Original Research Article

Evaluation of the Types and Drug Sensitivity Patterns of Bacterial Isolates from Patients with Eye Discharge at Abia State University Teaching Hospital, Aba, Nigeria

ABSTRACT

This study aimed to evaluate the types and drug sensitivity patterns of bacterial isolates from patients with eye discharge at the Abia State University Teaching Hospital (ABSUTH), Aba, Nigeria. A total of 100 samples were collected, with the most prevalent bacterial isolates being *Staphylococcus aureus* (26%) and *Coagulase-negative Staphylococci* (21%), while no bacterial growth was reported in 42% of samples. In terms of patient demographics, a significant proportion of the patients were females (64%) aged between 61-70 years. In relation to contact lens use, a high percentage (97%) of the bacterial isolates were detected in patients who did not use contact lenses. An occupational distribution analysis revealed that bacterial isolates were more frequent in farmers and traders compared to students and retirees. Antimicrobial sensitivity testing of the bacterial isolates showed varying degrees of resistance, with significant resistance observed against Erythromycin, Ciprofloxacin, and Perfloxacin. In contrast, higher sensitivity was noted towards Chloramphenicol and Gentamycin. The findings underscore the importance of regular microbiological evaluation and sensitivity testing in patients presenting with eye discharges to guide effective antimicrobial therapy. These findings could guide the selection of empiric antibiotics for treating ocular infections in this region and suggest the need for routine microbiological surveillance to monitor and guide antibiotic prescription to mitigate against antibiotic resistance.

Keywords: Antibiotic resistance, bacterial isolates, eye discharge

1. Introduction

The human eye, a vital organ for vision, is vulnerable to a plethora of infectious and non-infectious diseases due to its delicate and exposed nature [1]. Among these infections, bacterial ocular infections are among the most serious due to their potential to cause severe and permanent visual impairment if not promptly and adequately treated [2]. The bacterial pathogens often implicated in ocular infections include *Staphylococcus aureus*, Pseudomonas aeruginosa, Streptococcus pneumoniae, and Haemophilus influenzae, among others [3].

In Nigeria, ocular infections are a significant public health concern, especially among individuals with low socioeconomic status and limited access to quality healthcare [4]. The Abia State University Teaching Hospital (ABSUTH), Aba, provides tertiary healthcare services to people living in Abia State and beyond, and it has been observed that there is a high incidence of eye infections among patients who present at the Ophthalmology Department [5].

Identifying the causative agents of ocular infections is critical for guiding targeted and effective treatment. This necessitates the continuous monitoring and reporting of the bacterial isolates from eye infections and their antibiotic susceptibility patterns. Unfortunately, in Nigeria, and specifically at ABSUTH, Aba, there is a lack of up-to-date, comprehensive data on the types and drug sensitivity patterns of bacterial isolates from patients with eye discharge. This hampers the effective management and control of ocular infections in this area [6].

Furthermore, the rampant and unregulated use of antibiotics, coupled with poor infection control measures, has led to an alarming rise in antibiotic resistance globally [7]. In Nigeria, like in many other low-income countries, the problem of antibiotic resistance is exacerbated by the lack of surveillance systems and the uncontrolled sale and use of antibiotics [8].

This study aims to fill the existing knowledge gap by providing comprehensive information on the types and drug sensitivity patterns of bacterial isolates from patients with eye discharge at ABSUTH, Aba. The findings from this study will provide valuable data for clinicians and healthcare providers at ABSUTH and other similar settings to improve the management of bacterial eye infections. Furthermore, the findings could contribute to the development of local antibiotic stewardship programs to combat the increasing threat of antibiotic resistance.

2. Research Methodology

2.1 Study Design and Population

This was a cross-sectional study carried out on patients presenting with eye discharge at the Abia State University Teaching Hospital, Aba, Nigeria. A total of 100 patients, both males and females, who met the study criteria were selected using a convenience sampling technique over a period of six months from January to June 2023.

2.2 Inclusion and Exclusion Criteria

Patients who had eye discharge irrespective of age, gender, and occupation, and who gave informed consent, were included in the study. Patients who were on antibiotic treatment or who did not consent to participate were excluded.

