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Epidemiology and Resistance Profile of *Staphylococcus* spp. Strains Isolated at the Biomedical Laboratory of the Abass NDAO Hospital Center in Dakar from January 1, 2020, to December 31, 2024

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A B S T R A C T

This study focuses on staphylococci isolated in a hospital setting and analyzes their susceptibility and resistance profiles regarding major antibiotics. Among a total of 502 strains, a clear predominance of *Staphylococcus aureus* was observed, primarily in purulent samples. Interpretation of the antibiograms revealed particularly high resistance to penicillin, indicating the persistence of β-lactamase-producing strains. Conversely, key agents such as vancomycin, aminoglycosides, fluoroquinolones, and chloramphenicol retained satisfactory activity against the majority of isolates. Coagulase-negative staphylococci exhibited generally low resistance rates, despite some variations across antibiotic classes. These findings underscore the need for continuous microbiological monitoring and the judicious use of antibiotics to limit the spread of multidrug-resistant strains. This work contributes to the local understanding of antimicrobial resistance and serves as a valuable tool for optimizing the management of staphylococcal infections.

Introduction

Bacterial infections pose a major challenge to global public health, particularly in hospital settings where antibiotic resistance is continuously rising (Tong *et al.,* 2015). Among the most significant pathogens are bacteria of the genus *Staphylococcus*, which are responsible for a wide spectrum of infections ranging from mild skin conditions to septicemia, endocarditis, pneumonia, and medical device-associated infections (Tong *et al.,* 2015).

Staphylococci are ubiquitous microorganisms—widely distributed in air, soil, and water—yet they also form part of the commensal flora of human and animal skin and mucous membranes (Aïcha Marceline Sarr, 2014).

Staphylococcus aureus is a major opportunistic pathogen capable of resisting both the immune system and antibiotics; the emergence of methicillin-resistant strains (MRSA) complicates treatment efforts (David and Daum, 2010). Coagulase-negative staphylococci (CoNS), long dismissed as mere contaminants, are now recognized as agents of nosocomial infections in vulnerable patients (Becker *et al.,* 2014). The issue of antibiotic resistance is particularly concerning in sub-Saharan Africa, where surveillance remains inadequate and the unregulated use of antibiotics fosters the emergence of multidrug-resistant strains (Faye-Kette *et al.,* 2004; WHO, 2017).

In response to this situation, Senegal adopted a multisectoral national plan to combat antimicrobial resistance in 2017, based on the "One Health" approach (Republic of Senegal, 2017). This strategy aims to strengthen surveillance and promote the prudent use of antibiotics through national guidelines (Senegalese Ministry of Health, 2009). In this context, studying local *Staphylococcus* resistance profiles is essential for guiding therapeutic strategies and contributing to the fight against antimicrobial resistance. As a referral hospital, the Abass Ndao Hospital Center in Dakar provides a suitable setting for conducting this analysis. Studying the 2020–2024 period allows for an assessment of epidemiological trends, changes in resistance profiles, and the impact of therapeutic practices—particularly given the currently limited local data available in Senegal.

The research question is as follows: how have *Staphylococcus* resistance profiles evolved at the Abass Ndao Hospital Center between 2020 and 2024, and what are the implications for therapeutic management? Our primary hypothesis is that there is significant and evolving resistance among *Staphylococcus* strains, particularly to antibiotics commonly used in clinical practice.

The general objective of this study is to assess the prevalence and antimicrobial resistance profiles of Staphylococcus strains isolated at the Abass Ndao Hospital Center between 2020 and 2024. Specifically, the study aims to determine the prevalence and distribution of the different *Staphylococcus* species isolated; characterize the epidemiological profile of the isolates according to patients' age, sex, specimen type, and sample origin; and evaluate the antimicrobial resistance patterns of the isolated *Staphylococci* against the principal antibiotics commonly used in clinical practice.

