Dermatological Disordersamongst Primary School Children In Riyom Community, North-Central Nigeria

Onwuliri, E.A *[1], Ndako, J.A.,[2]Dahunsi, S.O.,[2]Aderibigbe, A.[3]Awakan, J.O[2], Fajobi,V.O[4],Ohiobo,A.E[2]

[1] Department of Pharmaceutics and Pharmaceutical Technology, University of Jos, Nigeria

[2]Department of Biological Sciences, Microbiology Unit, Landmark University Omu aran,-Nigeria

[3]Department of Medical Microbiology, Fed.College of Medical Lab.Science and Tech.Vom-Nigeria

[4]Department of Health Services, Landmark University Omu aran,-Nigeria

ABSTRACT

Dermatologic disorders are common and a significant burden of skin diseases in school children. The aim of this study is to determine the prevalence and possible socio-demographic risk factors involved in common transmissible skin disorders (TSD) among Primary school children in Riyom community. A total 150 samples from pupils of seven (7) primary schools within the community comprising 80 (53.3%) males and 70(46.7%) females were randomly selected for the study. Dermatological diagnosis was made mainly by Laboratory investigations**.** Samples obtained from volunteer subjects were cultured into aSabouraud Dextrose Agar (SDA) incorporated with Chloraphenicol and Streptomycin. Each were Inoculated and incubated at 37°C, while growth was monitored daily. The result obtained showed infection to be common among the males than the females and found to be frequent among the children between ages of 3and 8 years.Species of dermatophytes isolated from the various forms of the infection, includes Trichophyton species found in57(38%)has the highest number of fungal isolates,this is followed closely by the Aspergillus species in 40(26.7%) among the samples screened,while the Microsporum speciewere found in34 (22.6) pupils. Other opportunistic mycosis isolated includes Aspergillus species, candida species, mucor species and penicllum species. Species associated with Aspergillusin this work include Aspergillusfumigatus(13.3%), Aspergillus Niger (10%) and Aspergillusflavus has(40%). In candida, candida albcanis has 3.3% candida spp has 2.0%, mucors species has 6.0% and penicillum species has 1.3%.The prevalence rate of dermatological disorders reflects hygienic conditions and socio- economic status.Ringworm therefore is not a reportable disease but is a cause for concern because of its contagious nature.

Keywords: Dermatological disorder, Primary school, North –central Nigeria.

INTRODUCTION

Skin infections are very common in children worldwide and between 49 - 80.4% of African school children are affected [(1).]In Nigeria, the prevalence rate is about 40.4% among pupils in primary schools [(2)]. Two separate surveys in Ile-Ife and Ibadan, both in Nigeria, have shown that, Tinea and Scabies are the most common skin diseases among young children, constituting 15 - 17 and 16% respectively [(3 ,4)]. Ringworm is a skin infection caused by fungus that affects the scalp, skin, finger, toe, nails, or feet. [(5)].Children are particularly susceptible to ringworm and can pass it on easily to other children. Adults can also be infected; e.g. farmers and people who work with animals that have fur are at risk [(6)].Some fungi live only in human skin, hair or nails while other live on animals and only sometimes are found on human skin, still others live in the soil. lt is often difficult or impossible to identify the source of a

particular fungal infection. Heat and moisture helps fungi to grow and thrive, which makes them more commonly found in skin folds such as those which grow between the toes. It is as a result of this, that they are mostly acquired from showers locker rooms and swimming pools [7].

Fungi that grow on the skin are called dermatophytes. In man dermatophhytescauses dermatomycoses [8]. These dermatophytesare Keratinophilic fungi and utilization of keratin as their sole source of nitrogen is the basis of their roles in nature and disease [9]. In relation with the study carried out, the skin is a favored location of the development of fungal parasites, most of which requires aerobic environment, tolerate dry conditions and have limited nutritional requirements that they can satisfy by utilizing keratin and other available materials [10].Justifying why dermatophytes grow only within keratin layers Kennth (11) asserts that there are serum fungi inhibitory factors that enters the extra vascular space and protects living tissue against deep penetration of fungal elements[12].

