RESEARCH PAPER

Antimicrobial susceptibility and sensitivity patterns of agents responsible for otitis externa in a private tertiary health institution, South West Nigeria

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Abstract

Background: Otitis externa is a common otologic condition in tropical regions, yet data on its microbiological profile and antimicrobial susceptibility patterns in private tertiary healthcare settings in Nigeria remain limited. Understanding local epidemiology is essential for guiding empirical therapy and combating antimicrobial resistance.

Objective: To determine the socio-demographic characteristics, clinical presentation, microbiological isolates, and antimicrobial sensitivity patterns among patients with otitis externa at a private tertiary health institution in South West Nigeria.

Materials and Methods: A retrospective cross-sectional study was conducted among 79 patients with clinically diagnosed otitis externa. Data on age, sex, occupation, presenting complaints, predisposing factors, ear examination findings, ear swab culture results, and antimicrobial susceptibility (Kirby-Bauer disk diffusion per CLSI guidelines) were extracted from medical records. Analysis was performed using SPSS version 22.0.

Results: The mean age was 19.9 ± 18.9 years (range: 1–72 years), with females comprising 55.7% (n=44). Students accounted for 40.5% (n=32). Ear discharge (51.9%) and self-ear cleansing (35.4%) were the most common presenting complaint and predisposing factor, respectively. Pseudomonas spp. was the predominant isolate (39.2%), followed by Proteus spp. (8.9%) and Klebsiella spp. (7.6%). No growth occurred in 10.2%. Fluoroquinolones (ciprofloxacin, levofloxacin) and anti-pseudomonal cephalosporins (ceftazidime) demonstrated frequent sensitivity patterns.

Conclusion: Pseudomonas spp. is the leading pathogen in otitis externa in this setting. Empirical therapy with topical fluoroquinolones is supported. Self-ear cleansing represents a modifiable risk factor requiring public health intervention. Continued antimicrobial surveillance is warranted.

Keywords: Otitis externa; antimicrobial susceptibility; Pseudomonas aeruginosa; Nigeria; ear swab culture; fluoroquinolones.

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Introduction

Otitis externa, an inflammation of the external auditory canal, presents a significant clinical concern due to its impact on auditory health and quality of life. The condition is commonly caused by bacterial and fungal infections, which can be exacerbated by environmental factors such as moisture, trauma, and the use of hearing aids[1,2]. In Nigeria, the burden of otitis externa is compounded by limited access to healthcare services and varying patterns of antimicrobial susceptibility[3,4]. These pathogens, necessitating a thorough investigation into the sensitivity profiles of these agents.

Numerous studies have identified a spectrum of microorganisms associated with otitis externa, including Staphylococcus aureus, Pseudomonas aeruginosa, and various species of fungi such as

Candida[5,6]. The predominance of these pathogens can differ based on geographical location and prevailing environmental conditions[7,8]. For instance, a study conducted in a similar demographic context revealed that Pseudomonas aeruginosa was the most frequently isolated pathogen, emphasizing the need for region-specific data to inform treatment protocols[9,10]. With rising concerns about antibiotic resistance, it is paramount to assess the susceptibility patterns of these organisms to commonly prescribed antimicrobials, allowing healthcare providers to make informed decisions.

Antimicrobial resistance (AMR) remains a global health challenge that complicates the management of infections[11]. The emergence of resistant strains has been documented in various regions, leading to treatment failures and prolonged morbidity in patients[12]. Research indicates that inappropriate use of antibiotics, inadequate dosage, and incomplete courses of treatment contribute significantly to the development of AMR[13,14]. Therefore, routine surveillance of antimicrobial susceptibility patterns is crucial for effective clinical management and to guide empirical therapy in outpatient and inpatient settings.

The objective of this study is to evaluate the antimicrobial susceptibility and sensitivity patterns of pathogens responsible for otitis externa at a private tertiary health institution in South West Nigeria. By identifying the most common causative agents and their respective resistance profiles, the study aims to provide a comprehensive understanding of the local epidemiology of otitis externa, which can ultimately guide clinical practices and inform public health strategies. It is anticipated that the findings will serve as a resource for healthcare professionals, contributing to improved treatment outcomes and enhancing the overall management of otitis externa in the region.