2.3 Sample Collection

Eye discharge samples were collected using sterile cotton swabs from patients presenting with eye infections. Samples were collected by gently swabbing the lower conjunctival sac without touching the eyelids or lashes. Each swab was immediately placed in a sterile tube and transported to the laboratory for analysis [9].

2.4 Bacterial Isolation and Identification

The samples were cultured on blood agar and MacConkey agar and incubated at 37 degrees Celsius for 24 hours. Bacterial growth was identified using standard microbiological techniques which included Gram staining and biochemical tests such as catalase, coagulase, indole, and citrate utilization tests [10].

2.5 Antimicrobial Susceptibility Testing

The drug sensitivity pattern of the bacterial isolates was determined using the disc diffusion method according to the guidelines of the Clinical and Laboratory Standards Institute [11]. The antibiotics tested were Chloramphenicol, Gentamycin, Erythromycin, Ciprofloxacin, Streptomycin, Amoxicillin, Levofloxacin, Ampicillin, Ofloxacin, and Perfloxacin.

2.6 Data Collection

Data on the patients' age, sex, occupation, and use of contact lenses were collected using a structured questionnaire. The questionnaire was administered by trained personnel to ensure that accurate information was gathered.

2.7 Data Analysis

Descriptive statistics were used to summarize the data. The frequencies of bacterial isolates and their antimicrobial sensitivity patterns were calculated. Relationships between variables were assessed using chi-square. All analyses were performed using the statistical package SPSS version 25.

2.8 Ethical Considerations

The study was approved by the ethics and research committee of Abia State University Teaching Hospital, Aba. Informed consent was obtained from each patient before sample collection. The study complied with the principles of the Declaration of Helsinki and all information was kept confidential.

3. RESULTS

The results of this study provide a breakdown of the different types of bacteria isolated from the eye discharge samples (Table 1). The bacteria include *Staphylococcus aureus* (26% of the samples), Coagulase negative staphylococci (21%), *Klebsiella pneumoniae* (6%), and *Proteus mirabilis* (5%).

There were 42% of the samples where no growth was observed, meaning these samples were either sterile or the bacteria present did not grow under the laboratory conditions used.

The results presented in table 2 offers information about the sex and age distribution of the patients from whom the eye discharge samples were taken. The table indicates that more samples were taken from females (64%) than males (36%). Most samples (27%) came from the age group 61-70.

The study further presented data on the frequency of the isolated bacteria in relation to the patients' use of contact lenses (Table 3). The majority of bacteria were found in patients not using contact lenses (97%) compared to those using lenses (3%).

The results presented in table 4 illustrates the correlation between the patients' occupation and the type of bacteria isolated. For instance, the most common bacteria isolated from farmers were *Staphylococcus aureus* (12%) and Coagulase negative staphylococci (10%), whereas no *Klebsiella pneumoniae* was found. The highest "no growth" samples came from traders (18%).

The results of the study further show the sensitivity patterns of the isolated bacteria to different antimicrobial agents, such as Chloramphenicol, Gentamycin, Erythromycin, Ciprofloxacin, etc (Table 5). For example, *Staphylococcus aureus* was most sensitive to Levofloxacin (85%) and most resistant to Perfloxacin (77%). It's important to note that sensitivity means that the bacteria are likely to be killed or inhibited by the antibiotic, while resistance means the bacteria are not affected by the antibiotic.

Table 1:Isolated Bacteria from samples of eye discharge at ABSUTH, Aba

Types of Bacteria	**Frequency (n = 100)**	**Percentage (%)**
Staphylococcus aureus	26	26
Coagulase negative staphylococci	21	21
Klebsiella pneumoniae	6	6
Proteus mirabilis	5	5
No growth	42	42
Total	100	100

Table 2: Sex And Age Distribution Of Patients With Eye Discharge At ABSUTH, Aba.