When the skin is infected the fungi spreads in the dead keratinized layer inform of branching hyphae with occasional arthrospores, the inflammatory reaction from living tissue below may be very mild and only a little dry scaling or hyperkeratosis is seen. More commonly there is irritation; erythema, oedema and some vesiculation especially at the spreading edge and this irregular pink periphery give rise to the name Ring worm. Animal strain of dermatophyte, secondary infection or vigorous treatment may give rise to an exaggerated reaction with weeping vesicles, pustules and ulceration. Clinically characteristic appearances may be associated with particular species e.gTinealimbricata with Tineaconcentrium. The species that commonly attack the skin are Trichphytonspp, Epidermophyton. floccosum (groin and feet) and Microsporumcanis [13]

The gross appearance of the lesion is that of an outer ring of an active progressing infection with central healing with the ring [14]. Superficial mycoses have historically been called Ringworm because the classical lesions of tinea tend to assume a circular form [15]. Gugnani [16] stated that throughout the world, a good number of people are affected by fungi that invade and destroy our skin, hair and that the situation is more alarming in tropical countries like Nigeria, as warm and humid climate crowded living and poor sanitary conditions promote the spread of such infections, therefore mycoses has not yet be given rightful place in Nigeria. The aim of this study was to ascertain the incidence, prevalence, causative organisms, and source of infection as well as probable methods of transmission of the infection among the primary school children in Riyom community.

MATERIAL AND METHOD

Study area

Riyom Community at Riyom Local Government area of Plateau State was selected for the study.

Study population

Seven (7) primary schools within the community wereenrolled for the study.

Sample size

A total of 150 samples from pupils with lesions suggestive of tinea sp.in our study locations were collected to the laboratory for identification and analysis.

Ethical clearance/Consent

Ethical clearance was obtained from relevant authorities after due consent from the parents of volunteer subjects. The pupils were also given proper enlightenment on the disease, while each pupil's head scalp, hands, legs and other parts of the skin were thoroughly examined for evidence of scaling, crusting, follicular inflammation and possible hair loss and erythematous, scaly plaque that rapidly worsen. In each clinically diagnosed case a detailed history was recorded. Information was noted on the disease duration, socioeconomic status and the level of crowding at home. Data confidentiality and subject's privacy were maintained throughout the study.

SAMPLE COLLECTION

Sample Collection and Methods: In all suspected cases of T. capitisand T. corporis, the diseased areas of the skin or head were thoroughly cleaned with alcohol and hairs and scales were collected for mycological examination using the most appropriate technique used by Fatiniet al (17).The scrapings were handled separately and no individual scraping was allowed to mix up with the other. The scrapings and the pieces of hair were plated out separately on sabourand agar. Media with antibacterial antibiotics greatly facilitate the isolation of fungi from non-sterile specimens. The resultant culture plates were incubated at 27°C for 4 weeks and then examined for the presence of dermatophytes. Subculture was made on SDA for further identification after the growth of the dermatophytes was established. Both net and slide culture techniques were carried out as described by Omar (18). Extreme care was taken by wearing of hand gloves so as to prevent direct contact with the specimens.

Sample transportation

The samples collected were sealed in an envelope and was further transferred into a black cellophane bag and transported to the mycology laboratory for investigation.

Medium

Sabrouraud Dextrose Agar (SDA) containing 0.5mg/ml of chloramphenicol and 40µg/ml of streptomycin to inhibit the growth of bacteria (19) was used as the culture medium.

Direct microscopic examination (Wet-preparation)

The skin scrapings were placed in 2 drops of 10% on a KOH a clean glass slide, and teased using a sterile razor blade. The slide was warm gently over the flame of a Bunsen burner, in order to soften and clear the epithelium. A cover slip was applied and the glass slide was gently warmed again, to clear the specimen, making it transparent. It was allowed to stand for 15-20 minutes before examination. The preparation was examined microscopically with x10 and x40 objective with the condenser iris diaphragm sufficiently closed to give good contrast and observed for branching hyphae and chains of arthrospores.

Inoculation

The scrapings were inoculated on SDA containing antibiotics(chloraphenicol and streptomycin). Each sample was inoculated and incubated at room temperature for four weeks which was examined daily for fungal growth. The plates were sealed with masking tape to avoid dehydration and minimize contamination. Identification was done based on the rate of growth or growth characteristic and morphology of the fungi.

Macroscopy

The rate of growth, colonial morphology, colour and presence of pigmentation in the medium were recorded. Other features observed include surface texture (Raised, folded, flat cotton, velvety) and colour on the surface and reverse of the plate.