Furthermore, this research seeks to fill the existing gap in literature concerning the local epidemiology of otitis externa and its microbiological profile. With the lack of extensive studies and published data on this subject in South West Nigeria, this study could serve as a model for similar research in other regions facing comparable public health challenges. By aligning our objectives with the global push for antibiotic stewardship, we hope to underscore the importance of region-specific antimicrobial susceptibility data in addressing AMR and improving the management of otitis externa.

Materials and Methods

This was a hospital-based retrospective cross-sectional study conducted at a private tertiary health institution in South West Nigeria. The hospital serves a mixed urban and peri-urban population, including students, civil servants, and self-employed individuals, with a catchment area extending across Lagos, Oyo, Osun, and Ogun states.

The need for individual informed consent was waived due to the retrospective nature of the data, and all patient records were anonymized and de-identified prior to analysis. The study adhered to the principles of the Declaration of Helsinki.

A total of 79 participants met the inclusion criteria and were enrolled consecutively.

Inclusion criteria: All patients with a clinical diagnosis of otitis externa (acute or chronic). Attended the Ear, Nose, and Throat (ENT) outpatient clinic between January 2023 and December 2024. Had a completed ear swab microscopy, culture, and sensitivity (MCS) result available in the medical record

Exclusion criteria: Patients with malignant otitis externa or otitis media with perforation. Incomplete medical records (missing age, sex, presenting complaints, or MCS results). Ear swabs collected after initiation of systemic antibiotic therapy (to avoid culture-negative bias).

Data were extracted from paper-based and electronic medical records using a structured proforma developed for this study. The proforma captured the variables on socio-demographic data including age (years), sex (male/female) and occupation (categorized into student, civil servant, self-employed, housewife, retiree, others)

Clinical variables included presenting complaints (ear pain, ear discharge, feeling of blockage, itching, others). Affected ear (left, right, bilateral). Predisposing factors (self-ear cleansing, trauma, allergy, others). Ear examination findings (hyperemia, discharge, debris, edema, tragal tenderness)

Microbiological variables such as organism(s) isolated from ear swab culture. Antimicrobial susceptibility patterns (sensitive/resistant to specific agents)

Two independent data extractors (both senior medical officers) performed the extraction to minimize errors. Discrepancies were resolved by consensus and by a third reviewer (consultant microbiologist).

Ear swabs were obtained by ENT physicians using sterile cotton-tipped swabs (Sterile®, UK). The external auditory canal was first cleansed of debris if necessary. The swab was gently rotated against the medial wall of the canal near the tympanic membrane, then immediately placed into Amies transport medium and transported to the hospital microbiology laboratory within 1–2 hours of collection.

All samples were processed in the hospital's accredited microbiology laboratory following standard operating procedures.

Swabs were inoculated onto: Blood agar (Oxoid, UK) – incubated aerobically at 35–37°C for 24–48 hours. MacConkey agar (Oxoid, UK) – incubated aerobically at 35–37°C for 24 hours. Chocolate agar – incubated

in 5–8% CO_2 at 35–37°C for 24–48 hours. Sabouraud dextrose agar (with chloramphenicol) – incubated at 25°C for up to 7 days for fungal isolation.

Bacterial isolates were identified by: Gram staining, Colony morphology, and Standard biochemical tests: catalase, coagulase (for staphylococci), oxidase, indole, urease, citrate utilization, triple sugar iron (TSI) agar, and motility tests

Fungal isolates were identified by: Lactophenol cotton blue mount microscopy. Colony characteristics on Sabouraud dextrose agar

Reference strains (Escherichia coli ATCC 25922, Staphylococcus aureus ATCC 25923, Pseudomonas aeruginosa ATCC 27853) were used for quality control of culture media and biochemical tests.

Antimicrobial susceptibility was determined using the Kirby-Bauer disk diffusion method on Mueller-Hinton agar (Oxoid, UK), following Clinical and Laboratory Standards Institute (CLSI) guidelines (CLSI M100, current edition at the time of testing). The following antibiotic disks (Oxoid, UK) were tested, based on local formulary and CLSI recommendations for ear isolates.

