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ISSN: 2348-1927

RESEARCH ARTICLE

Annals of Biological Sciences
2014, 2 (2):5-9

Prevalence of superficial mycoses among pupils in rural areas of Zamfara State

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ABSTRACT

A study was conducted to investigate the prevalence of superficial mycotic infections among the primary school children in Maru emirate, Zamfara State, Nigeria. Out of 3251 pupils examined, 356 were implicated with clinical skin, hair and nail infections. Dermatophytic fungi observed to be associated with the infections were of the genera Trichophyton and Microsporum. Further identification in lieu to occurrence showed that, Trichophytonment agrophytes dominated (33.3%), followed by Trichophytongallinea (15.2%), while Microsporumdistortum was the least encountered dermatophytic fungus (2.0%). The pupils of the age range 13 — 15 years had the highest prevalence rate compared to other age groups most especially 4 — 7 years. With respect to gender, the females had high (22.1%) significant (p<O.05) prevalence rate than the males (9.7%). This study therefore, revealed existence of mycotic infection among the population at risk. Thus, adequate medical attention coupled with quality health education should be given priority among the pupils in these areas.

Keywords: Mycotic infections, dermatophytic fungi, *Trichophyton, Microsporum, gender*

INTRODUCTION

Superficial fungal infection affects skin, hair and nails and on the skin and scalp, the lesions are often roughly circular with a raised border, but may coalesce to form confluent areas of dry, scaling skin, itching and scratching, which in severe cases may ulcerate Many epidemiological studies have investigated the prevalence of etiological agents of superficial mycoses in different part of the Nigeria [1, 4] coupled with the fact that, host susceptibility may be enhanced by moisture, warmth, specific skin chemistry, composition of serbum and perspiration, age, heavy exposure and genetic predisposition [2]. The incidence is higher in hot humid climates and crowded living conditions, with the understanding that dermatophytosis is highly contagious and represents a significant public health problem in Nigeria and Africa at large, particularly among school children [3].

The prevalence of superficialmycoses in primary school children in Anyigba, Kogi State, Nigeria, was also reported by [4]ofwhich 6.6% hadlesions suggestive of superficial mycoses. Remain endemic in Nigeria, largely dueto lack of information on its prevalence and absence of control measures [5].Although a number of studies on the prevalence and etiological aspects of superficial mycoses have been carried out in different parts of Nigeria Zamfara State did not form part of these studies. Therefore, this study investigated theprevalence of superficial mycoses among primary school pupils in Maru emirate, Zamfara State, Nigeria.

MATERIALS AND METHODS

Study area, Population and Sample collection: Maru local government area of Zamfara State is situated between longitude 6°24'E and latitude 12°20'N. The inhabitants are mostly engaged in agriculture, animal husbandry and trading. Health facilities in the study areas are mainly primary health care centers / dispensaries. All schools used for this study were public schools with crowded classrooms and inadequate facilities. By simple random sampling, five primary schools were selected in Maru emirate. With all public health precautions and protocols observed, the sites of the infection were first cleaned with 70% v/v ethanol and light scrapping of skin scales, crusts, hair pieces and nails samples were collected from the active age lesions. A total of 356 infected skins, hair and nails were collected from infected pupils with clinical manifestation of dermatophytosis. All the samples were labeled appropriately, coded and transported to mycology laboratory, UsmanuDanfodiyo UniversitySokoto

Isolation and identification of mycotic agents:
Sabouraud Dextrose Agar (SDA) was prepared and used in accordance with manufacturer's instructions and specifications. The collected samples were cultured and incubated at 28±2°C. After 3 weeks, the plates were observed for colony growth and the colony types were noted and recorded[8]. A fresh SDA agar plates were then prepared and used to subculture so as to obtain pure cultures. Microscopic identification was carried out and some of the characteristics used for the identification of the pure cultured isolated fungi include, the appearance of the micro and macro-conidia; smooth orrough, the shape and their arrangement on the hyphae, in pairs or in clusters, septate or nonseptate hyphae, colour of mycelia, size, and type of spore and appearance of the sporangiophores.

