

ISOLATION, IDENTIFICATION AND ANTIBIOTIC SUSCEPTIBILITY OF BACTERIA AND FUNGI FROM ECZEMA PATIENT.

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ABSTRACT

Eczema is an inflammatory skin condition that affects people of all ages and causes severe pain, dryness, and itching of the skin. Samples were collected from twenty patients with observed Eczematous skin. The swabbed sticks were streaked on Nutrient and MacConkey media, and incubated at 37°C for 24-48hours for enumeration of bacteria. Potato Dextrose agar was employed to culture fungi present in the samples. Morphological and Biochemical tests were carried out on presumptive microbial colonies. Antibiotic susceptibility testing of bacterial isolates to clinically used antibiotics was done using agar well diffusion method. The

Introduction:

Atopic eczema (atopic dermatitis [AD]), which affects 5% of adults and 40% of children, significantly lowers quality of life. The major skin barrier deficit, severe immunological dysregulation, and microbiome dysbiosis are the basic pathomechanisms of AD. (Bieber *et al.*, 2016) Skin inflammation known as eczema has historically been accompanied by spongiosis with different degrees of acanthosis and a superficial perivascular

results obtained indicate the occurrence of *Staphylococcus aureus*, *Fusarium oxysporium*, *Penicillium* species and *Aspergillus flavus* from Eczematous samples. Most of the *Staphylococci* isolates were multidrug resistant. The study's findings underscore the necessity of adequate cleanliness as well as appropriate diagnosis and treatment.

Keywords: Eczematous skin, patients, bacteria, *Staphylococci* isolates, multidrug resistant

Lymphohistiocytic infiltration. Eczema's clinical signs include itchiness, redness, scaling, and clustered papulovesicles. The disease can be caused by a wide range of internal and external variables acting alone or in combination. (Holden and Berth-Jones, 2004)

Eczema is common in people under the age of 40. It is caused by a variety of distinct factors, including internal ones like naturally occurring eczema and external ones like irritation or allergic eczema, as well as contact with water and detergent. Women are twice as likely to develop eczema as men. (Burnner *et al.*, 2018); around one-fifth of people may experience the condition at some point in their lives, and its frequency varies significantly across the globe.

Due to the introduction of environmental allergens, the prevalence of this condition has increased in industrialized nations during the past century. However, current studies show that this disease has declined dramatically in countries with high previous prevalence such as England, this disease is still regarded as a major health problem especially in developing countries (Thomsen, 2014).

Staphylococcus aureus is a type of bacteria found on the skin of nearly all people with eczema, it also lives on the skin of about 20 percent of healthy adults. *Staphylococcus aureus* thrive on weeping or broken skin, in case of Staphylococcal infection, eczema spread more quickly and makes healing

more difficult. (Ogonowska *et al.*, 2017). The most frequent cause of skin and soft tissue infections is *Staphylococcus aureus*. Community-associated methicillin-resistant *S. aureus* (CaMRSA), which builds community reservoirs and spreads by asymptomatic colonization, has emerged in recent decades, posing unique infection prevention concerns (Hudson *et al.*, 2012) However report are scarce in literature on fungal pathogens isolated from the skin of people with Eczema

This study therefore aimed at isolating and identifying different bacteria and fungi present on the skin of individuals suffering from eczema.

Materials and Methods

Twenty study subjects were involved in a cross-sectional study. The study subjects were collected from people suffering from eczema in and around The Polytechnic, Ibadan.

The eczematous skin is swabbed with sterile swabs. In nutrient broth, the swabs are placed. Potato Dextrose sugar was employed for enumeration of fungi at room temperatures for 3 to 5 days while bacterial cultures are enumerated on Nutrient and MacConkey media and incubated at 37° C environment for 24-48 hours. Morphological and biochemical tests such as Gram staining, Indole, oxidase were employed to identify bacterial isolates, whereas a cultural characteristic and morphological test are used to identify fungus.

The typical agar disc diffusion technique was employed to assess the antibiotic susceptibility of microorganisms. Antibiotic discs were chosen in accordance with local prescription trends, recommendations from the Clinical Laboratory Standards Institute (CLSI)

RESULTS

Table1: Morphological and biochemical characteristics of bacteria isolated from Eczema patients