Materials and Methods

Study Setting

The Abass Ndao Hospital Center, located in the Gueule Tapée district of Dakar, is a Level III public health facility. As a referral hospital, it fulfills a threefold mission: patient care, teaching, and research. It comprises medical, surgical, and medico-technical departments. Key medical and surgical departments include internal medicine, general surgery, gynecology-obstetrics, pediatrics, maternity services, and ophthalmology. The facility also houses an Emergency Department and a nephrology department with a dialysis unit. Additionally, the hospital features a medical analysis laboratory (covering biochemistry, hematology, immunoserology, and bacteriology-parasitology), a radiology department, and a hospital pharmacy.

Study Type and Period

This is a retrospective study conducted over the period from January 2020 to December 2024.

Study population

The study population consisted of patients at the Abass Ndao Hospital Center in Dakar from whom *Staphylococcus spp*. strains were isolated between the period of study, based on various clinical samples collected during inpatient or outpatient care.

Inclusion criterion

Patients included in this study were those whose samples tested positive for *Staphylococcus* spp. during the study period.

Non-inclusion criterion

Patients with contaminated or unusable samples, or samples with incomplete data, were non included.

Materials and Methods

Materials

The types of biological samples analyzed included urine, blood, pus, puncture fluids, and vaginal swabs. Collection required the use of sterile containers, cotton wool, syringes (used for clamping), swabs, sterile tubes, and blood culture bottles. Laboratory analysis equipment included an optical microscope, microscope slides and coverslips, an incubator, an anaerobic jar, a Bunsen burner, calibrated loops, Pasteur pipettes, and test tube racks. Various culture media were also used, notably CLED, MH, BT, Chapman, and MHSC. The Gram staining kit consisted of crystal violet, Lugol's iodine, 95% alcohol, and fuchsin. Additional materials included immersion oil, hydrogen peroxide, isotonic sodium chloride solution (saline), an antibiotic disk dispenser, sterile swabs, a refrigerator, yellow and blue pipette tips, trays, and antibiotic disks.

Methodology

Sample Collection

The samples analyzed in this study were obtained from both inpatients and outpatients at the Abass Ndao Hospital Center in Dakar. Specimens included pus, urine, blood, vaginal and urethral swabs, and aspirated fluids (pleural, synovial, peritoneal, and cerebrospinal). Samples were collected using standardized procedures specific to each sample type, in compliance with aseptic protocols. Pus samples were obtained via syringe aspiration or swabbing; urine was collected in a sterile container following genital cleansing or via urinary catheterization; blood cultures were performed via venipuncture; urethral samples were taken using a sterile swab; and aspirated fluids were collected via aseptic puncture. Samples were promptly transported to the laboratory in properly labeled sterile containers and processed as quickly as possible in accordance with the bacteriology laboratory's standardized procedures.

Sample Inoculation

Upon arrival at the laboratory, samples were inoculated onto various culture media selected to promote bacterial growth and enable identification. Several media were used: blood agar (MHSC) for general culture and the observation of hemolysis; Chapman agar (mannitol salt agar) to select for staphylococci, particularly *Staphylococcus aureus*; and CLED agar for urine samples, facilitating species differentiation. Inoculation was performed under aseptic conditions using sterile loops, Pasteur pipettes, or swabs, depending on the sample type. The quadrant streak method was employed to obtain isolated colonies. Petri dishes were then incubated at 37°C for 24 to 48 hours in either an aerobic or anaerobic atmosphere, depending on the requirements of the target microorganisms. Additionally, a macroscopic examination of each sample was conducted prior to microbiological analysis; observed characteristics included the color, consistency, and odor of the specimen. Microscopic examination was also performed by directly observing the specimen under a light microscope (at ×40 magnification) using a slide and coverslip to assess the cellular and microbiological elements present. This step yields cultures suitable for strain identification and antimicrobial susceptibility testing.

Strain identification

Laboratory identification of species within the genus *Staphylococcus* relies on phenotypic tests that distinguish them from other Gram-positive cocci. These methods are essential for differentiating pathogenic species from commensal ones and confirming their presence in clinical samples.

Gram staining

Gram staining is the most widely used staining method in medical bacteriology. It allows bacteria to be stained and distinguished during direct examination based on their ability to retain gentian violet (Gram-positive) or fuchsin (Gram-negative). The procedure is as follows:

Gram staining was performed on a previously fixed smear. A few drops of gentian violet (crystal violet) were applied to the smear and left for one minute, staining the bacterial cytoplasm. The slide was then briefly rinsed with tap water. Lugol's solution was applied for one minute to fix the dye within the bacterial cell wall, followed by a water rinse.

