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Species of Bacteria Associated with Skin Diseases of Different Occupational Groups in Plateau State, Nigeria.

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An investigation was carried out on the species of bacteria associated with skin diseases of different occupation groups in Plateau State, Nigeria. These occupational groups included students, housewives, primary school pupils, civil servants and businessmen. A total of thirty patients suffering from different skin diseases were examined. Out of which in twenty-four patients, bacteria isolates were recovered. Students, house wives, primary school pupils, civil servants and businessmen accounted for 16.67%, 37.5%, 33.33%, 8.33% and 4.17% of the skin diseases respectively. The skin diseases investigated included impetigo, ringworms, burns, dermatitis and boil. The bacteria isolates included *Staphylococcus aureus, Streptococcus pyogenes, Yersinia pestis, Klebsiella pyogenes* (Group A) is associated with some skin diseases like cellulites, erysipelas and occasionally impetigo.

Keywords: Bacteria, Skin diseases, Occupational groups, Nigeria.

Dermatophytes are largely known to cause skin infections, especially in Nigeria (Clarke, 1962). There are situations where after administering some fungicides, the skin diseases still persist. The aim of the study is therefore to investigate those bacteria species that are associated with skin diseases of different occupational groups in Plateau State. This is aimed at improving the health situations of those people with various skin diseases in Plateau State as necessary antibiotics may be prescribed alongside fungal creams.

MATERIAL AND METHODS

Thirty patients with various skin diseases were selected for the present study. The patients were chosen at guided random, which included primary school pupils, students, housewives, businessmen and civil servants. The skin diseases investigated for their bacterial species content included ringworm infection, boil, impetigo, dermatitis and burns.

Specimens were collected from such skin disease patients for culturing in the laboratory. In the case of ringworm infections scrapings were obtained from the active growth areas with the aid of sharp sterile blades. Such scrapings were placed in normal saline solution and plated out on blood agar medium. Eight culture plates were employed for each ringworm disease scraping. The resultant plates were the divides into two batches. The first batch of culture plates made up of 4 plates was incubated at 25°C while the second batch of 4 plates was incubated at 37°C (the normal body temperature). The plates were then examined after 24 and 48 hours for the presence of bacterial colonies. Such colonies of bacteria were then sub cultured several times until pure cultures were obtained.

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As for skin diseases that developed as deep wounds, specimens were collected with the aid of sterile swab sticks. Each swab was immediately transferred to test tube containing 1ml transport medium (phosphate buffer saline) with pH 7.2. Such swab specimens were then plated out on blood agar medium.

The bacteria colonies that developed on the culture plates were sub cultured until pure cultures were obtained. The various bacterial colonies were examined under the microscope. The various bacterial isolates were also subjected to biochemical and physiological tests like sugar fermentation abilities and carbon assimilation tests. References were also made to stock cultures and different microbiology monographs in order to make proper identifications of the various microbial isolates.

RESULTS

The species of bacteria isolated from the different skin diseases examined included *Clostridium perfringens, Klebsiella pneumoniae, Yresinia pestis, Staphylococcus aureus* and *Streptococcus pyogenes. S. aureus* had 41.67% frequency of occurrence. It was closely followed by *S. pyogenes* 25.00%, *T. pestis* 16.67%, *K. pnenmoniae* and *C. perfringens,* which had 8.33% frequency of occurrence each as shown in Table 1. Chi-square was implored in the statistical analysis of the frequency of occurrence of both the bacteria isolates and various skin diseases as shown in Table 2. The cultural characteristics of the bacterial isolates are presented in Table 3, which the biochemical characteristics of the bacteria isolates are presented in Table 4. Of the

Table 1. Species of bacteria isolated from the various skin diseases.

Bacteria isolates	Different types of skin diseases						
	Boil	Burns	Ringworm Infection	Dermatitis	Impetigo	Total	% Incidence
Staphylococcus aureus Rosenbach	5	2	1	1	1	10	41.67
Streptococcus pyogenes Rosenbach	2	2	1	1	-	6	25.00
Yersinia pestis	1	1	-	-	2	4	16.67
Klebsiella pneumonia Rosenbach and Merchant	-	1	-	-	1	2	8.33
Clostridium perfringens	-	1	-	-	1	2	8.33
						24	100

+ = present; - = absent

Table 2. Chi - square Table on the occurrence of the bacteria associated with various skin diseases in Plateau Sate.

Bacterial isolates	Frequency of occurrence of various Diseases (Observed)
Staphylococcus aureus Rosenbach	10 (8)*
Streptococcus pyogenes Rosenbach	6 (4.8)*
Yersinia pestis	4 (3.2)*
klebsiella pneumonia Rosenbach and Merchant	2 (1.6)*
Clostridium perfringens	2 (1.6)*

*Numbers in parenthesis are expected frequencies
Ho: the frequency of occurrence of bacteria isolates is independent of various skin diseases.
F. Tab 9.49> Cal 1.2, therefore we accept the hypothesis

various occupational groups examined, the housewives with skin diseases had the highest percent frequency of occurrence of the bacteria isolates (37.5%). They were followed by school pupils (33.33%), students (16.67%), civil servants and businessmen who had 8.33% and 4.17% frequency of occurrence of bacterial isolates respectively. The details of the results obtained are presented in Table 5. The statistical analysis is shown in Table 6. Plate 1 shows a typical ringworm infected hand of a housewife. Plate 2 shows a typical ringworm infected leg of a female student.

Table 5. The relationship between the bacteria isolates and the different occupational groups.

