsporum canis*	48	30	8	3	5	2
2. *Microsporum audouinii*	113	71	5	27	-	10
3. *Trichophyton tonsurans*	210	114	15	54	7	20
4. *Trichophyton rubrum*	162	97	48	16	-	1
5. *Epidermophyton floccosum*	81	63	2	13	1	2
6. *Trichophyton schoenleinii*	178	188	-	7	-	53
7. *Trichophyton soudanense*	517	390	37	17	-	53
8. *Candida albicans*	65	47	5	11	2	-
9. *M. nanum*	129	89	1	31	7	1
10. *Candida tropicalis*	113	78	1	20	14	-
TOTAL	1616	1097	122	199	68	130
	%	67.9	7.6	12.3	4.2	8

Footnote: H/S = Head or scalp; F = Face, B/T = Body or trunk, E = ear, LH = Limbs

DISCUSSION

The present study has shown that dermatophytoss constitutes a serious public health problem in tropical countries like Nigeria where the warm humid climate, overcrowded living and poor sanitary condition promote the spread (Ogbonna *et al,* 1985). Previous studies have revealed that the incidence of dermatophytosis in children with mycologically, positive cases are usually higher (Okoro, 1973and Itah, 1999). The result of the present study have confirmed this and values have shown that the incidence of dermatophytosis in children with mycologically positive cases was high (92%). Rippon, (1994) reported that high incidence of dermatophytes in children may be attributed to the low levels of fungistatic fatty acids in them. In another study Soyinka, (1978) attributes the high incidence of ringworm among children due to use of unsterilized barbing instruments and exposure during play. The results have also revealed high incidence (96. 2%) of dermatophytosis in Essien Udim and Ikot Ekpene. This agrees with the

work of Shrank and Harman (1986) which reported that ringworms are more prevalent villages than urban cities.

Based on the body sites infected, tinea capitis (ring worm of the head or scalp) was the most prevalent (67.9%) followed by tinea corporis (12.3%). The results are also in agreement with the findings of Gugnani *et al*, (1985) that Tinea capitis is the most common dermatophytosis amongst school children. Female children exhibited higher susceptibility to infection, although variation in occurrence etiological agents between sex and age of was not definitive. Most of etiological agents were encountered in children between 9 and 12 years old and *Trichophyton tonsurans, T. rubrum, T. schoenleinii,, T. soudanense* were common in both sexes. On the other hand, *Candida albicans, C. tropicalis* and *Microsporum manum* were more commonly associated with female children.

CONCLUSION AND RECOMMENDATION

The present work has revealed the existence of dermatophytosis among children in six Akwa Ibom State localities. From the data analyzed, it is obvious that there is a high incidence of dermatophytosis among both male and female children in Akwa Ibom State. The degree of infection in children between the ages of 5-8 years with 73.6% incidence rate is alarming and calls for intense health education on personal hygiene in primary and secondary schools in Akwa Ibom State.

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