Anti-pseudomonal agents like Ceftazidime (30 µg), Ciprofloxacin (5 µg), Levofloxacin (5 µg), Meropenem (10 µg), Imipenem (10 µg), Gentamicin (10 µg), Amikacin (30 µg), Colistin (10 µg), and Piperacillin-tazobactam (100/10 µg). Other antibiotics were Amoxicillin (25 µg), Amoxicillin-clavulanate (20/10 µg), Ceftriaxone (30 µg), Cefuroxime (30 µg), Cefixime (5 µg), Ofloxacin (5 µg), Azithromycin (15 µg), and Erythromycin (15 µg)

Zone diameters were measured using a calibrated ruler and interpreted according to CLSI breakpoints. Isolates were classified as Sensitive, Intermediate, or Resistant. For this analysis, intermediate results were grouped with resistant (non-susceptible) unless otherwise specified.

For fungal isolates, antifungal susceptibility was not routinely performed, consistent with local laboratory policy for outpatient otomycosis.

Data collected were collated and were subsequently entered into Microsoft Excel (version 2019) and exported to IBM SPSS Statistics version 22.0 (IBM Corp., Armonk, NY, USA) for analysis.

Categorical variables (age, sex, occupation, predisposing factors, affected ear, organism isolated) were summarized as frequencies (n) and percentages (%).

Proportion of each bacterial and fungal isolate. Percentage of isolates sensitive to each tested antibiotic

To minimize information bias, all laboratory results were extracted directly from standardized MCS report forms. Selection bias was reduced by including all eligible patients within the study period (consecutive sampling). However, as a single-center retrospective study, causality cannot be inferred, and findings may not be generalizable to public tertiary or primary care settings in Nigeria. Additionally, the absence of antifungal susceptibility testing and the potential for prior antibiotic use (despite exclusion criteria) are acknowledged limitations.

Results

4.1 Socio-Demographic Characteristics of respondents

The result presented in the study showed mean age and standard deviation of 19.9±18.9. Result revealed that 40.5% of respondents are students while 7.6% are Civil servant. Other occupations indicated in the study includes Missionary workers (2.6%), house wife (1.3%), Plumber (1.3%), Retiree (1.3%), Self-employed (1.3%), Health worker (1.3%), and Transporter (1.3%).

Study also revealed that female participant are 55.7% while their male counterpart falls below average at 44.3%.

Table 4.1: Socio-Demographic Characteristics of the participants in study

Variables and Items to be considered	**Respondents in this Study N=79**	
	N	%
SOCIO-DEMOGRAPHIC DATA		
Gender;		
Male	35	44.3
Female	44	55.7
Occupation;		
Missionary	2	2.6
Civil servant	6	7.6
Housewife	1	1.3
Plumber	1	1.3
Retiree	1	1.3
Self-employed	2	2.5
Student	32	40.5
Health worker	1	1.3
Transporter	1	1.3

4.2 Presenting complaints

Data from this section of the study revealed that slightly more than half (51.9%) of the patients that took part in the study complained of ear discharge while 35.4% had ear pain, while 7.6% presented feeling of blockage, while 2.5% complained of itching.

Further research revealed that other presenting complaints includes Ear pain (20.3%), reduced hearing (1.3%), and other pains (1.3%).

Table 4.2: Showing the presenting complaints given by participants

Variables and Items to be considered	Respondents in this Study N=79	
	N	%
Presenting Complaints		
Ear pain	28	35.4
Ear Discharge	41	51.9
Feeling of Blockage	6	7.6
Itching	2	2.5
Others	2	2.5
IF OTHERS;		
Ear pain + Itching	18	22.9
Ear pain + Reduced hearing	1	1.3

4.3 Affected ear

Data also revealed that 45.6% of participants complained that their Left ear is the affected ear, while those affected in Right ear are 36.7%. Those that have their both ear affected are 17.7%.

Table 4.3: Showing the affected ear among respondents

Variables and Items to be considered	Respondents in this Study N=79	
	N	%
Affected ear;		
Left	36	45.6
Right	29	36.7
Both	14	17.7

4.4 Predisposing factors

The instrument that measured predisposing factors revealed that 35.4% reported self-ear cleansing as one predisposing factor, 3.8% identified Trauma as another predisposing factor. However, only 1 participant (1.3%) reported other predisposing factor such allergy and trauma. On the other hand, 59.5% were unable to report the predisposing factor that led to the health issue.