	Occupational groups					
	House wives	Businessman	Civil servants	Students	School pupil	Total
Ringworm infections						
S. aureus	+	-	-	+	+	3
S. pyogenes	+	-	-	-	+	2
Y. pestis	-	-	-	-	-	
C. perfringens	-	-	-	-	-	
K. pneumoniae	-	-	-	-	-	
Boils						
S. aureus	+	+	-	+	+	4
S. pyogenes	+	-	-	-	+	2
Y. pestis	-	-	-	-	-	-
C. perfringens	-	-	-	-	-	-
K. pneumoniae	-	-	-	-	-	-
Dermatitis						
S. aureus	-	-	+	-	+	2
S. pyogenes	+	-	-	-	-	1
Y. Pestis	-	-	-	-	-	
K. pneumoniae	-	-	-	-	-	
C. perfringes	+	-	-	-	+	2
Burns						
S. aureus	+	-	-	-	-	2
S. pyogenes	-	-	-	-	-	
Y. pestis	-	-	-	+	-	1
K. pneumoniae	+	-	-	-	-	1
C. perfringens	-	-	-	-	+	1
Impetigo						
S. aureus	-	-	+	+	-	2
S. pyogenes	+	-	-	-	-	1
Y. pestis	-	-	-	-	-	
C. perfringens	-	-	-	-	-	
Total	9	1	2	4	8	24
% Occurrence	37.5%	4.17%	8.33%	16.67%	33.33%	

+ = present; - = absent

Table 6. Chi-square Table on the relationship between the bacteria isolates and the different occupational groups suffering from the skin diseases.

House wives	9 (7.2)*
Civil servants	2 (1.6)*
Students	4 (3.2)*
Sschool pupils	8 (6.4)*
Businessmen	1 (0.8)*

* Numbers in parenthesis are expected frequencies
Ho: The frequency of occurrence of bacterial isolates independent of different occupational groups suffering from skin diseases.
F. Tab 9.49> Cal 1.2, therefore we accept the hypothesis.

There were no significant difference in the relationship of the number of bacteria isolates and the different occupational groups suffering from skin diseases at probability of < 0.05.

DISCUSSION

The results obtained from the study has shown that species of bacteria are associated with skin diseases. These species of bacteria could be there as mere normal flora feeding on the products of skin tissues breakdown by other organisms like dermatophytes and pathogenic yeasts. These species of bacteria isolated from the various wounds could be playing active role in the development of the wound or skin diseases. Bartlet, (1970) in his study on the survival of bacteria on swabs, showed that *S. pyogenes* is present in high numbers. Marples (1974) reported that *S. aureus* one of the species of bacteria isolated during the present study, can be isolated from almost any area of the skin of almost any individual at one time or the other. *S. aureus* which was one of the bacterial isolates had been reported to be widespread (Wilkinson, 1977). The author made this observation during his study on the causes of cross-infection in hospitals. Gill (1984) also showed that *S. aureus* causes secondary infection in insect bites, ulcers, burns, wounds and skin disorders. He reported that the agents involved included *Staphylococcus aurous, pseudomonas aeruginosa, Proteus sp and possibly Escherichia coil.*

The prevalence of *S. aureus* may be attributed to its ability to produce coagulase enzyme that clots plasma which probably prevents the bacteria from being phagocytosed and destroyed by macrophages. *S. pyogenes* which accounted for 25.00% of the number of the bacterial isolates may have thrived due to its ability to produce various enzymes and toxins. *Yersinia pestis, klebsiella pneumoniae* and *Clostriduim perfringens,* which accounted for 16.67%, 8.33% and 8.33% of the number of the bacteria isolates respectively may be described as opportunistic pathogens.

The result of the survey also showed that out of 30 skin diseases patients, housewives had 37.5% of wounds with bacterial infections. They were followed with pupils, students, civil servants and businessmen who accounted for 33.33%, 16.67%, 10% and 4.17% of the bacterial wound infections respectively. The methodology employed by house wives in the sweeping of compounds of various residential areas may have also contributed to the high percentage of bacterial infected areas may have also contributed to the high percentage of various residential areas may have also contributed to the high percentage of bacterial infected wounds of house wives. This is because as the compound is swept with the aid of bunch of broom sticks, an eddy of dust results, which leads to the raising of microbial spores which could then settle on the skin of the housewives. The presence of hairs on the skins could also help in the trapping of such bacterial spores on the skin. Such bacterial spores could eventually gain entry into open wounds. However, the bacterial spores could enter directly into the wounds more especially if such wounds happen to be open ones. Rubber shoes make the surface of the sole wet, hence encouraging ringworm development and such ringworm infections could eventually be colonized by species of pathogenic bacteria.

Primary pupils accounted for 33.33% of patients with skin diseases. This is in conformity with the report of Soyinka, (1978) in his study on the incidence of dermatophytes amongst school children in lbadan, Nigeria. The same author reported that school children had 55.1% incidence of skin diseases. This result may be due to the fact that primary pupils always play with soil, the soil which is a reservoir of microorganisms (Wright and Terry, 1981). Students accounted for 16.67% of the total number samples. These may be due to their social habit of exchange of shoes and items of clothing (Ogbonna; Robinson andAbubakar, 1985). The low percentage of bacterial infected wounds amongst businessmen could stem from their improved level of personal hygiene.

When wound infections are being treated, combinations of drugs should be employed. If the wound stems from ringworm infection, fungicidal medication should be combined with antibiotics treatment because such ringworm wounds must have been also colonized by species of opportunistic and pathogenic bacteria. Similar treatments should also be given to wounds infected predominantly by bacteria. The administration of fungicidal drugs in wounds infected predominantly by fungi will lead to the creation of vacuum, which would lead to unlimited proliferation of bacterial cells some, which could be pathogenic. The same thing applies to the treatment of predominantly bacterial infected wounds with antibiotic drugs alone. A midway treatment of such wounds should therefore be adopted.

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