Decolorization was carried out using alcohol for approximately 20 to 30 seconds—until the violet color disappeared-after which the slide was rinsed with water to halt the process. A fuchsin counterstain was applied for one minute, followed by rinsing and air-drying. Microscopic examination was then performed using a 100x objective lens with immersion oil.

Gram-positive bacteria appear violet, whereas Gram-negative bacteria stain pink. After staining, *Staphylococcus aureus* appears as Gram-positive cocci, arranged in pairs (diplococci) or grape-like clusters.

Catalase test

Catalase is an enzyme that catalyzes the dismutation of hydrogen peroxide into water and oxygen: 2 $H_2O_2 \rightarrow$ 2 $H_2O + O_2$.

This test distinguishes the Micrococcacae family (catalase-positive) from the Streptococcacae family (catalase-negative). The formation of bubbles upon the addition of hydrogen peroxide indicates a positive reaction (Figure 1).

Coagulase test

The coagulase test is used to differentiate coagulase-positive staphylococci, such as *Staphylococcus aureus*, from coagulase-negative species. After incubating an inoculated Petri dish at 37°C for 24 hours, a colony is picked and placed in a tube containing an equal-parts mixture of human plasma and physiological saline. This mixture is then incubated at 37°C. Coagulation of the plasma, observed between 2 and 4 hours, indicates a positive result (Figure 2).

Antibiogram

An antibiogram is a laboratory method used to determine the susceptibility or resistance of a bacterium to a range of antibiotics.

In this study, antimicrobial susceptibility testing was a crucial step in evaluating the sensitivity of the isolated bacterial strains to antibiotics. This method helped guide bacterial identification and confirm certain hypotheses, but above all, it allowed for the determination of the resistance or susceptibility profiles of the tested strains.

Strain preparation

After incubating the culture media for 24 hours, suspected colonies were isolated. Two sterile hemolysis tubes were used to prepare the inoculum:

- ✓ The first tube contained 5 ml of sterile physiological saline.
- ✓ The second tube contained 1 ml of physiological saline, to which a pure colony to be tested was added.

After mixing, 20 µL of the contents of the second tube (containing the colony) were transferred into the first tube (the 5 ml one). This step aimed to produce a standardized bacterial suspension equivalent to a 0.5 McFarland standard, which is necessary to ensure the reliability of the susceptibility test.

Inoculation onto Mueller-Hinton agar

Using a sterile swab soaked in the prepared suspension, the inoculum was spread over the entire surface of a Mueller-Hinton agar plate.

Spreading was performed using three crosswise passes to ensure uniform distribution of the strain across the medium (Figure 3).

Application of antibiotic disks

After the medium had dried, antibiotic disks were placed using sterile forceps. For Gram-positive cocci (*Staphylococcus*), the antibiotics tested were:

Erythromycin, cefoxitin, penicillin G, kanamycin, vancomycin, chloramphenicol, fusidic acid, pristinamycin, gentamicin, oxacillin, tetracycline, ciprofloxacin, amikacin, and lincomycin (Figure 4).

Incubation, reading, and interpretation

The inoculated plates were incubated at 37°C for 18 to 24 hours. Readings were taken by measuring the diameters of the zones of inhibition around each antibiotic disk using a millimeter ruler.

Results were interpreted according to the 2023 CA-SFM (Antibiogram Committee of the French Society for Microbiology) standards, classifying strains as susceptible (S), intermediate (I), or resistant (R) (Figure 5).

Statistical analysis

Data were entered using Microsoft Excel 2013 software. Descriptive analysis was performed using Epi Info software (version 7.2.6.0), allowing for the calculation of frequencies, percentages, and mean age.

The graphs were created using Microsoft Excel 2013. Associations between the variables studied were examined using the chi-square test, with a significance level set at 5% ($p < 0.05$).