Table 4.4: Showing the Predisposing factors of respondents

Variables and Items to be considered	Respondents in this Study N=79	
	N	%
Predisposing factors;		
Self-ear cleansing	28	35.4
Trauma	3	3.8
Others	1	1.3
IF OTHERS;		
Allergy and Trauma	2	2.6

4.5 Ear examination

Result of from ear examination revealed the following in participants such as Hyperaemia (10.1%), Discharge only (68.4%), Debris only (16.5%) and others (3.8%) such as edematous canal (1.3%), Tragal tenderness plus hyperaemic EAC (1.3%), Debris and Discharge 10.1%

Table 4.5: Showing the result from ear examination of participants

Variables and Items to be considered	Respondents in this Study N=79	
	N	%
Ear examination;		
Hyperaemia	8	10.1
Discharge	54	68.4
Debris	13	16.5
Others	4	5.1
Other Ear Examination;		

Debris + Discharge	8	10.1
Edematous canal	1	1.3
Tragal tenderness + Edematous EAC	1	1.3
Tragal tenderness + Hyperaemic EAC	1	1.3

4.6 Ear swab MCS - Organism

Result from the ear swab MCS revealed the growth of so many organisms. However, data shows that among several that were identified, *Pseudomonas spp* had the highest growth of 39.2% followed by *Proteus spp* (8.9%) and *Klebsiella* (7.6%). Others includes Coagulase (-) staphylococcus (6.3%), *Aspergillus fumigatus spp* (3.8%), *Candida albican* (3.8%), *Staphylococcus aureus* (3.8%) among others.

Table 4.6: Ear swab MCS – Organism of participants in study

Variables and Items to be considered	**Respondents in this Study N=79**	
	N	%
Ear swab MCS_Organism		
Aspergillus fumigatus spp;	3	3.8
Candida albican	3	3.8
Coagulase (-) Staph. + Ecoli	1	1.3
Coagulase (-) Staph. + Pseudomonas	1	1.3
Coagulase (-) Staph.	5	6.3
Coagulase (-) Staph. + Fungi	1	1.3
Coagulase (-) Staph. + Candida albicaus	1	1.3
E. coli	1	1.3
Gram (+) Cocci	1	1.3
Gram (-) bacilli + Heavy growth of Proteus	1	1.3
Klepsiella	6	7.6
Klepsiella + Pseudomona	1	1.3
No growth	8	10.2
Proteus spp	7	8.9
Pseudomonas spp	31	39.2
Pseudomonas aureginosa	2	2.5
Staph + Klepsiella	1	1.3
Staphylococcus aureus	3	3.8
Staph aureus + Pseudomonas aureginosa	1	1.3

4.7 Ear swab MCS - Sensitivity

Result from the ear swab revealed so many of this organism are sensitive to some identified drug. It further revealed that it is sensitive to the combination of those drugs as shown in the table below.

Table 4.7: Ear swab MCS – Sensitivity

Variables and Items to be considered	**Respondents in this Study N=79**	
	N	%
Ear swab MCS_Sensitivity		
Ceftazidime, Ceftriaxone, Cefuroxime, Meropenem, Gentamycine	1	1.3
Amoxicillin	1	1..3
Amoxicillin, Ciprofloxacin, Ceftriaxone, Gentamycine	1	1.3
Amoxicillin, Ceftriaxone, Ceftazidine	1	1.3
Amoxicillin, Ceftriaxone, Cefuroxime, Levofloxacin, Colistin, Amikacin	1	1.3
Amoxicillin, Cefuroxime	2	2.5
Amikacin, Ceftazidime, Colistin	1	1.3

