



## Occupational Predisposition to Dermatophytes and other Agents of Human Dermatitis in Jos, Nigeria

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**ABSTRACT:** Five hundred and twenty human samples were collected from patients with dermatitis, who visited the Dermatophylosis research laboratory in Jos, Plateau State, Nigeria. This was in order to determine occupational predisposition to dermatophytes and other agents of human dermatitis. Samples collected were skin scrapping, nails, hair and pus exudates. They were processed according to standard procedure. Four hundred and thirty-three (83.3%) of the collected samples were positive for dermatophytes and other agents of dermatitis. The breakdown of the result along occupational categories were; Students (38.10%), Civil servants (31.64%), Self-employed (12.93%), Housewives (9.24%), Unemployed (4.16%) and Farmers (3.93%). The dermatophyte *Trichophyton mentagrophytes* had the highest frequency of occurrence in Civil servants (28), Students (26) House wives (8) and Unemployed (5). While *Aspergillus niger* had the highest frequency with the Farmers (4) and Self-employed (11). The students' were noticed to be more predisposed to dermatophytes and other agents of dermatitis than any other category as a result of poor environmental hostel conditions that facilitate easy spread of infections and their unhealthy habit of sharing clothing and personal items. A vigorous public awareness on the risk involved in unhealthy and unhygienic habits could reduce the spread of these organisms. @JASEM

Dermatophytes are not a particular fungus but rather a common name for a group of three genera of fungi that cause skin disease in both man and animals. These genera are; *Microsporium* spp, *Trichophyton* spp and *Epidermophyton floccosum*. These dermatophytes and other agents of human dermatoses abound in the environment and cause different dermatitis in humans. The free online medical dictionary (2010) defines dermatitis as skin diseases that are not usually accompanied by inflammation. Dermatophytes are transmitted by either direct contact with infected host (human or animal) or by direct or indirect contact with infected exfoliated skin or hair in combs, hair brushes, clothing, furniture, public seats, caps, bed linens, towels, and hotel rugs. Jungerman and Schartzman, (1972) have reported that approximately 20% of human infections in urban areas are of animal origin while about 80% of human infections in rural areas are of animal origin.

Occupation can be defined as an act or routine activity that occupies the time of an individual. It could be money yielding, voluntary or simply a duty (Wikipedia, 2010). Occupation as relates to this study, is referred to the regular daily activity that occupies a greater amount of time of an individual's day. This means that a student who is in class for most of the hours of the day can clearly fill out a form requesting for occupational information as a "Student". Certain occupational groups have been found to be more prone to infection by these agents than others. A lot of study and research have been carried out by most of the developed countries regarding occupational dermatitis and some prominent surveillance establishments have been instituted in this regard which include the

"Occupational Disease Intelligence Network" (ODIN), established in 1996 and the "Surveillance of Work-related and Occupational Respiratory Disease" (SWORD) established in 1988, all of which are based in the United Kingdom. Previous research have also reported findings on some diseases that were completely associated with the occupation of the infected individual and some of these studies include; acute work related respiratory diseases (McDonald *et al*, 2005), Surveillance of occupational skin disease (Cherry *et al.*, 2000) Skin disease in the British Army in South East Asia (Sanderson and Sloper, 1953) and Pattern of skin diseases among migrant construction workers (Kuruwila *et al*, 2006). Veterinarians and other workers in the livestock industry have been reported to be prone to dermatitis of animal origin. Work-related skin disease is common but few cases are documented in this part of the world. Some of the contributing factors to occupational dermatitis could be the nature of the job, what the individual is exposed to and the working equipment or environment of the worker. Since all these factors vary in the different occupation, it is therefore necessary to determine and document occupational predisposition of patients visiting Dermatophylosis research laboratory, National.Veterinary.Research.Institute, Vom, Plateau State.