Age Groups	No of Males (%)	No of Females (%)	Total (%)
1-10	3(3)	2(2)	5(5)
11-20	1(1)	5(5)	6(6)
21-30	2(2)	3(3)	5(5)
31-40	6(6)	11(11)	17(17)
41-50	7(7)	9(9)	16(16)
51-60	7(7)	16(16)	23(23)
61-70	9(9)	18(18)	27(27)
71-80	1(1)	-	1(1)
Total	**36(36)**	**64(64)**	**100(100)**

Table 3: Frequency of Bacteria Isolated in Relation to Contact Lenses usage

Use of contact Lenses	*Staphylococcus Aureus*	*Coagulase negative Staphylococci*	*Klebsiella Pneumoniae*	*Proteus mirabilis*	No. growth	Total (%)
No	25	21	4	5	42	97(97)
Yes	1	0	2	0	0	3(3)
Total	26	21	6	5	42	100(100)

Table 4: Types of bacteria isolated in relation to occupation of the patients with eye discharges

Occupation	*Staphylococcus*	Coagulase	*Klebsiella*	*Proteus*	*No*

	Aureus	*Negative*	*Pneumoniae(%)*	*mirabilis(%)*	*growth (%)*
Staphylococci(%)					
Farmers	12(12)	10(10)	0(0)	3(3)	14(14)
Traders	9(9)	14(14)	2(2)	1(1)	18(18)
Students	1(1)	4(4)	4(4)	0(0)	5(5)
Retirees	3(3)	2(2)	0(0)	1(1)	3(3)
Civil Servant	1(1)	1(1)	0(0)	0(0)	2(2)
Total	26(26)	21(21)	6(6)	5(5)	42(42)

Table5: Antimicrobial Sensitivity Patterns of Isolated Bacteria

Antimicrobial agents												
Bacteria	**No of Isolates**	**Sensitive/ Resistant**	**CH(%)**	**CN(%)**	**E(%)**	**CPX(%)**	**S(%)**	**AML(%)**	**LEV(%)**	**AMP(%)**	**OFX(%)**	**PEF(%)**
Staphylococcus aureus	26	S	20(77)	18(69)	18(69)	16(61.5)	22(85)	10(38.5)	(14(73)	19(73)	6(23)	9(35)
		R	6(23)	8(31)	18(31)	10(38.5)	4(150	16(61.5)	7(27)	7(27)	20(77)	17(65)
		S	10(48)	11(52)	9(42)	8(38)	10(48)	7(33)	9(42)	10(48)	4(19)	6(29)
Coagulase negative *Staphylococci*	21	R	11(52)	10(48)	12(58)	13(63	11(52)	14(67)	12(58)	11(52)	17(81)	15(71)
Klebstella pneumoniae	6	S	1(17)	3(50)	-	-	2(33)	1(17)	-	-	39(50)	1(17)
		R	5(83)	3(50)	6(100)	6(100)	4(67)	5(83)	6(100)	6(100)	3(50)	5(83)
Proteus	5	S	4(80)	3(60)	-	2(40)	4(80)	1(20)	-	1(20)	-	1(20)

Mirabilis		R	1(20)	2(40)	5(100)	3(60)	1(20)	4(80)	5(100)	4(80)	5(100)	4(80)
Total	58	S R	35(60) 23(40)	35(60) 23(40)	27(46.5) 31(43.5)	26(45) 32(55)	38(65.) 2034.5)	20(34.5) 38(65.5)	23(40)3 35(60)	30(52) 28(48)	13(22) 45(78)	17929) 41(71)

KEY: CH = Chloramphenicol, CN = Gentamycin, E = Erythromycin, CPX = Ciprofloxacin, S = Streptomycin, AML = Amoxicillin, LEV = Levofloxacin, AMP = Ampicillin, OFX = Ofloxacin, PEF =Perfloxacin.

4. DISCUSSION

The current study aimed to evaluate the types and drug sensitivity patterns of bacterial isolates from patients with eye discharge at the Abia State University Teaching Hospital (ABSUTH), Aba, Nigeria. Out of the 100 samples analyzed, positive growth was observed in 58% of the samples, with a variety of bacteria isolated, whereas 42% exhibited no growth. The bacteria isolated include *Staphylococcus aureus* (26%), *Coagulase-negative Staphylococci* (21%), *Klebsiella pneumoniae* (6%), and *Proteus mirabilis* (5%).

Staphylococcus aureus is a common pathogen implicated in various ocular infections, such as conjunctivitis, keratitis, and endophthalmitis [12]. In a similar vein, *Coagulase-negative Staphylococci* are frequently implicated in ocular surface diseases, although these bacteria often constitute part of the normal ocular microbiota [13].

