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 Dermatophilosis 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 scraping, 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.

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; *Microsporum* 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 Slopfer, 1953) and Pattern of skin diseases among migrant construction workers (Kuruvila 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 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
Occupational Predisposition to Dermatophytes.....

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 24 hours. 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

<table>
<thead>
<tr>
<th>Isolated Organisms</th>
<th>Students</th>
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<th>House Wife</th>
<th>Farmer</th>
<th>Self Employed</th>
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<td>Total</td>
<td>165</td>
<td>137</td>
<td>40</td>
<td>17</td>
<td>56</td>
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% of number isolated 38.10% 31.64% 9.24% 3.93% 12.93% 4.16%
Aspergillus flavus
Trichophyton sp
Trichophyton verrucosum
they dominate the isolations from the skin infections. group responsible for human dermatitis even though
Trichophyton violaesum
Trichophyton mentagrophytes
Aspergillus niger
Rhizopus sp
shows that the dermatophytes are clearly not the only
isolated from patients with various skin infection
changes in their immunity. The wide array of fungi
Ekanem, (1987), suggested that age influences
the kindergarten and primary levels of education.
the occurrence of dermatophytes, particularly those in
beddings. Their age is also a contributing factor to
and items such as combs, hair pins, towels, shoes and
facilities and of course the habit of sharing clothing
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.

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
care of the population is their responsibility to educate their
people and also make plans for the growing
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.

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Mr. Bulus Datok for his technical assistance.

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<table>
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<th>2006</th>
<th>2007</th>
<th>Total</th>
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<td>Trichophyton tonsurans</td>
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<td>Trichophyton rubrum</td>
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<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Trichophyton mentagrophytes</td>
<td>63</td>
<td>11</td>
<td>74</td>
</tr>
<tr>
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<tr>
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<tr>
<td>Aspergillus fumigatus</td>
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</tr>
<tr>
<td>Bipolaris sp</td>
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</tr>
<tr>
<td>Penicillium sp</td>
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<td>3</td>
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</tr>
<tr>
<td>Mucor sp</td>
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<td>Rhizopus sp</td>
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<tr>
<td>Coccioides immitis</td>
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</table>

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.

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