Results and Discussion

Epidemiological profile

Prevalence of staphylococcal infections

Over a five-year period (2020–2024), out of 19,211 (100%) samples collected, we isolated 502 *Staphylococcus* strains, representing 2.61% of the total (Figure 6). The mean age of the patients was 43.35 ± 22.27 years, with a median of 48 years and a range of 0 to 88 years.

Microbiological profile

Distribution of the different *Staphylococcus* species isolated

A total of 502 *Staphylococcus* strains were isolated from various types of samples, including urine, blood, pus, puncture fluids (pleural, synovial, peritoneal, and cerebrospinal), vaginal swabs, and urethral swabs. Among these strains, 94.42% (474/502) were identified as coagulase-positive staphylococci (CPS), while 5.58% (28/502) were coagulase-negative staphylococci (CNS) (Table I).

Distribution of *Staphylococcus* species by age

Coagulase-negative staphylococci (CoNS) were predominantly found in subjects aged 21 to 40 years, accounting for 32.14% of isolates, followed by patients aged 60 years and older (28.57%). Subjects aged 0 to 20 years were the least represented, at 14.29%. Regarding coagulase-positive staphylococci (CoPS), they were primarily isolated from patients aged 41 to 60 years (32.70%), followed by the 0–20 (20.89%) and 21–40 (19.83%) age groups, while subjects aged 60 years and older accounted for the smallest proportion. However, no statistically significant difference was observed in the distribution of these strains according to age (Figure 10; chi-square = 3.04; p = 0.3856) (Figure 7).

Distribution of *Staphylococcus* species by sex

Coagulase-negative staphylococci (CoNS) were predominantly found in subjects aged 21 to 40 years, accounting for 32.14% of isolates, followed by patients aged 60 years and older (28.57%). Subjects aged 0 to 20 years were the least represented, at 14.29%. Regarding coagulase-positive staphylococci (CoPS), they were primarily isolated from patients aged 41 to 60 years (32.70%), followed by the 0–20 (20.89%) and 21–40 (19.83%) age groups, while subjects aged 60 years and older accounted for the smallest proportion. However, we did not observe a statistically significant difference in the distribution of these strains according to age (Figure 10; chi-square = 3.04; p = 0.3856) (Figure 8).

Distribution of *Staphylococcus* species by department of origin

The graph highlights a clear predominance of coagulase-positive staphylococci (CPS) in both inpatient and outpatient settings. Among inpatients, CPS account for 84.46% of isolates, compared to 4.98% for coagulase-negative staphylococci (CNS). Among outpatients, CPS account for 9.96% of isolates, while CNS account for 0.60%. No statistically significant difference was observed between the strain type and the patient setting (inpatient vs. outpatient) (p = 0.9203) (Figure 9).

Distribution of *Staphylococcus* species by sample type

The graph shows a clear predominance of coagulase-positive Staphylococci (CPS) in pus samples, where they account for approximately 77.49% of isolates, compared to only 2.99% for CNS. In other sample types, the proportions of CPS remain low: 8.96% in urine, 4.38% in vaginal swabs, 2.39% in blood, and less than 2% in other sites. CNS remain a minority overall, with values ranging between 1% and 3% depending on the sample type (Figure 10). However, a highly significant association is noted between the nature of the clinical sample and the type of *Staphylococcus* strain isolated (Figure 13; p = 0.0023).

Antibiotic resistance of isolated strains

Resistance of coagulase-positive Staphylococci (CPS) to the antibiotics tested

Analysis of the results presented in Figure 11 shows that coagulase-positive staphylococcus (CPS) strains exhibit high resistance to penicillin (95.36%), moderate resistance to cefoxitin (31.22%) and oxacillin (31.68%), and intermediate resistance to erythromycin (28.00%), ciprofloxacin (19.57%), lincomycin (19.31%), pristinamycin (18.31%), and norfloxacin (17.77%). Low resistance is observed with fusidic acid (10.62%), kanamycin (11.90%), and gentamicin (7.40%). Chloramphenicol shows a resistance rate of only 4.41%, while vancomycin remains fully active (0% resistance).

