

The Prevalence of Pseudomonas Aeruginosa on Recommended Glasses of Selected Volunteers in Olabisi Onabanjo University Ogun State

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Abstract: This study was carried out to assess the prevalence of *Pseudomonas aeruginosa* on the recommended glasses of selected volunteers in Olabisi Onabanjo University Teaching Hospital Sagamu Campus. A cross-sectional survey of 100 selected volunteers comprises 43 males and 57 females were examined. A total of 30 (30%) were found to have *Pseudomonas aeruginosa* on their contact lenses, of which 13 (43.3%) of the isolates were pigmented and 17 (56.7%) were non pigmented isolates of *Pseudomonas aeruginosa*. Eighty percent (80%) of the isolates were susceptible to ciprofloxacin, 63% to ceftazidime while 50% were susceptible to ofloxacin. The isolates were totally resistant to augmentin and ampicillin, while 97% resistant to gentamicin and 70% resistant to nitrofurantoin were recorded in this study. Thus, ciprofloxacin and ceftazidime could be recommended for the management of *Pseudomonas aeruginosa* on contact lenses.

Keywords: Prevalence, Recommended glasses, *Pseudomonas aeruginosa*.

1. INTRODUCTION

Recommended glasses, known as contact lenses are a popular means of vision correction and are worn by approximately 85 million individual worldwide. There are number of ways in which these lenses can be worn; (1) daily wear with disinfection at night and re-use the next day, (2) daily disposable wear-a new lens is used in each day (3) extended wear-the lens is used continuously for 1 week and then replaced, and (4) continuous wear- the lens is used continuously for 1 month and then replaced (Miller, 2009).

Eyes are the most important sense organs of our body which provide visual perception. Because of this visual perception we are able to know what is happening around us in our external environment and accordingly we are able to act towards a particular situation. But sometimes these eyes may become defective due to various reasons. Various common defects of the eyes, the problems they pose to humans in their vision, the cause of these defects and the possible ways to overcome these defects include the wearing of recommended glasses (Roanova, 2009).

Recommended glasses refers to glasses worn on the eyes by people to enhance sight, correct a defect of the eye, protect eye from sunlight or for fashion. The alarming prevalence of recommended glass wearing that cut across both the young and the aged can be attributed to many factors. Apart from the decline immune flow in the adult as a result of vessels sag that reduces the flow of blood to the eye, Eye infection that demand the wearing of glasses can be hereditary. The environment, abuse of eye caring norms, violation of hygiene that can culminate the growth of microbial pathogens. Studies have shown that bacteria do adhere to contact lenses and that the extent of colonization depend on the nature of the material used. It has been shown that the oxygen content of the tear film underlying the lens may be markedly reduced depended on the nature of the material used in the manufacture of contact lenses (Rivera, 2008).

Majority of contact lenses wearers used either rigid gas-permeable or soft hydrogel lenses. The numbers of the organisms present on the eyelids and conjunctivae increase over a 12 month period in the individual using a daily-wear schedule, the increase in numbers occurs only in a species that are members of the indigenous microbiota. It is relevant to know that environmental organism a nutritionally non exacting *Pseudomonas aeruginosa* is an efficient colonizer of many type of contact lenses materials, and its viability is unaffected by many contact lenses disinfecting solutions. It can therefore, form a biofilm on the contact lenses. Many contact lenses wearers have an increase have an increased risk of developing microbial keratitis, and in 70% of such cases the causative agent is *Pseudomonas aeruginosa* (Dart, 1999).

The pivotal interrelationship between the blink reflex, (usually 12 blinks per minute), rubbing of the eye, moving over the cornea to remove desquamated cells with any associated microbes coupled with the environment provide an ease contamination of contact lenses with potential pathogens even during the ocular antimicrobial defence mechanisms. The aim of this cross-sectional studies is; to aseptically swab the volunteers recommended glasses, to cultivate the samples on centrimide nutrient agar (a selective medium designed for the isolation of *Pseudomonas aeruginosa*), to characterized the isolates biochemically and to carry out an antibiogram on the isolates obtained for the purpose of therapeutic management of the pseudomonads induced eye infection (Liesegang, 2002).