Amikacin, Ceftazidime, Imipenem	1	1.3
Amikacin, Ciprofloxacin, Ceftazidime, Meropenem	1	1.3
Amikacin, Ciprofloxacin, Ceftazidime, Meropenem, Colistin, Tazobactam	1	1.3
Amikacin, Ciprofloxacin, Levofloxacin, Ceftriaxone	1	1.3
Amikacin, Ciprofloxacin, Levofloxacin, Colistin	1	1.3
Amikacin, Gentamycin, Ciprofloxacin, Levofloxacin, Ceftriaxone, Colistin	1	1.3
Amikacin, Levofloxacin, Ceftriaxone	1	1.3
Amikacin, Levofloxacin, Gentamycin, Ceftazidime, Ciprofloxacin	1	1.3
Ampicillin, Amikacin, Amoxicillin, Ciprofloxacin	1	1.3
Ceftazidime, Ceftriaxone	1	1.3
Ceftazidime, Ceftriaxone, Ciprofloxacin, Gentamycin	1	1.3
Ceftazidime, Ceftriaxone, Meropenem, Tazobactam, Levofloxacin	1	1.3
Ceftazidime, Cefuroxime, Ceftriaxone, Amoxicillin	1	1.3
Ceftazidime, Cefuroxime, Ceftriaxone, Gentamycin, Ciprofloxacin	1	1.3
Ceftazidime, Levofloxacin, Ceftriaxone	1	1.3
Ceftazidime, Tazobactam, Colistin	1	1.3
Cefixime, Amikacin, Gentamycin, Levofloxacin, Ceftriaxone, Cefuroxime	1	1.3
Ciprofloxacin, Azithromycin, Meropenem	1	1.3
Ciprofloxacin, Ceftazidime, Meropenem	1	1.3
Ciprofloxacin, Ceftriaxone, Ceftazidime, Cefuroxime, Meropenem	1	1.3
Ciprofloxacin, Levofloxacin	1	1.3
Ciprofloxacin, Levofloxacin, Amikacin, Ceftazidime, Gentamycin, Ceftriaxone, Colistin	1	1.3
Ciprofloxacin, Levofloxacin, Amikacin, Meropenem	1	1.3
Ciprofloxacin, Levofloxacin, Ceftazidime	1	1.3
Ciprofloxacin, Levofloxacin, Ceftriaxone,	1	1.3

Ceftazidime, Meropenem		
Ciprofloxacin, Levofloxacin, Gentamycin	1	1.3
Ciprofloxacin, Levofloxacin, Meropenem	1	1.3
Ciprofloxacin, Ofloxacin, Levofloxacin	1	1.3
Gentamycin, Augumentin, Levofloxacin, Ceftriaxone, Ceftazidime	1	1.3
Gentamycin, Ceftazidime, Ceftriaxone	1	1.3
Gentamycin, Ceftazidime, Meropenem, Tazobactam	1	1.3
Gentamycin, Ciprofloxacin, Ceftazidime	1	1.3
Gentamycin, Ciprofloxacin, Ceftriaxone, Ceftazidime	1	1.3
Gentamycin, Ciprofloxacin, Ceftriaxone, Ceftazidime, Levofloxacin	1	1.3
Gentamycin, Ciprofloxacin, Ceftriaxone, Ceftazidime, Meropenem, Tazobactam	1	1.3
Gentamycin, Ciprofloxacin, Levofloxacin,	1	1.3
Ceftriaxone, Ceftazidime		
Gentamycin, Ciprofloxacin, Levofloxacin, Ceftriaxone, Ceftazidime, Meropenem	1	1.3
Gentamycin, Levofloxacin, Ceftazidime, Tazobactam	1	1.3
Imipenem, Amikacin, Ciprofloxacin	1	1.3
Levofloxacin	3	3.8
Levofloxacin, Gentamycin, Colistin	1	1.3
Levofloxacin, Gentamycin, Colistin, Ceftazidime, Tazobactam	1	1.3
Meropenem	1	1.3
Meropenem, Ceftazidime, Amikacin, Ceftriaxone	1	1.3
Meropenem, Ciprofloxacin	1	1.3
Meropenem, Ciprofloxacin, Ceftazidime	1	1.3
Meropenem, Ciprofloxacin, Cefuroxime	1	1.3
Meropenem, Colistin, Gentamycin, Ceftazidime	1	1.3
Ofloxacin, Erythromycin, Perfloxacin	1	1.3
Tazobactam, Ceftazidime,	1	1.3

	Levofloxacin, Meropenem

Discussion

This retrospective study of patients with otitis externa in a private tertiary health institution in South West Nigeria provides critical insights into the socio-demographic, clinical, and microbiological profiles of this condition, with a particular focus on antimicrobial susceptibility patterns. The study population showed a female predominance (55.7%), consistent with findings from earlier Nigerian studies which reported female-to-male ratios of 1.2:1 and 1.4:1 respectively in patients with otitis externa[15,16]. This female preponderance may reflect higher health-seeking behavior among women in South West Nigeria rather than true biological susceptibility, as women often prioritize family health and present earlier with symptoms[15].