### MATERIALS AND METHODS

The occupational category of the patients were divided into six groups namely; students (kindergarten to tertiary institution), civil servants (local, state and federal workers), housewives (full time wives and mothers who do not perform any

other money yielding activity outside the home), farmers (crops and livestock), self-employed and unemployed. Samples from patients were collected from infected sites of the individuals and this was done by soaking cotton wool in 70% alcohol and swabbing the infected site to disinfect it. Skin scales, nails or hair was scraped using a sterile scalpel blade into clean paper. The pus exudates were collected into a sterile universal bottle. All specimens were labeled properly. The collected samples, were processed by performing an initial wet mount preparation in 20% KOH (Potassium Hydroxide) for direct microscopy as described by Hainer (2003). Afterwards the samples were seeded into Sabouraud dextrose agar containing chloramphenicol at 16ug/ml using a straight inoculating wire and incubated at room temperature for three to four weeks. The pus was streaked aseptically in blood agar and incubated at 37°C for 24hours. Gram stain was performed on the resultant culture and viewed using x100 objective. Subsequent bacteria identification was performed to identify the culture. The fungi cultures were identified by their colonial morphology and tease mount method (Murray *et al*, 2005). Data from a total of 520 patients who visited the Dermatophilosis Research Laboratory of the National Veterinary Research Institute, Vom in Jos, Plateau

State, Nigeria between January 2006 and December 2007 were used for this study The above figure excluded infants from birth to 2 years.

## RESULTS AND DISCUSSION

The results of the samples analyzed showed that 433 out of 520 (83.3%) were positive for dermatophytes as shown in Table 1. It shows the number and distribution of dermatophytes and other agents of dermatitis based on occupational disposition. Students had the highest number of dermatophytes 38.10%, followed by civil servants 31.64% while farmers had the least number of isolates 3.93%. It also reveals that the dermatophyte *Trichophyton mentagrophytes* had the highest frequency of occurrence in Civil servants (28), Students (26) House wives (8) and Unemployed (5). While *Aspergillus niger* had the highest frequency with the Farmers (4) and Self-employed (11). Table 2 shows an array of dermatophytes and other agents of human dermatitis isolated over the two year period of study with *Trichophyton mentagrophytes* being the most isolated dermatophytes (74) followed by *Aspergillus niger* (58), *Aspergillus fumigatus* (43) and *Sporothrix schenckii* (38).

**Table 1** Distribution of the Dermatophytes and other Agents of Human Dermatitis Based on Occupational Category of the Patients

Isolated Organisms	Students	Civil Servants	House Wife	Farmer	Self Employed	Unemployed
<i>Trichophyton tonsurans</i>	4	3	2	-	1	1
<i>Trichophyton rubrum</i>	3	4	-	-	-	-
<i>Trichophyton mentagrophytes</i>	26	28	8	3	4	5
<i>Trichophyton violaceum</i>	9	6	4	-	2	-
<i>Trichophyton verrucosum</i>	5	1	1	-	-	-
<i>Trichophyton sp</i>	4	3	-	2	2	-
<i>Aspergillus fumigatus</i>	17	10	5	2	6	3
<i>Aspergillus flavus</i>	12	12	2	2	6	-
<i>Aspergillus niger</i>	16	18	5	4	11	4
<i>Aspergillus sp</i>	1	2	1	-	2	-
<i>Bipolaris sp</i>	-	1	-	-	-	-
<i>Penicillium sp</i>	2	-	-	-	2	-
<i>Mucor sp</i>	16	8	5	-	4	-
<i>Rhizopus sp</i>	7	4	2	2	2	-
<i>Sporothricum schenckii</i>	16	12	-	2	5	3
<i>Microsporium audouinii</i>	3	-	-	-	2	-
<i>Staphylococcus aureus</i>	7	7	-	-	3	1
<i>Clostridium sp</i>	2	3	-	-	1	-
<i>Blastomyces dermatoides</i>	1	1	1	-	-	-
<i>Curvularia sp</i>	1	5	1	-	-	1
<i>Cladosporium</i>	4	3	1	-	1	-
<i>Candida albicans</i>	5	5	2	-	1	-
<i>Phialophora verrucosa</i>	2	1	-	-	1	-
<i>Coccidioides immitis</i>	2	-	-	-	-	-
Number on roll	200	167	46	18	69	20
Number isolated	165	137	40	17	56	18
% of number isolated	38.10%	31.64%	9.24%	3.93%	12.93%	4.16%