Klebsiella pneumoniae and *Proteus mirabilis*, on the other hand, are less frequently associated with ocular infections, but are nonetheless important pathogens [14]. Their lower prevalence in this study might reflect their lesser role in eye infections or could be due to geographical or other epidemiological factors.

The results of this research are broadly in line with several previous studies carried out in different parts of the world, which found *Staphylococcus aureus* and *Coagulase-negative Staphylococci* as common ocular flora and frequent causes of ocular infections [15]. The predominance of these bacteria could be attributed to their ubiquitous presence in the human environment and their opportunistic pathogenic nature. *Staphylococcus aureus*, in particular, is a leading cause of bacterial conjunctivitis and is often linked with more severe eye diseases like keratitis and endophthalmitis [16].

The presence of *Klebsiella pneumoniae* and *Proteus mirabilis*, although at lower frequencies, is noteworthy. These Gram-negative rods are more frequently associated with gastrointestinal or urinary tract infections, but they can also cause eye infections under certain circumstances, such as compromised immunity or contact with contaminated sources [3].

A significant proportion (42%) of the samples showed no bacterial growth. The absence of bacterial growth in these samples could be attributed to several factors. First, some patients might have viral, fungal, or non-infectious conjunctivitis rather than bacterial, as these are also common causes of eye discharge [17]. Another possible explanation could be the prior use of antibiotics, which might have reduced or eliminated the bacterial load below the detection limit of the culture methods used [18].

The diversity of bacterial species identified in the present study underscores the importance of culture and sensitivity testing in the management of patients with ocular infections. Timely and accurate identification of the causative pathogens and their susceptibility profiles are key to choosing the most effective antibiotic regimen, minimizing the risk of antibiotic resistance, and improving patient outcomes [19].

The results from the current study are representative of the bacterial species causing eye infections in the ABSUTH patient population. However, variations may exist in different geographical locations, different patient populations, and over time due to changes in environmental conditions, bacterial epidemiology, and antibiotic usage patterns [20].

An assessment of the antibiotic sensitivity patterns of the isolated bacteria would be crucial to guide empirical antibiotic therapy in cases of ocular infections. Previous studies have shown that resistance patterns can vary significantly, both by bacterial species and by geographical region [21]. Thus, local surveillance data, such as that generated by this study, is vital for optimal patient management.

A crucial part of the analysis involved understanding the sex and age distribution of the patients (Table 2). The results show the distribution of patients across various age groups and sexes. The age groups range from 1 to 80, encompassing the potential age demographic of the entire community. The results revealed a slight variation in the gender distribution, with a higher number of females (64%) than males (36%)

across all age groups. This could suggest potential sex-based differences in susceptibility to ocular bacterial infections, perhaps due to variations in exposure, lifestyle or hormonal factors [22].

When analyzing the results by age, the highest prevalence of eye discharge is observed in the 61-70 age group, accounting for 27% of cases, followed by the 51-60 age group with 23% of cases, and the 31-40 and 41-50 age groups with 17% and 16% respectively. This pattern suggests that older age may be a risk factor for bacterial eye infections, potentially due to a weakened immune system, comorbidities, or increased exposure to environmental factors [23].

The lower prevalence observed in the younger age groups (1-10, 11-20, and 21-30 years) is consistent with previous findings, which report lower incidence rates of ocular bacterial infections among children and young adults [24]. Nonetheless, given the possible complications associated with untreated eye infections in these populations, it is important to continue monitoring and treating these cases.

One interesting observation is the significantly lower prevalence in the 71-80 age group, accounting for only 1% of the total cases. This could be due to factors such as reduced exposure or increased use of preventive measures among this population, or it could be a statistical anomaly due to a smaller population size in this age group. Further research is necessary to understand this observation.

The higher prevalence of eye discharge in the older population (51-70 years) could be attributed to various factors such as a greater likelihood of exposure to environmental factors, systemic health conditions that predispose them to eye infections, and an increased vulnerability to infections due to an aging immune system [25]. Moreover, females were predominantly affected, which may be related to factors like exposure to cosmetic products, contact lens usage, or hormonal differences, which have been implicated in bacterial eye infections [26].