Students constituted the largest occupational group (40.5%), which aligns with the mean age of 19.9 ± 18.9 years. This finding corroborates the work reported that adolescents and young adults in Nigerian tertiary institutions are at increased risk due to shared living environments, use of personal audio devices, and limited ear hygiene education[17]. The wide standard deviation (18.9) indicates substantial age heterogeneity, ranging from infants to the elderly, reflecting the broad community burden of otitis externa in this setting.

Unlike studies from temperate climates where otitis externa peaks in older adults[18]. Our findings demonstrate a bimodal distribution with a significant pediatric and young adult component—a pattern consistent with tropical otolaryngology literature[15].

Ear discharge (otorrhea) was the most common presenting complaint (51.9%), followed by ear pain (35.4%). This hierarchy differs from the classic description by a study that identified otalgia as the predominant symptom in acute otitis externa[19]. The predominance of discharge in our cohort may reflect delayed presentation, chronicity, or a higher proportion of fungal or mixed infections, which are known to produce more profuse discharge[20].

The combination of ear pain and itching (22.9%) is clinically significant, as pruritus is often underreported. According to report the presence of both pain and itching suggests a mixed inflammatory process involving both bacterial and possible fungal elements[21]. This has therapeutic implications: empirical therapy should consider antifungal coverage in patients presenting with this symptom cluster. The low proportion of isolated itching (2.5%) alone suggests that most patients seek care only when more distressing symptoms (discharge or pain) develop, highlighting a need for public education on early recognition of otitis externa.

Unilateral involvement (left ear 45.6%, right ear 36.7%) was more common than bilateral disease (17.7%). This finding is consistent with international literature which reported that 70–80% of otitis externa cases are unilateral[22]. The slight left-ear predominance observed here has been noted by other African researchers though its mechanism remains speculative[23]. Possible explanations include handedness-related self-cleaning practices or sleeping position-related moisture trapping.

The bilateral involvement rate of 17.7% is higher than the 5–10% reported in European studies which may indicate a greater environmental or behavioral risk burden in this Nigerian cohort, such as swimming in untreated water or humidity exposure during the rainy season.[24]

Self-ear cleansing was the predominant predisposing factor (35.4%), a finding that mirrors the systematic review by study that identified ear picking as the most common modifiable risk factor for otitis externa globally[15]. In the Nigerian context, study reported that up to 68% of adults use cotton swabs, hairpins, or rolled cloth to clean their ears, often believing this improves hygiene[25]. In reality, such practices remove protective cerumen, cause microabrasions, and inoculate pathogens into the external auditory canal.

Trauma alone (3.8%) and combined allergy with trauma (2.6%) were less frequent, consistent with hospital-based studies rather than emergency department data[26]. The low rate of isolated allergy as a predisposing factor is notable, though atopic diathesis may still play a role in chronic or recurrent cases[27]. Public health implication: Interventions discouraging self-ear cleansing could substantially reduce the incidence of otitis externa in this population.

Discharge was the dominant physical finding (68.4%), which aligns with the high prevalence of otorrhea as a presenting complaint. Debris (16.5%) and hyperemia (10.1%) were less common as isolated findings, though combined debris and discharge occurred in an additional 10.1% of patients. This pattern is characteristic of subacute or chronic otitis externa, as opposed to the classical "hot, red, swollen canal" described in acute cellulitic presentations[28].

Oedematous canal and tragal tenderness—classic signs of acute otitis externa—were observed in only a small minority (<2% each). This suggests that many patients presented after the acute inflammatory phase had already evolved to a suppurative stage, or that the clinical spectrum in this Nigerian cohort differs from Western descriptions. As noted by report, delayed presentation is common in resource-limited settings due to cost barriers and self-medication[29].

Pseudomonas spp. was the most frequently isolated organism (39.2%), with P. aeruginosa identified separately in an additional 2.5%, bringing total pseudomonal involvement to 41.8%. This finding strongly aligns with global microbiological data. A meta-analysis reported that P. aeruginosa accounts for 30–45% of bacterial isolates in otitis externa worldwide[30]. Similarly, Nigerian studies found pseudomonal prevalence rates of 38.7% and 42.1%[3,16].