Antibiotic resistance of coagulase-negative Staphylococci (CoNS)

According to the results shown in Figure 12, coagulase-negative staphylococci (CoNS) strains exhibit very high resistance to penicillin (96.43%). Moderate resistance is observed for cefoxitin (37.04%), oxacillin (37.04%), erythromycin (38.46%), tetracycline (35.29%), and kanamycin (28.57%). The strains show lower resistance rates to gentamicin (20%), fusidic acid (21.43%), pristinamycin (22.73%), lincomycin (25%), and norfloxacin (18.52%). Ciprofloxacin shows good activity, with only 17.86% of strains being resistant. Finally, no resistance was observed with vancomycin or chloramphenicol (0%).

The aim of this study was to evaluate the prevalence and resistance profile of *Staphylococcus* strains isolated at the Abass Ndao Hospital Center between 2020 and 2024. Out of 19,211 samples analyzed, 502 *Staphylococcus* strains were isolated (2.61%); this frequency is lower than those reported elsewhere in Senegal, such as the 30.3% rate of *Staphylococcus aureus* in cases of bacteremia at Fann Hospital and the 43.77% rate of *Staphylococcus* spp. isolated from positive blood cultures at the Albert Royer National Children's Hospital (Thioub *et al.,* 2024; Dieye *et al.,* 2026). It is also lower than the prevalence observed in wound infections in Somalia, where the overall prevalence of staphylococci reached 21% (Zubair *et al.,* 2025). Among these, *Staphylococcus aureus* accounted for 94.42% (474/502) of the isolates, compared to 5.58% (28/502) for coagulase-negative Staphylococci (CoNS), reflecting a strong predominance of coagulase-positive strains. This proportion is higher than that reported in Nigeria (83.61%) (Ibrahim *et al.,* 2019), whereas the frequency of CoNS remains comparable to that observed in Somalia (4.6%) (Zubair *et al.,* 2025). These discrepancies may be attributed to geographical context, the type of patients treated, the categories of samples studied, and local practices regarding sample collection and microbiological interpretation. Analysis by gender shows a slight male predominance (52.59% versus 47.41% for women). This profile is consistent with previous work conducted at the same institution, where a male predominance was reported in both parts of the study, with 54.63% men in the prospective series and 62.25% in the retrospective series. At the regional level, data from an Algerian hospital show a female predominance, with 52.72% women and 47.27% men among the infected hospitalized patients (Bezzar, 2014). These discrepancies may be attributed to differences in sampling across studies—specifically sample size, study period, inclusion criteria, and the characteristics of the study population. They may also reflect variations in risk factors and patient management practices between facilities. From a microbiological perspective, coagulase-negative Staphylococci (CoNS) predominate in subjects aged 21 to 40 (32.14%), whereas coagulase-positive Staphylococci (CoPS) peak in the 41–60 age group (32.70%). This distribution differs from that reported by Badla (2018), where CoNS were less represented in the 21–40 age group (11.11%) and CoPS reached 25.92% in older subjects, reflecting variations linked to the populations studied. Our results show that 84.46% of CoPS isolates originated in a hospital setting. This hospital-based predominance is also observed in Greece and Romania, where 71% of *Staphylococcus aureus* infections involve hospitalized patients (Vittorakis *et al.,* 2024), as well as in Senegal, where 71.9% of methicillin-resistant *S. aureus* strains are hospital-acquired compared to 28.1% being community-acquired.

These findings underscore the pivotal role of healthcare facilities as a primary reservoir for Staphylococci, a situation driven by antibiotic pressure and cross-transmission within care units. A clear predominance of SCPs is observed in pus samples, reaching a rate of 77.49%. This trend is also documented in Senegal, where 46.5% of *Staphylococcus aureus* isolates originated from pus, as well as in Nepal, with a comparable proportion of 78.95% (Sapkota *et al.,* 2019). Similarly, pus was the primary site of *S. aureus* isolation in Morocco, with a rate of 19%. Conversely, the low proportion of coagulase-negative Staphylococci (CoNS) in pus samples observed in this study (2.99%) contrasts with the 21.6% reported in India (Raina *et al.,* 2020). Antibiotic susceptibility testing reveals very high resistance of *S. aureus* to penicillin, reaching 95.36%. These results are comparable to those reported in Algeria, where 95.23% resistance to penicillin was observed (Benguesmia and Rabehi, 2016).