2. MATERIALS AND METHODS

Target population:

The population size of Olabisi Onabanjo University Teaching Hospital comprises of students of medicine, and pharmacy, lecturers and non-teaching staff as well as health workers of about 700 individuals were randomly sampled.

Collection of samples:

A total of 100 swabs were collected from selected volunteers using recommended glasses, these include students of medicine, and pharmacy, lecturers and non-teaching staff, health workers of varied age and gender in Olabisi Onabanjo University Teaching Hospital, Ogun State, Nigeria.

Bacteriological isolation:

Swab stick moistened with sterile distilled water were used to aseptically clean the lenses of recommended glasses, which were then transferred into nutrient broth prior to their subculture to centrimide nutrient agar (CNA) and incubation at 37°C for 24 hours for the isolation of *Pseudomonas aeruginosa*.

Identification of isolates:

The bacterial isolates on the actively growing selective media were subjected to conventional biochemical characterization to confirm the isolates as *Pseudomonas aeruginosa*. The biochemical tests include; Gram staining, oxidase test, citrate test, glucose, sucrose and lactose fermentation test

Antibiogram:

Antibiotic sensitivity test was determined by modified disk diffusion technique on the biochemically characterized isolates. A volume of 0.1ml of the overnight broth culture of every isolate was pipetted into 9.9mls of sterile distilled water in the test tubes to make 10⁻² dilution of the organism. From this dilution, 0.1ml of the diluted culture was pipetted into the sterile melted and cooled (45 °C) Mueller Hinton Agar medium (Oxoid) and aseptically poured into the sterile culture plate and were allowed to set, the antibiotic multi-discs were aseptically placed in each plate, after 45 minutes of pre-diffusion, they were then incubated at 37°C for 24 hours. The zone of growth inhibition were recorded, analysed and interpreted by CLSI standard.

3. RESULTS

The age distribution of the isolates range were grouped within an interval of 12 years and the highest number of the samples were collected within the age 49 -60 years which yielded 8 isolates of *Pseudomonas aeruginosa*. Age range 13 - 24 yielded 9 isolate which was the highest. No isolate was present in the age interval 0-12 years and age 60 years and above as elicited in Table 1.0 below. The biochemical characterization of the 30 Gram isolates of *Pseudomonas aeruginosa* obtained in this study were citrate and oxidase positive, non of the isolates ferment glucose, maltose and

sucrose sugars. In the percentage susceptibility of the isolates to the antibiotics recorded, ciprofloxacin, ceftazidime elicited the highest susceptibility profiles of 80% and 63% respectively while equal number of susceptibility and resistance was recorded in ofloxacin. The highest resistance were recorded in ampicillin, cefuroxime and augmentin. And the isolates invitrobially assessed elicited 77% and 97% to nitrofurantoin and gentamicin respectively as shown in Table 2.0 and pie chart in figure 1 below.

Table 1.0: Age and sample distribution table

Age group	No of sample examined	Positive (isolates)	Percentage (%)
0-12	2	0	0
13-24	33	9	9.0
25-36	25	7	7.0
37-48	11	6	6.0
49-60	26	8	8.0
> 60	3	0	0
Total	100	30	30

Table 2.0: Percentage susceptibility of the isolates to antibiotics

Antibiotics	% Sensitive(≥ 18 mm)	%Resistant (<13mm)
CAZ	63%	37%
CRX	0%	100%
GEN	3%	97%
CPR	80%	20%
OFL	50%	50%
AUG	0%	100%
NIT	23%	77%
AMP	0%	100%

CAZ- ceftazidime, CRX- cefuroxime, GEN- gentamicin, CPR- ciprofloxacin, OFL- ofloxacin, AUG- augmentin, NIT- nitrofurantoin, AMP- ampicillin