Isolate code	Gram reaction	Shape	Catalase	Indole	Oxidase	Methyl red	Voges Proskauer	Gelatin hydrolysis	Coagulase	Endospore staining	Size	Colour	Elevantin	Probable identity
102	+	C	+	-	-	+	-	+	+	-	sm all	Crea my	rais ed	<i>Staphylococ cus aureus</i>
05	+	C	+	-	-	+	-	+	+	-	sm all	Crea my	rais ed	<i>Staphylococ cus aureus</i>
06	+	C	+	-	-	+	-	+	+	-	sm all	Crea my	rais ed	<i>Staphylococ cus spp.</i>
07	+	C	+	-	-	+	-	+	+	-	sm all	Crea my	rais ed	<i>Staphylococ cus aureus</i>
10	+	C	+	-	-	+	-	+	+	-	sm all	Crea my	rais ed	<i>Staphylococ cus aureus</i>
IPL 1	+	C	+	-	-	+	-	+	+	-	sm all	Crea my	rais ed	<i>Staphylococ cus aureus</i>
IPL 2	+	C	+	-	-	+	-	+	+	-	sm all	Crea my	rais ed	<i>Staphylococ cus spp.</i>
IPL 3	+	C	+	-	-	+	-	+	+	-	sm all	Crea my	rais ed	<i>Staphylococ cus aureus</i>

Table 2: Fungi isolated from Eczema patients in this study.

Isolate code	Macroscopic properties	Microscopic properties	Fungi Identity
BY4	Colonies are initially whites, becoming thinned with salmon lavender at maturity	Hyphae are septae and hyaline, colonies are too short and simple	<i>Fusarium oxysporum</i>

AP2	The swarm is granular, dense, and dark-green to greyish green in colour with a white border. The expansion is medium, and the reversal is pale orange.	Conidia are strands of flat, round to oval, single celled organisms. Phialides are found in crystal bunches with slick conidophores.	<i>Penicillium</i> spp.
PL6	On potato dextrose colonies grow quickly and have an olives to lime green colour with a cream reversal. It has a fuzzy, cottony, or slightly gritty quality.	Hyphae are sepate and hyaline, conidophores are coarsely rough and uncolored.	<i>Aspergillus flavus</i>

Table 3: Antibiotics Susceptibility of Staphylococcus species isolated in this study.

S/N	Probable organism	AM	R	CPX	S	SXT	E	PEF	CN	APX	Z
1	<i>Staphylococcus aureus</i>	NZ	NZ	6mm	NZ	9mm	3mm	9mm	2mm	NZ	NZ
2	<i>Staphylococcus aureus</i>	NZ	NZ	8mm	NZ	NZ	NZ	NZ	NZ	NZ	NZ
3	<i>Staphylococcus aureus</i>	NZ	NZ	1mm	NZ	NZ	NZ	8mm	NZ	NZ	NZ
4	<i>Staphylococcus epidermiditis</i>	NZ	NZ	NZ	NZ	NZ	NZ	1mm	7mm	NZ	NZ

5	<i>Staphylococcus aureus</i>	NZ	NZ	NZ	NZ	NZ	3mm	8mm	NZ	NZ	NZ
6	<i>Staphylococcus aureus</i>	NZ	NZ	6mm	NZ	2mm	1mm	5mm	NZ	NZ	NZ
7	<i>Staphylococcus epidermiditis</i>	NZ	NZ	9mm	NZ	NZ	2mm	7mm	NZ	NZ	NZ
8	<i>Staphylococcus aureus</i>	NZ	NZ	9mm	NZ	1mm	3mm	9mm	NZ	NZ	NZ

Result and Discussion

The result of this research work revealed that *Staphylococcus aureus*, *Staphylococcus epidermiditis*, *Fusarium species*, *Aspergillus flavus*, *Aspergillus niger* were the probable organisms obtained from eczema patients.

Staphylococcus aureus is a major human pathogen that causes a wide variety of clinical manifestations that are common in humans, *Staphylococcus aureus* are found on skin and mucous membrane and are highly resistant to treatment with antibiotics which remain challenging to manage due to the emergence of multi drug resistant strains as MRSA (methicillin- resistant *Staphylococcus*) this was in agreement with the study of Nørresl *et al.*, 2022).

This study showed that *Staphylococcus aureus* is a gram positive bacteria (stain purple by gram stain) that are cocci shaped and tend to be arrange in cluster described as grape like, biochemical identification test include catalase positive to distinguish from other *Staphylococcus* species as compared with the work (Lemriss *et al.*, 2014)

Staphylococcus epidermiditis is also a gram positive bacteria which colony appear small and black. It is considered as an opportunistic microorganism

which is also known as a coagulase-negative Staphylococci that is the most reason of clinical infections (Guo *et al.*, 2019)

It was confirmed in this study that *Fusarium* species are usually pale or brightly colored (depending on the species) and their colour varies from whitish to yellow, brownish, pink or reddish. According to (Risan, 2016.) reported that *Fusarium* species such as *Fusarium oxysporum* are microbes associated with human infections and responsible for opportunistic infections in humans, causing systematic infections with a high mortality rate as well as localized infections in skin and other body parts.

Aspergillus flavus, an opportunistic pathogens in human and is the second leading pathogen of invasive Aspergillosis because of the harmful effect of fungus, *Aspergillus flavus* causes skin diseases to humankind, this report was gathered by (Rudramurthy *et al.*, 2019)

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