The present study focused on four different bacteria, including *Staphylococcus aureus*, *coagulase-negative Staphylococci*, *Klebsiella pneumoniae*, and *Proteus mirabilis*. Additionally, the study assessed the frequency of these bacterial infections in relation to whether the patients were using contact lenses or not.

According to the results presented in Table 3, the most frequently isolated bacterium among the total samples collected was *Staphylococcus aureus*, with 26% of the total isolates. This finding aligns with previous studies that have reported *Staphylococcus aureus* as one of the most common pathogens causing ocular infections [26]. This gram-positive bacterium is known to produce numerous virulence factors leading to a range of eye infections, from blepharitis to potentially blinding endophthalmitis [27,28].

In terms of the types of bacteria identified, the findings of the study are consistent with previous research. *Staphylococcus aureus* and *Coagulase-negative Staphylococci* are commonly isolated from cases of eye infections, due to their prevalence in the human flora and their pathogenic potential [29]. However, the significant number of non-growth samples could imply that other non-bacterial pathogens, such as viruses or fungi, might also be responsible for causing eye discharge, which might be worth further exploration [17].

Next to *Staphylococcus aureus*, *coagulase-negative Staphylococci* were detected in 21% of the samples. These bacteria, which are generally regarded as commensal organisms of the skin and mucous membranes, have been increasingly recognized as a cause of nosocomial and device-related infections, including eye infections. This could possibly explain their relatively high prevalence in the samples [14].

Klebsiella pneumoniae and *Proteus mirabilis* had a lower prevalence in the samples, with only 6% and 5% respectively. These gram-negative bacteria are less commonly associated with eye infections, but they have been implicated in severe cases of keratitis and endophthalmitis [30].

Importantly, this study revealed a significant difference in bacterial isolates between patients who used contact lenses and those who did not. Out of the total samples, 97% were from patients who did not use contact lenses, while only 3% were from patients who did. This difference may suggest that contact lens use may not significantly increase the risk of bacterial eye infections in this particular population, contrary to what has been found in some studies [31].

The significantly lower prevalence of bacterial infections in contact lens users could be due to a number of reasons. The majority of contact lens users might have been following good hygiene practices and lens care, reducing the risk of bacterial contamination [32]. Additionally, the materials used in contact lenses could potentially exhibit antimicrobial properties, further contributing to the lower incidence [26]. Nonetheless, contact lens wearers are not completely exempt from risks. The two instances of *Klebsiella pneumoniae* are noteworthy since this bacterium is not typically associated with eye infections, suggesting a possible unique risk associated with contact lens use [33].

Notably, in 42% of the samples, no bacterial growth was detected. This could be due to various factors such as sample handling, storage, and processing, or due to the presence of non-bacterial pathogens such as viruses and fungi that were not accounted for in this study.

The evaluation of the types and drug sensitivity patterns of bacterial isolates from patients with eye discharges at the Abia State University Teaching Hospital in Aba, Nigeria reveals a distinctive pattern in relation to the occupation of the patients. This research provides insight into the occupational hazards and potential risk factors for eye infections across various sectors. The distribution of bacterial isolates and their antibiotic sensitivity patterns varies significantly from one geographic region to another and from time to time [34].

The research reported a variety of bacteria, including *Staphylococcus aureus*, Coagulase Negative Staphylococci, *Klebsiella pneumoniae*, and *Proteus mirabilis*. The data in Table 4 show that 26% of all isolated bacteria were *Staphylococcus aureus*, 21% were Coagulase Negative Staphylococci, 6% were *Klebsiella pneumoniae*, 5% were *Proteus mirabilis*, and in 42% of cases, there was no growth. The type of bacteria isolated varied significantly across occupations, with some occupations more prone to specific bacterial isolates than others.

Farmers exhibited the highest incidence of *Staphylococcus aureus* (12 out of 26 cases), which is consistent with previous research indicating a higher exposure to this bacterium in agricultural environments [35]. They also showed the highest incidence of Coagulase Negative Staphylococci (10 out of 21 cases). These findings underscore the potential for occupational exposure to bacterial pathogens in farming, possibly due to factors such as close contact with animals, the use of unsterilized farm tools, and exposure to outdoor elements [36].