Other gram-negative organisms included Proteus spp. (8.9%) and Klebsiella spp. (7.6%), which are recognized pathogens in chronic suppurative ear disease, particularly in tropical climates[31]. Gram-positive isolates, including S. aureus (3.8%) and coagulase-negative staphylococci (6.3%), were less common—a finding consistent with the work that S. aureus predominates in acute otitis externa in some settings but is often supplanted by Pseudomonas in chronic or treated cases[5].

Fungal isolates (Aspergillus fumigatus 3.8%, Candida albicans 3.8%) were present but less frequent than in studies from more humid regions of Nigeria. Study reported fungal isolation rates of 15–25% in similar tropical settings[32]. The lower fungal rate here may reflect differences in sampling technique (e.g., failure to use Sabouraud agar routinely) or true epidemiological variation.

Notably, 10.2% of swabs showed no growth, which may be due to prior antibiotic use, inadequate sampling, or non-infectious otitis externa. This rate is comparable to the 8–12% reported by other study[33].

The antimicrobial susceptibility data demonstrated considerable heterogeneity, with many unique sensitivity profiles each occurring in only one or two patients. However, several meaningful patterns emerged when profiles were analyzed collectively.

Fluoroquinolones (ciprofloxacin, levofloxacin, ofloxacin) appeared frequently in sensitive profiles. This is consistent with current treatment guidelines: the Infectious Diseases Society of America (IDSA) and the American Academy of Otolaryngology recommend topical fluoroquinolones as first-line therapy for acute otitis externa[34]. Ciprofloxacin has excellent activity against P. aeruginosa and S. aureus, the dominant pathogens in our cohort.

Aminoglycosides (gentamicin, amikacin) also showed good sensitivity patterns, supporting their continued utility as topical or systemic therapy. However, caution is warranted in a study that aminoglycosides carry a risk of ototoxicity if used in the presence of a tympanic membrane perforation, though this was excluded in our study[35].

Anti-pseudomonal cephalosporins (ceftazidime) were commonly paired with ciprofloxacin or gentamicin, reflecting guideline-concordant combination therapy for pseudomonal infections[36].

A small subset of isolates showed sensitivity to colistin and tazobactam combinations, raising the possibility of multidrug-resistant (MDR) or extended-spectrum beta-lactamase (ESBL)-producing organisms. While not widespread, this finding is concerning and aligns with emerging resistance patterns reported in Nigeria[37]. Continued surveillance and antimicrobial stewardship are essential to preserve last-line agents.

Limitations

Key limitations include reliance on retrospective data with incomplete records (e.g., symptom duration, prior antibiotics), which may introduce bias. The single private tertiary center in South West Nigeria limits generalizability to public hospitals or other regions. Excluding empirically treated patients may have selected for more severe cases. No antifungal susceptibility testing was performed, and retrospective design prevented reliable disease duration classification. Subgroup analyses were underpowered, and prior antibiotic use (despite exclusions) may have reduced culture yield (10.2% no growth).

Recommendations

Empirical therapy for otitis externa in South West Nigeria should include anti-pseudomonal coverage (e.g., ciprofloxacin). Health campaigns should discourage inserting objects into the ear. Microbiological diagnosis is advised for recurrent/refractory cases. Add antifungals if itching or discharge >4 weeks. Schools should teach ear hygiene, and public health authorities should mandate ear-canal warnings. Antibiotic stewardship is needed to counter emerging colistin/tazobactam resistance. Future research should be multicenter, report antibiotic-specific sensitivity percentages, include antifungal susceptibility testing, and link microbiological findings to treatment outcomes.

Conclusion

This retrospective study of 79 patients in a private Nigerian tertiary hospital found that otitis externa predominantly affects females and students, with self-ear cleansing as the main risk factor. Pseudomonas (41.8%) was the leading pathogen; fluoroquinolones remain empirically appropriate. However, emerging colistin/tazobactam-only sensitivity signals possible multidrug resistance. The condition affects all ages (mean 19.9 years), with highest burden in young adults and children. Public health efforts should discourage ear cleaning, target Pseudomonas, and maintain antimicrobial surveillance. Larger prospective multicenter studies are needed.

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Conflict of Interest:
Nil

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