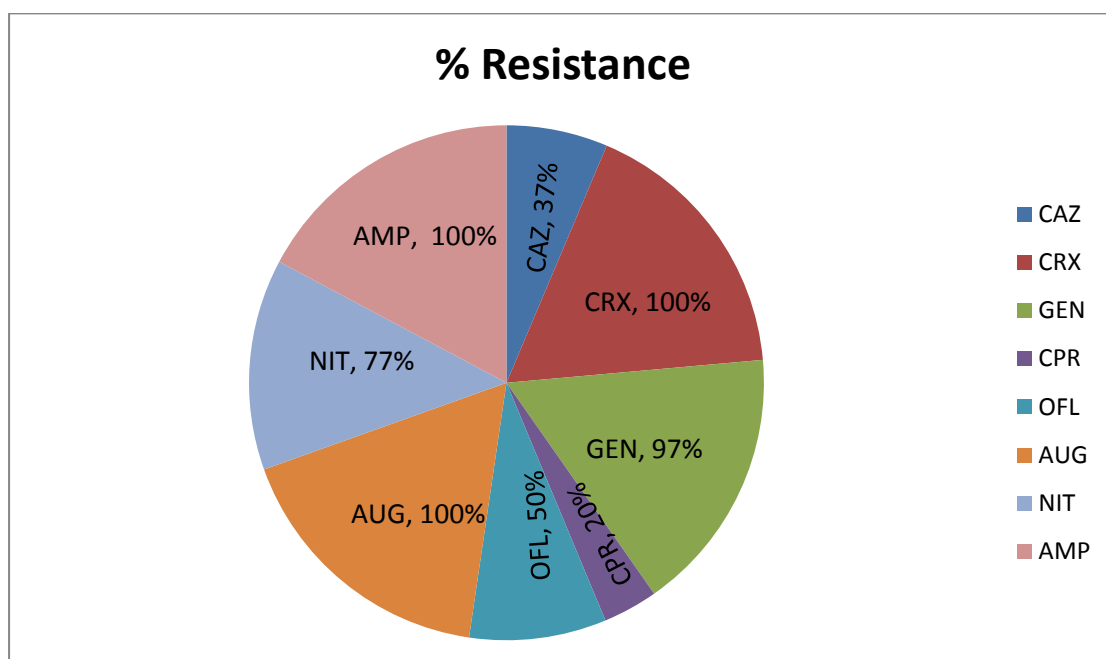


Figure 1: Pie chart showing percentage resistance of Pseudomonas aeruginosa isolates to antibiotics

4. DISCUSSION

One hundred selected volunteers with recommended glasses (contact lenses) were assessed, of which 30 isolates of *Pseudomonas aeruginosa* were obtained. Thirteen (13) isolates elicited greenish pigmentation while the remaining 17 isolates showed no pigmentation which may be due to their variation. The gender distribution recorded in the sample collection was higher in females (57%) while 43% of the samples came from male. The low numbers of isolates of *Pseudomonas aeruginosa* obtained from the entire sample studied could be attributed to the level of the hygiene awareness of the individuals and their understanding about the intricacies associated with eye related issues (Rivera, 2008).

The 30 isolates biochemically characterized were oxidase and citrate positive but none of the isolates ferment glucose, maltose and sucrose. The alarming resistant pattern to ampicillin, augmentin and cefuroxime in this study is a known phenomenon though augmentin can be said to be a broad spectrum. This can be as a results of increasing resistance of *Pseudomonas aeruginosa* which may be due to excessive beta lactamase production or efflux mechanism. The 50% resistance to ofloxacin recorded in the study could be strain dependent since the remaining 50% of the isolates were also sensitive to ofloxacin, this highlights the increasing menace of ofloxacin resistant strains of *Pseudomonas aeruginosa* (Stapleton,1993).

The isolates elicited high susceptibility to ciprofloxacin (80%), a quinolone and ceftazidime(63%) . This could be due to the ability of these antibiotics to inhibit a formative nucleic acid synthesis and or a metabolic step in the isolates. The phenomenon of multi drug resistance were recorded in this study since non of the isolates was 100% susceptible to any of the antibiotic appropriated. Ciprofloxacin and ceftazidime could be recommended as a drug of choice in the management of *Pseudomonads* induced contact lenses associated infection rationally as these two antibiotic elicited high levels of potency on the isolates of *Pseudomonas aeruginosa* obtained from this study. Proper hygiene should also be observed in wearing contact lenses and medical regular check-up could an added preventive measure (Roanova, 2009).

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