Figure.1 Photo of catalase production

Figure.2 Photo of the coagulase test

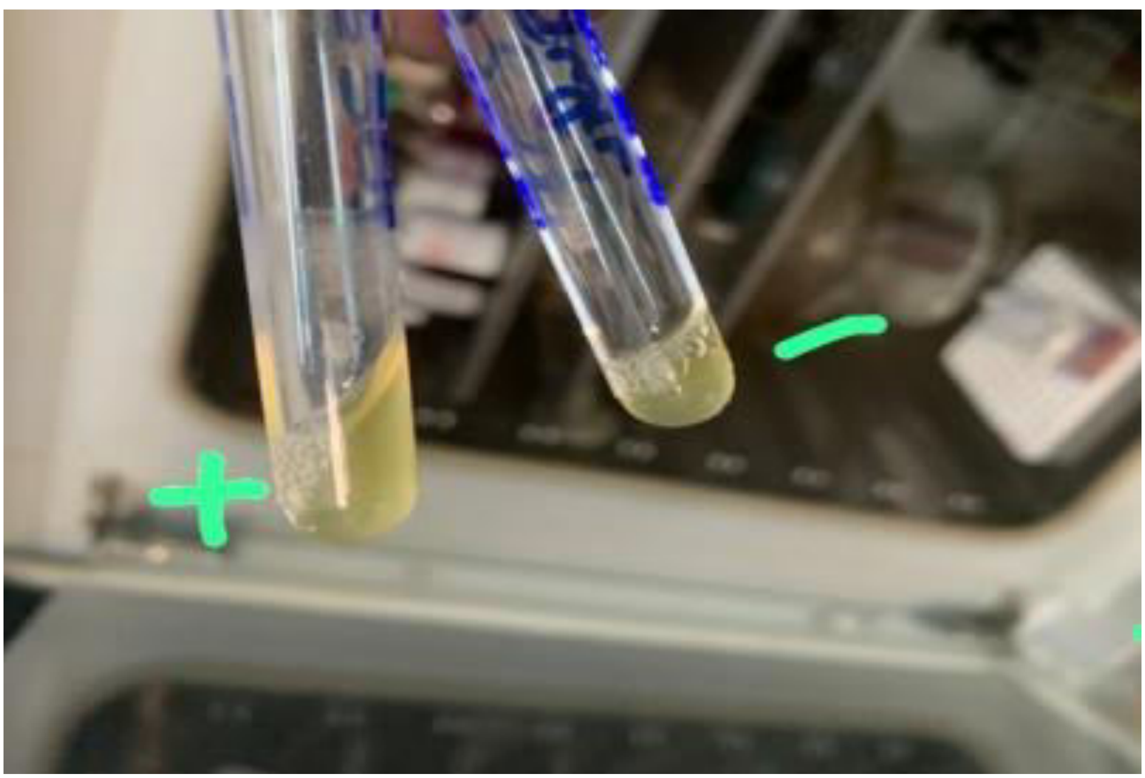

Figure.3 Inoculation on agar

Figure.4 Application of antibiotic discs on MH agar