**Table 2** Dermatophytes And Other Agents Of Human Dermatoses Isolated Over A Two Year Period

Isolated Organisms	2006	2007	Total
<i>Trichophyton tonsurans</i>	3	8	11
<i>Trichophyton rubrum</i>	6	1	7
<i>Trichophyton mentagrophytes</i>	63	11	74
<i>Trichophyton violaceum</i>	21	-	21
<i>Trichophyton verrucosum</i>	6	1	7
<i>Trichophyton sp</i>	6	5	11
<i>Aspergillus fumigatus</i>	28	15	43
<i>Aspergillus flavus</i>	2	32	34
<i>Aspergillus niger</i>	25	33	58
<i>Aspergillus sp</i>	1	5	6
<i>Bipolaris sp</i>	1	-	1
<i>Penicillium sp</i>	1	3	4
<i>Mucor sp</i>	8	25	33
<i>Rhizopus sp</i>	4	13	17
<i>Sporothricum schenckii</i>	4	34	38
<i>Microsporium audouinii</i>	2	3	5
<i>Staphylococcus aureus</i>	3	15	18
<i>Clostridium</i>	-	6	6
<i>Blastomyces dermatoides</i>	1	2	3
<i>Curvularia sp</i>	4	4	8
<i>Cladosporium</i>	2	7	9
<i>Candida albicans</i>	5	8	13
<i>Phialophora verrucosa</i>	2	2	4
<i>Coccidioides immitis</i>	2	-	2

This study indicated that the student occupational category recorded the highest number of positive isolation. This is not surprising as this group had the highest attendance. This group also generally constitutes a large proportion of the population. Farmers on the other hand had the least number of isolations and the least number of attendances. This could be due to little awareness and reluctance to avail themselves of such services.

There are certain factors that influence the distribution of dermatophytes and these include environment, age and sex (Srejaard, 1982). The student hostel environment especially in the tertiary institutions, are very conducive for easy spread of dermatophytes. This is because the rooms are often overcrowded beyond their normal carrying capacity, thereby promoting constant body contact, the sanitary conditions of the student hostels are no better as so many of them are made to share insufficient toilet facilities and of course the habit of sharing clothing and items such as combs, hair pins, towels, shoes and beddings. Their age is also a contributing factor to the occurrence of dermatophytes, particularly those in the kindergarten and primary levels of education. Ekanem, (1987), suggested that age influences susceptibility to dermatophytes because of the changes in their immunity. The wide array of fungi isolated from patients with various skin infection shows that the dermatophytes are clearly not the only group responsible for human dermatitis even though they dominate the isolations from the skin infections.

The high positive isolation of non-dermatophytes, particularly *Aspergillus* species may be due to the ubiquitous nature of their spores in our environment. Another reason could be because they are carried transiently even on healthy skin (Oyeka, 2002).

The dermatophyte *Trichophyton mentagrophytes* was the most isolated organism from the student, civil servants, house wives and unemployed occupational category. *T mentagrophytes* is one of the three genera of fungi that commonly cause skin disease of both people and animals. They are mainly found in soil and have been incriminated in the infection of feet, body, nails, beard, scalp, hand and groin. *Aspergillus niger* which was the highest isolated organism amount the farmers and unemployed is a fungus that causes a disease called black mold on certain fruits and vegetables such as grapes, onions, and peanuts, and is a common contaminant of food. It is ubiquitous in soil and is commonly reported from indoor environments. This explains the high frequency of isolation from farmers and the unemployed.

In conclusion, dermatophytes and other agents of human dermatitis can be found everywhere and no geographical area, age, sex or category of people is spared by these organisms as shown by this study. The students' occupational category is obviously the most predisposed to dermatophytes and other agents of dermatitis compared to other categories looked at by this study. As a result of their large number, they therefore serve as a source of infection transmission to the rest of the population. The obvious solution to this unpleasant situation is to create wide spread public awareness for cleanliness among our student population and letting them know in details the risk they face if they continue to indulge in their unhealthy and unhygienic habits. The Government has a part to play in providing proper infrastructure for her people and also make plans for the growing population of her nation. Parents at home are not left out in the bid to minimize or completely eradicate the high occurrence of dermatophytes from the student population as it is their responsibility to educate their wards on the basics of clean and healthy living.

**Acknowledgement:** The authors wish to acknowledge Mr. Bulus Datok for his technical assistance.

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