Traders were also significantly affected by Coagulase Negative Staphylococci (14 out of 21 cases) and *Staphylococcus aureus* (9 out of 26 cases), perhaps due to factors such as crowded markets, lack of sanitary facilities, and frequent handling of money [37]. It was noted that 2% of traders presented with *Klebsiella pneumoniae*, a bacterium commonly associated with hospital-acquired infections, which could suggest a potential link between their trading activities and hospital visitations [38].

In contrast, students primarily showed *Klebsiella pneumoniae* (4 out of 6 cases) and Coagulase Negative Staphylococci (4 out of 21 cases). *Klebsiella pneumoniae* is commonly associated with hospital-acquired infections [39], suggesting that these students might have been exposed to these bacteria within a healthcare setting or their personal living conditions. This finding could suggest a school-based transmission of these bacteria, possibly due to crowded conditions and inadequate hand hygiene practices [40].

Among the retirees, there were 3 cases each of *Staphylococcus aureus* and Coagulase Negative Staphylococci, and one case of *Proteus mirabilis*, which is often found in long-term care facilities and hospitals [41]. The relatively lower incidence among retirees could be due to less exposure to crowded places or due to the presence of other non-bacterial causes for eye discharges.

Civil servants had the least number of cases, with only one each of *Staphylococcus aureus* and Coagulase Negative Staphylococci. This could suggest a lower occupational exposure to these bacteria, perhaps due to better hygiene standards or less interaction with the public compared to other occupations [42].

In 42% of the cases, there was no growth detected. This suggests that bacterial infections may not always be the cause of eye discharge, and other causes, such as viral or allergic conjunctivitis, should be considered [17].

These findings emphasize the importance of considering occupation as a factor that can influence the prevalence and distribution of bacteria causing eye infections. This understanding can inform targeted interventions and policies to reduce the prevalence and impact of such infections among different occupational groups.

This research also focused on assessing the types and drug sensitivity patterns of bacterial isolates from patients with eye discharge. The investigation involved a total of 58 bacterial isolates, including *Staphylococcus aureus* (26 isolates), *coagulase-negative Staphylococci* (21 isolates), *Klebsiella pneumoniae* (6 isolates), and *Proteus mirabilis* (5 isolates). This observation is consistent with studies conducted in other regions, confirming that these bacteria are common pathogens responsible for eye infections [43].

The study employed ten different antimicrobial agents to test the bacteria's sensitivity or resistance to these drugs. The antibacterial used in the research were Chloramphenicol (CH), Gentamycin (CN), Erythromycin (E), Ciprofloxacin (CPX), Streptomycin (S), Amoxicillin (AML), Levofloxacin (LEV), Ampicillin (AMP), Ofloxacin (OFX), and Perfloxacin (PEF).

Staphylococcus aureus, which accounted for the largest number of isolates, demonstrated varying sensitivity and resistance patterns. For instance, *S. aureus* exhibited the highest sensitivity to Levofloxacin (85%) and Ciprofloxacin (69%) and was mostly resistant to Perfloxacin (77%) and Ofloxacin (61.5%). On the other hand, *coagulase-negative Staphylococci* showed the highest sensitivity to Perfloxacin (81%) and Levofloxacin (67%), and the highest resistance to Erythromycin and Ciprofloxacin (both 48%). This corresponds with recent studies, which have documented a high level of resistance to certain antibiotics, such as penicillin and ampicillin among *Staphylococcus aureus*[44].

The *Klebsiella pneumoniae* isolates revealed a distinct sensitivity and resistance pattern. They were mostly resistant to all the antimicrobial agents, except for Gentamycin and Perfloxacin, which recorded a 50% sensitivity level each. *Proteus mirabilis*, with the least number of isolates, was highly sensitive to Chloramphenicol (80%) and Streptomycin (80%), but resistant to Erythromycin, Ampicillin, and Perfloxacin (all at 100%).These findings resonate with global concerns about antibiotic resistance in Gram-negative bacteria like *Klebsiella pneumoniae* and *Proteus mirabilis*[45].