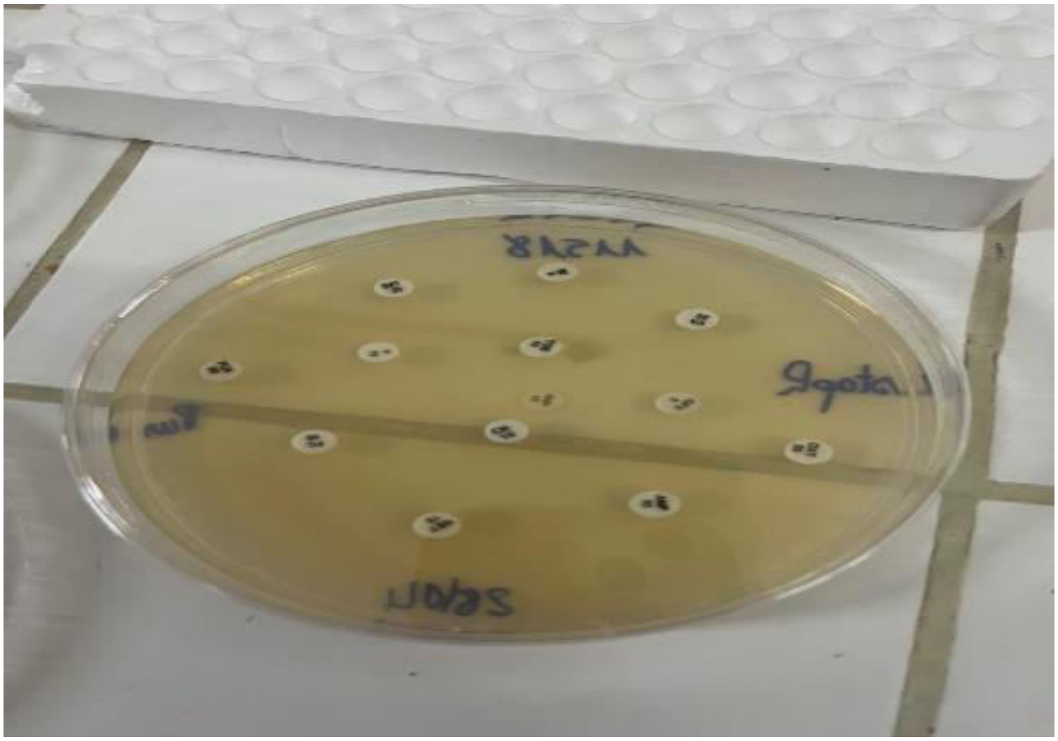

Figure.5 Antibiotic susceptibility test results

Figure.6 Prevalence of staphylococcal infections

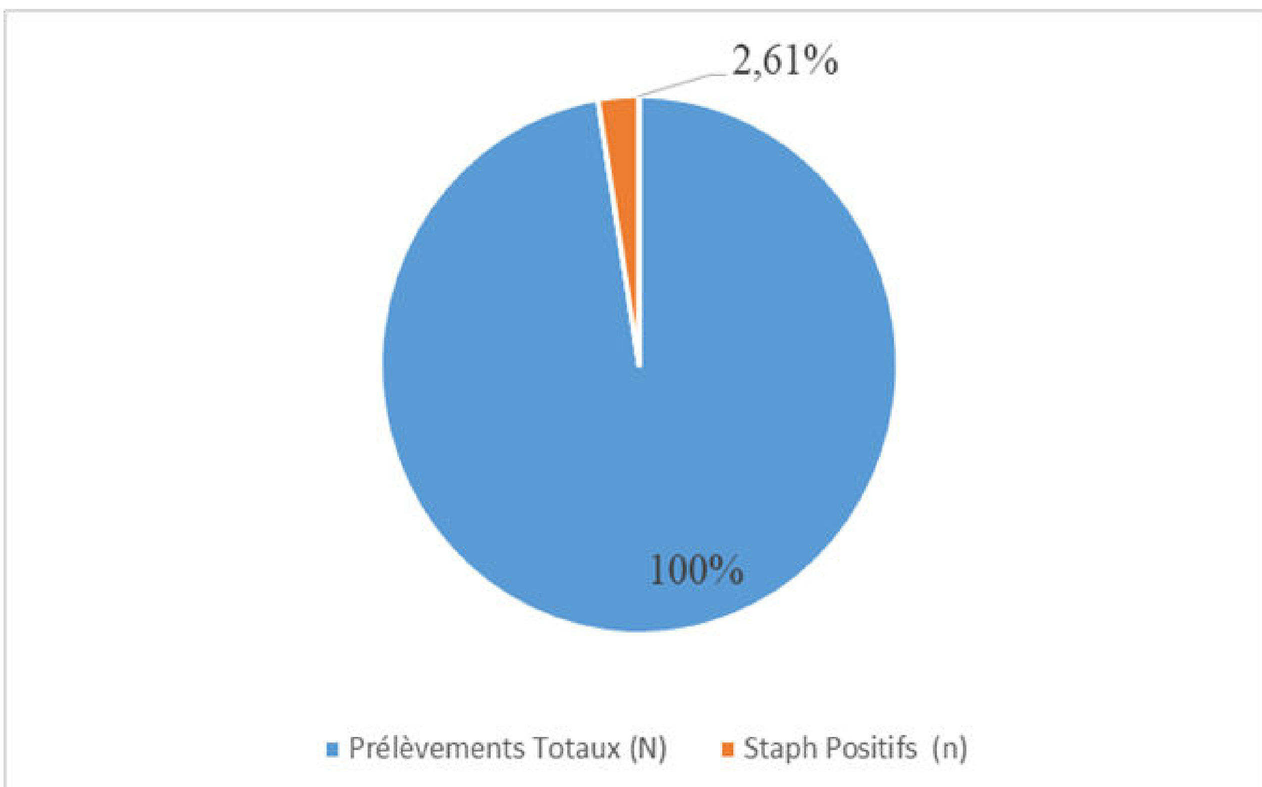