Data analysis: Statistical comparison using chi-square test ($p>0.05$) was used to determine the significant differences on the prevalence of the superficial mycotic infections among the pupils with respect to their sex, age and educational status of their parents.

RESULTS

Prevalence of fungal isolates associated with superficial mycoses: The prevalence and distribution of the disease varied among the schools (Table 1); of which out of 3251 (100%) pupils examined, 356 (10.1%) were implicated with the suggestive superficial mycoses, with males having 80.1% and females 19.9%. The result of the Chi-square statistics showed that sex (X2 = 11.61) and educational status of the parent of infected pupils (X2 = 48.46) had significant relationship (p<O.O5) with the prevalence of clinically superficial mycoses among the infected pupils (Table 2). *Trichophyton and Microsporurn were the most isolated genera which included Trichophytonmentagrophytes, Trichophytongallinae, Trichophytonmegninii, Trichophytonverrucosum, Trichophytonsoudanense, Trichophytonviolaceum, Microsporumcanis, Microsporumgypseum* and *Microsporumdistortum. T. mentagrophytes* had the highest (33%) percentage frequency of occurrence (Table 3), while M distortum had the lowest (2%). Further observation showed that, T mentagrophytes had the highest prevalence in both male and female, while other *Trichophyton*and *Microsporum*varied (Table 3).

Table 1: Prevalence of clinically suggestive superficial mycoses with respect to schools and sex of infected pupils

	Sex		
Schools	**Male**	**Female**	**Suggestive Mycoses**
Dade Model Primary School	48	8	56
Kanoma Model Primary School	86	25	111
RuwanDorawa Model Primary School	66	7	73
Mayanchi Model Primary school	47	21	68
Bing Model Primary School	38	10	48

Chi-square = 11.61, df= 1, P< 0.05. Chi-square (x^2_{cal})= 11.61, from the critical table x^2_{cal}at 5% (0.05) with df= 1 is 3.84. Sex has significance relationship (P< 0.05) on the prevalence of clinically suggestive superficial mycoses among infected pupils.

Table 2: Prevalence of clinically suggestive superficial mycoses with respect to schools and educational status of parent of infected pupils

		Educational Status		
Schools	Number of Educated	Primary	Secondary	Post-Secondary
Dade Model Primary School	17	10	19	10
Kanoma Model Primary School	42	40	27	2
RuwanDorawa Model Primary School	33	30	8	2
Mayanchi Model Primary school	20	30	16	2
Bing Model Primary School	20	22	6	0

Chi-square = 48.46, df = 3, P<0.05

Table 3: distribution of various etiological agents with respect to sex

	Sex		
Etiological agent	Male	Female	Total
T. mentagrophytes	29	4	33
T. gallinae	13	2	15
T. megninii	10	1	11
T. verrucosum	9	2	11
T. soudanense	8	2	10
T. violaceum	8	1	9
M. canis	5	0	5
M. gypseum	2	1	3
M. distorium	2	0	2

Chi-squre = 3.01, df= 1, P<0.05

Table 4: Distribution of various etiological agents with respect to Age (Years)

	Age (Years)			
Etiological agent	4-7	8-10	11-15	>15
T. mentagrophytes	6	16	10	1
T. gallinae	3	7	4	1
T. megninii	5	5	1	0
T. verrucosum	5	4	2	0
T. soudanense	4	3	3	0
T. violaceum	3	5	1	0
M. canis	1	3	1	0
M. gypseum	1	1	1	0
M. distorium	1	0	1	0

Chi-square = 12.97, df= 3, P<0.05

Table 5: Distribution of various etiological agents with respect to site of lesions

	Site of Lesions		
Etiological agent	Scalp	Skin	Nail
T. mentagrophytes	32	1	0
T. gallinae	10	5	0
T. megninii	11	0	0
T. verrucosum	9	2	0
T. soudanense	10	0	0
T. violaceum	7	2	0
M. canis	5	0	0
M. gypseum	2	1	0
M. distorium	2	0	0

Chi-square = 16.36, df= 3, P<0.05

Table 6: The prevalence of superficial mycoses in pupils with respect to risk factors