Microscopy (Lactophenol cotton Blue)

A drop of lacto phenol cotton blue was placed on a clean grease free slide which was added a fragment of the culture was placed on a clean grease free slide. A fragment of the culture was gently teased in the reagent with needles. When it was satisfactory spread, a cover slip was applied, pressed gently and avoiding air bubbles. Any excess stain around the cover slip was removed with the edge of a piece of blotting paper. The stain was allowed to penetrate for 5 minutes. The preparation was examined with x 10 and x 40 objectives. Microconidia, macroconidia, chlamydospores and hypae appearing as spiral pectinate or reflexive were sought for and features seen were compared with atlas.

Grams staining

All creamy to white tan pasty colours with characteristic mucoid were stained by Gram's method and examined microscopically under x 100 objective. Observation of Gram positive oval elongated or broad shaped budding cells with or without pseudohyphae were considered as yeast – like organism.

Germ tube test

A single colony was tightly touched with sterile with wire loop. Excess inoculation was removed and the yeast cells were emulsified in 0.5ml of serum in a small test tube with a loose cotton wool plug. The tubes were incubated at 37°C for 3minutes to 3hrs. A drop of each serum – yeast culture was transferred to a clean grease free slide using a Pasteur pipette and covered with a cover slip; the preparation was examined with x 10 and x 40 objective. A known candida albican was used as positive controls were inoculated and they had tube – like out growths examination. The preparation was examined microscopically with x10 and x40 objectives with the condenser Iris diaphragm closed sufficiently to give good contrast. Branding hyphae and chains of arthropores were seen.

Biochemical techniques

Fermentation test

Alcohol fermentation is a process by which a carbohydrate is fermented by yeast to produce ethanol and carbon dioxide by production of gas (20).Yeast suspension was made in a sterile normal saline, and 0.2ml of the suspension was added to each carbohydrate medium to be tested (Dextrose, Lactose, Maltose, Sucrose and Galactose). It was incubated at 37^{o}c for 48 hours and was observed for acid and gas production (20).

RESULT

150 pupils consisting of 80 males and 70 females had superficial skin infections that were suspected to be Tineacorporis. Table I below gives the type of dermatophytes isolated from the skin scrapping collected aseptically in which trichophyton species had the highest number, 58(38%) of species, however, the least in number was penicillium species. 2 (1.3%)

Table 2 below show the age group and sex distribution of isolates, in which the male are more infected than female and the highest occurrence of infection decrease with increase in age where the least occurrence of infection is between the ages of 11-12.

Table 3 below gives the sex prevalence of each species isolated which has male to be the highest occurrence of the infection with T.violaceum 8 (5.2) having the highest occurrence and penicillium species 2 (1.5) been the least. The female however have a reduced occurrence with T.violaceum, Aspergillusfumigatus, Aspergillus Niger and microsporumferrugineumhaving the same frequency.

Table 4 give the frequency of dermatophytes isolated from Tineacorporis, Trichophyton species has the highest frequency with other dermatophytes has the lowest frequency.

Table 1:THE TYPES OF DERMATOPHYTES ISOLATED

Species	Number	Percentage (%)
Trichophyton species	57	38
Aspergillus species	40	26.7
Microsporum species	34	22.6
Mucorspp	9	6
Candida spp	8	5.2
Penilliumspp	2	1.3
Overall Total	**150**	**100**

Table 2 AGE GROUP AND SEX DISTIBUTION OF ISOLATES

Age group(years)	Male No	(%)	Female No	(%)
3-4	30	(11.3)	24	(16)
5-6	16	(16)	17	(11.3)
7-8	15	(6.7)	11	(7.3)
9-10	10	(4.7)	10	(6.7)
1-12	9	(7.3)	7	(4.6)
Total	**80**	**(53.3)**	**70**	**(46.7)**

Table 3 SEX PREVALENCE OF EACH SPECIES ISOLATED

TRICHOPHYTES	MALE	100(%)	FEMALE	(%)
T.violaceum	10	(6.7)	5	(3.3)
T.verrucosum	8	(5.3)	7	(4.7)
T.rubrum	5	(3.3)	5	(3.3)
T.tonsurans	5	(3.3)	2	(1.3)