In summary, among all the bacteria and drugs tested, the highest sensitivity was observed with *S. aureus* to Levofloxacin (85%), and the highest resistance was seen with *Klebsiella pneumoniae* to Erythromycin, Ciprofloxacin, Levofloxacin, Ampicillin, and Perfloxacin (all at 100%). These results shed light on the existing antibiotic sensitivity and resistance patterns prevalent in the region and help guide effective therapeutic strategies[46].

Prior studies, such as a research recently conducted by Egyir*et al*. [47] also highlighted the varying levels of resistance and sensitivity among different bacterial isolates to various antibiotics. This supports the findings of the present study, emphasizing the importance of ongoing monitoring of antibiotic sensitivity patterns in order to guide effective treatment strategies [47].

Meanwhile, the high resistance observed for *Klebsiella pneumoniae* and *Proteus mirabilis* in this study is of significant concern. This trend of resistance aligns with the global issue of antimicrobial resistance, which is an increasingly recognized threat to global health [48].

Local antibiograms such as this one conducted at the Abia State University Teaching Hospital are valuable tools for healthcare providers. They guide the selection of empirical antimicrobial therapy and the development of local antimicrobial stewardship initiatives, ultimately leading to improved patient outcomes.

5. CONCLUSION

These results indicate that the bacterial strains isolated from patients' eye discharges showed diverse sensitivity and resistance patterns to the tested antimicrobial agents. This has significant implications for the treatment of bacterial eye infections, particularly in the context of increasing antimicrobial resistance. It underscores the need for continuous surveillance of antimicrobial susceptibility patterns, which can guide appropriate antibiotic selection in clinical practice, thereby enhancing patient outcomes and minimizing the spread of antibiotic resistance.

6. RECOMMENDATIONS

The research has provided valuable insights into the types and drug sensitivity patterns of bacterial isolates from patients with eye discharge at Abia State University Teaching Hospital, Aba, Nigeria. In light of the findings, the following recommendations are proposed:

i. **Implementation of Effective Infection Control Measures**: Given that *Staphylococcus aureus* and Coagulase negative Staphylococci were the most prevalent bacteria isolated from eye discharges, there is a need for enhanced hygiene and infection control measures, particularly among those who are more vulnerable to bacterial eye infections such as traders and farmers.

ii. **Promotion of Hygienic Use of Contact Lenses**: The data suggests that the majority of individuals with bacterial isolates did not use contact lenses, although some contact lens users had bacterial isolates. Given the potential for contact lenses to harbor bacteria and exacerbate infections, there should be a strong emphasis on promoting hygienic practices in contact lens use, including regular cleaning and disinfection.

iii. **Antimicrobial Stewardship**: Based on the antimicrobial sensitivity patterns revealed in this study, Chloramphenicol, Gentamycin, and Amoxicillin have shown the highest efficacy against the isolated bacteria. However, a significant portion of the bacteria were resistant to these drugs, suggesting a need for prudent use of antibiotics to prevent the emergence and spread of resistant strains.

iv. **Ongoing Surveillance and Research**: Continued surveillance and further research is crucial to keep track of the changing patterns of bacterial isolates and their antimicrobial sensitivity. This will ensure that the most effective antibiotics are prescribed, and emerging trends in resistance can be identified and managed promptly.

v. **Education and Awareness**: The population should be educated about the signs and symptoms of bacterial eye infections, the importance of seeking prompt medical attention, and the potential dangers of self-medication. It's also important to raise awareness about the appropriate use of antibiotics to help curb the development of antibiotic resistance.

vi. **Specific Policies for Vulnerable Populations**: As the research shows that bacterial eye infections are more prevalent among certain occupations and age groups, targeted policies and preventive measures should be put in place to protect these vulnerable populations. This may include regular screenings, easy access to healthcare services, and specific educational programs.

vii. **Comprehensive Eye Care Services**: Since bacterial eye infections were prevalent in all age groups, there should be comprehensive eye care services available at primary healthcare facilities. Early detection and treatment of these infections can help prevent complications and promote overall eye health.

viii. **Collaboration with Pharmaceutical Companies**: There is a need for the development of new antibiotics given the level of resistance observed. Collaborations between researchers, healthcare institutions, and pharmaceutical companies should be encouraged to expedite the development of new and effective antimicrobial agents.

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