Gender	**Totalnumber examined**	**Number positive**	**Prevalence (%)**
Male	2930	285	9.7
Female	321	71	22.1
Age group			
4 – 7	1127	106	9.4
8 – 10	1282	129	10.1
11 – 15	833	113	13.6
>15	09	3	33.3

Distribution of the various etiological agents and risk factors: Out of the identified isolates, T *mentagrophytes* was the most frequently encountered having 33.3%, frequency of occurrence followed by T. *gallinae (15.2%), T megninil (11.1%), T verrucosum(11.1%), and T. soudanense (10.1%), while M distortum* was recorded as the lowest (2.0%). Further observation revealed that T. mentagrophytes was the most prominent across the age groups, compared to T gal/mae that was more prevalence between age group 8 — 10 and 11 — 15, while T *megninii dominated age group 4 — 7 and 8 — 10. The presence of M canis, M gypseum and M distortum* were relatively low across the age groups (Table 4). It could be deduced that, the scalp accommodated different species of *Trichophyton and Microsporum*, followed by the skin, while no single species of either *Trichophyton* and*Microsporum* was isolated from the nail (Table 5). The Chi-square statistics (Table 4 and 5) revealed that the distribution of etiological agents was not significantly ($p<0.05$) related to sex (X2 3.01) but was significantly ($p<0.05$) related to age (X2 = 12.97) and site of lesion (X2 = 16.36). The prevalence rate in females was found to be higher (22.1%) compared to males (9.7%), indicating that females are more prone to superficial mvcoses than males (Table 6).

DISCUSSION

Out of the five randomly selected primary schools in Maru emirate in Zamfara State, Nigeria, 10.1% were found to have clinical manifestation of skin, hair and nails infection, of which 3.32% are infected by some species of superficial *dermatophytes*. This corroborated with the report of [4] that *dermatophytosis* constitutes an important public health problem among children worldwide, including Nigeria. Out of the *dermatophytes* isolated, T. *mentagrophytes* was the most prevalence (3 3.3%). It occurs mainly in *prepubatal* children and it is of great publichealth importance, thus, it could be suggested that *T. mentagrophytes* could be the significant cause of superficial mycoses in these areas. Similarly, T. *gallinae* and T *soudanense* recovered from the children in the studied schools have been reported to be endemic in Kebbi State [8]. The occurrence of T *megninlii* and T. *verrucossum* in our study could be as a result of direct interaction of children with soil and possibly through direct contact with barber's instrument which has been implicated in the report of [8] to aid the spread of *mycotic* infections. *Microsporum*canis and *Mdistortum* with a prevalence of 5.1% and 2% respectively have been reported to be Zoophilic [1, 9], probably as a result of interaction with animals, since people in the area share their residential houses with domestic animals.

In our study, we observed that, the percentage of occurrence of mycotic infections is higher than the figure recorded in some parts of Nigeria, like in Kogi State (66%) [4], but lower in Ebonyi State [1] and lle-Ife [9], thus, these differences in variation may be associated with hygienic level and health education promoting status of the studied population. The exposure of females and males to mycotic infections is relatively significant as both genders naturally play with soil and animals in these areas.

The superficial mycoses was more in children whose parents had primary (68.3%, n= 356) education compared with other educational status emphasized in this study. This is an indication that, the parent educational status has significant relationship with the age and sex of the pupils. The prevalence of scalp lesions *(Tineacapitis*) is much higher compared to other site of superficial mycoses in the study population. The barbers instruments may play a role in the spread of these infections in males, while that of femles could be related to poor hygiene coupledwith lack of good learning environment. Also, personal uncleanliness may as well be contributing factors to the high frequency and ringworm infection in Zamfara state. This calls for good environment, intensive health education for the primary school children. The present work has revealed the existence of mycotic infection among the population at risk. The school children, teachers and parents are now aware of the existence of the disease in the study areas. Therefore, combined efforts of the school children, teachers, parents, local, state and federal government in the promotion of health in schools, personal and community hygienic practices, and provisions of infrastructures both in schools and residential areas would provide an environment free from *mycotic* infections.

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