T.mentagrophyte	3	(2)	2	(1.3)
T. schoenleinii	3	(2)	2	(1.3)
ASPERGILLUS SPECIES				
A.Flavus	12	(8)	8	(5.3)
A.niger	8	(5.3)	7	(4.7)
A.fumigatus	5	(2)	2	(1.3)
MICROSPORUM SPECIES				
M.ferrugineum5	(3.3)	10	(6.7)	
M.audouinii	3	(2)	6	(4)
M.gypeseum	2	(1.3)	4	(2.7)
M.canis	2	(1.3)	2	(1.3)
OTHER DERMATOPHYTES				
Candida species	6	(4)	2	(1.3)
Mucos species	4	(2.7)	5	(3.3)
Penicillium1	(0.7)	1	(0.7)	
OVER ALL TOTAL	**80**	**(53.3)**	**70**	**(46.6)**

Table 4 FREQUENT OF DERMATOPHYTES ISOLATES FROM TINEA CORPORIS

SPECIES	**Number**	**Percentage(%)**
TRICHOPHYTON SPECIES		
T.Mentagrophytes5	(3.3)	
T.rubrum10	(6.7)	
T.verrucosum15	(10.0)	
T.schoenleinii5	(3.3)	
T.tonsurans7	(4.7)	
T.violaceum15	(10.0)	
Total	**57**	**(38)**
ASPERGILLUS		
A.flavus20	(13.3)	
A.niqer15	(10.0)	
A.fumigatus5	(4.0)	
Total	**40**	**(26.7)**
MICROSPORUM SEPCIES		
M.ferrugineum9	(6)	
M.audouinii5	(3.2)	
M.canis2	(1.3)	
M.gypseum3	(2.0)	
Total	**24**	**(22.6)**
OTHER DERMATOPHYTES		
Mucorspp 9	(6)	
Candida albicans 5	(3.2)	
Penicillumspp 2	(1.3)	
Candida spp3	(2.0)	
Total	19	(12.5)
OVERALL TOTAL	**150**	**(100)**

The reported prevalence rate of Dermatomycosesin this study is higher than rates previously reported;these variations may be attributed to social, socio- economic and geographical variationswhich must have played a role in the spread of infection within our location of study. Out of the one hundred and fifty(150) samples studied, Tricophyton species were isolated in 57 (38%) of the volunteerswhileMicrosporum species recorded 34 (22.6%).This in agreement with the work done in Northern Ebonyi State of Nigeria where the existence of ringworm (Tineacapitis and Tineacorporis) among the population studied were at riskfrom infected pupils(21).It was however observed during our sample collection thatmost pupils with clinical signs were dirty, which alsoindicates an evidence of poor hygiene which might facilitate the growth of various forms of dermatophytes on the skin,Almeida(15).

Pupils of the same parent were observed to have the highest frequency, according to the pupils, most of them shares common facilities like clothes, towels, bed space, bathroom, combs.Furthermore, previous infection number of siblings greater than 4 and sharing of towels at home being significantly associated with skin disorders among the school children shows the importance of personal hygiene, and adequate care in the acquisition and development of skin disorders. This has been reported by several community based studies by Williams et al., (22).Interventions such as health education during the teacher's interactive forum with parents would to a greater extent enhance good personal hygiene amongst children.

Our study demonstrated, also, that the disease was prevalent among males only. This result is an agreement with other studies conducted in Nigeria.In this study, males were more often infected which is in agreement with the work carried out by Macura (23). This could be attributed to the fact that males are frequently exposed to dirts; mutual rough handling in outdoor games and coming in contact with live stocks animals expose them to extraneous source of infection. On the other hand, female are more restricted to exposure.

In this study the disease was restricted to those 3–9 years of age; this finding is in agreement with many studies which reported that the majority of cases occur in younger children less than 10 years of age Figueroa etal (24). This has been mainly attributed to the sensitivity of dermatophytes to certain sebaceous gland secretions that first appear at puberty.

This study revealed that the disease was strictly present among children in rural areas, living in overcrowding conditions and among parents of low educational status. This calls for a well enlightenment program particularly among the rural populace.

CONCLUSION

Poor hygiene was one of the observed factors contributing to the high prevalent rate recorded, it therefore becomes very important that parents, and school authorities educate and supervise that pupils observe personal hygiene before and after school. Parents are also encouragedto report inflammation of skin any child early enough for quick medical intervention.

REFERNCES

1. Dagnew MB, Erwin G (1991). Epidemiology of common transmissible skin diseases among primary school children in North-West Ethiopia.Trop. Geogr. Med. 43: 152-155.
2. Oyedeji OA, Okeniyi JAO, Ogunlesi TA, Onayemi O, Oyedeji GA, Oyelami OA (2006).Parental factors influencing the prevalence of skin infections and infestations among Nigerian primary school pupils. ISSN: 1531-3018 Internet J. Dermatol. 3: 2.

3. Odueko OM, Onayemi O, Oyedeji GA (2001). A Prevalence survey of skin diseases in Nigerian Children. Nig. J. Med. 2: 64-67.
4. Ogunbiyi AO, Owoaje E, Ndahi A (2005). Prevalence of skin disordersin school children in Ibadan, Nigeria. PaediatricDermatol. 22(1): 6-10.
5. Foster KW, Ghannoum MA, Elewski BE. (2009) Epidemiologic Surveillance of cutaneous infection in the United States from J Am AcadDermatol. 50(5): 748.52
6. Al-Amir. A, Chatratu V, Bhawan J, Stetanato CM (2003). The periodic acid. Schift Stain in diagnosing tinea. J CuttanPathol 10000; 30(10): 611-15
7. Wingfield AB. Fernardez – Obregon AC, WignallFs Greer DL. (2004).Treatment of Tineaimbricata: a randomized clinical trial using griseofulvin, terbinafine, itraconazole and fluconazole.Br J. Dermatol.150(1):119-26.
8. Bailey and Scotts (1986): Diagnostic Microbiology pp 679-773.
9. Del Ross JQ, Draelos ZD Jorizzo JL, Joseph Ws, Ribotsky BM, Rich (2007) Modern methods to treat superficial fungal disease. Cutis;J. 79 (2): 629.
10. Martin A.G. and G. Kobayashi. (1993) Fungal disease with cutaneous involvement in TB Fit 2 Patrick (ed) Dermatology in general medicine, McGraw-Hill New York. Vol 2 Pp 2421-2451.
11. Kenneth, A.A. (1978) Manual of dermatologic therapeutics (with essentials of diagnosis) pp 86-102; 279-287.
12. Drake L.A., Dinehart SM, Farmer E.R., 60HZ R.W., Graham G.F.,Hardinstay M.K. (1996). Guidelines of care for superficial mycotic infections of the skin Tineacorporis, tineacruris, Tineafaciei, tineamanuum, and Tineapedis. Guidelines outcomes committee.
13. Kim HS, Cho Bk Oh ST (2007).A case of tineacorporisPurpurica mycoses; 50(4): 314-6
14. Theos A. (2007) Diagnosis and management of superficial cutaneous fungal infections in children. Pediar. Annals; 36(1): 46:54.
15. Almeida L, Grossman M (1990). Wide spreaddermatophyte infections that mimic collagen vascular disease. J AM AcadDermatol(5 Pt 1):855-857
16. Gugnani, HC; (1982) mycoses as a public health problem in Nigeria Nig-Journal of Microbiology,(2) 47-60
17. Fatini,H.I; Al-Samarai, A.G.M; (2000). Prevalence of Tineacapitis among school children in Irag. Eastern Mediterranean Health Journal. 6(1):128-137.
18. Omar, A.A; (2000). Ringworm of the scalp in primary school children in Alexandria: infection and carriage. Eastern Mediterranean Health Journal. 6(5): 961-967.
19. WHO (1986): Guidelines for the diagnosis, preservation and control of dermatophytes in man and animals pp1-50.
20. Ochei J and Kolhatkar A, (2007) Medical laboratory science, theory and practice 6th edition, Tata McGraw-Hill publishing company Limited, pp 1076 – 1078.
21. Anosike, JC; Ikeke, IR ;Uwaeguoke, JC ; Anogic JC (2005); Journal of Applied Sciences and environmental management, vol. 9:(3) 21-25.
22. Williams JV, Eichenfield LF, Burke BL, Barnes-Eley M, Friedlander SF(2005). Prevalence of scalp scaling in pre pubertal children. Pediatrics. (1):115Available at: www.pediatrics.org/cgi/content/full/115/1/e1
23. Macura A., Laskownicha, Z. (1978) Foot mycosis in a student's community Prizegl- Epdein; vol 33; No.3; 299-306.
24. Figueroa JI, Hawrornik T, Abraha A, Hay RJ(1997).Tineacapitis in south western Ethiopia: a study of risk factors and carriage. Int J Dermatol. 36: 661 – 666.