Figure.7 Distribution of Staphylococcus strains by age

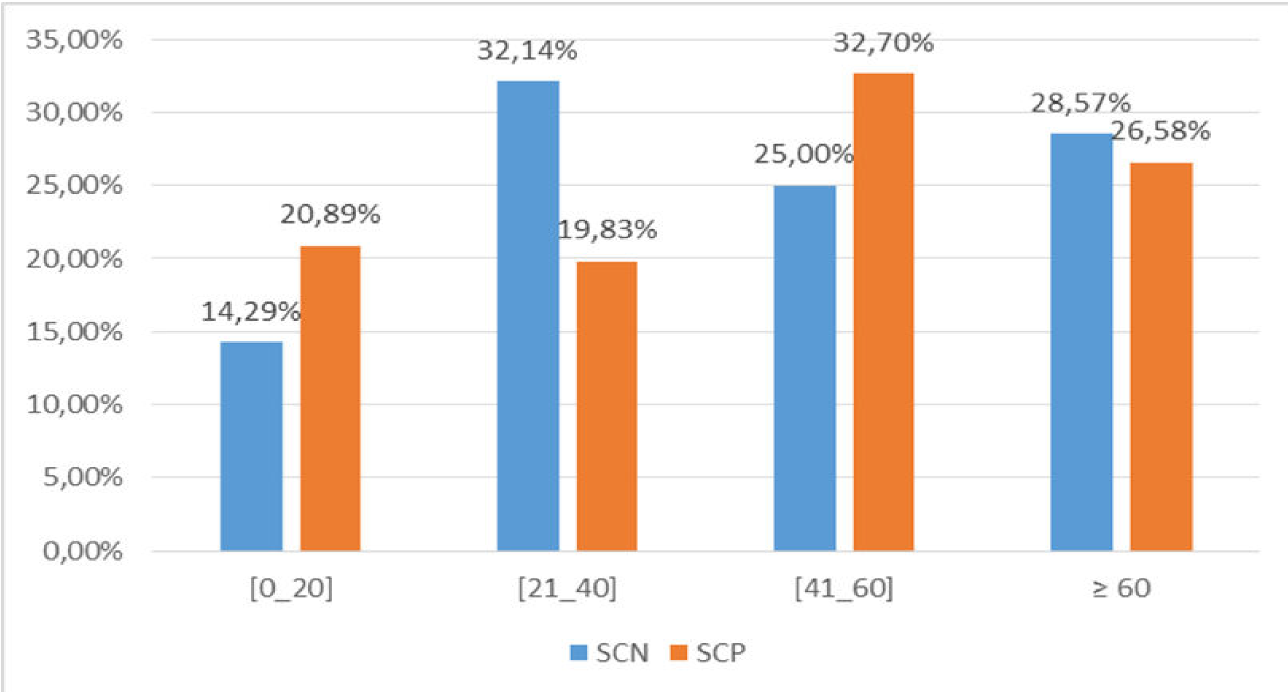

Figure.8 Histogram showing distribution of Staphylococcus by gender

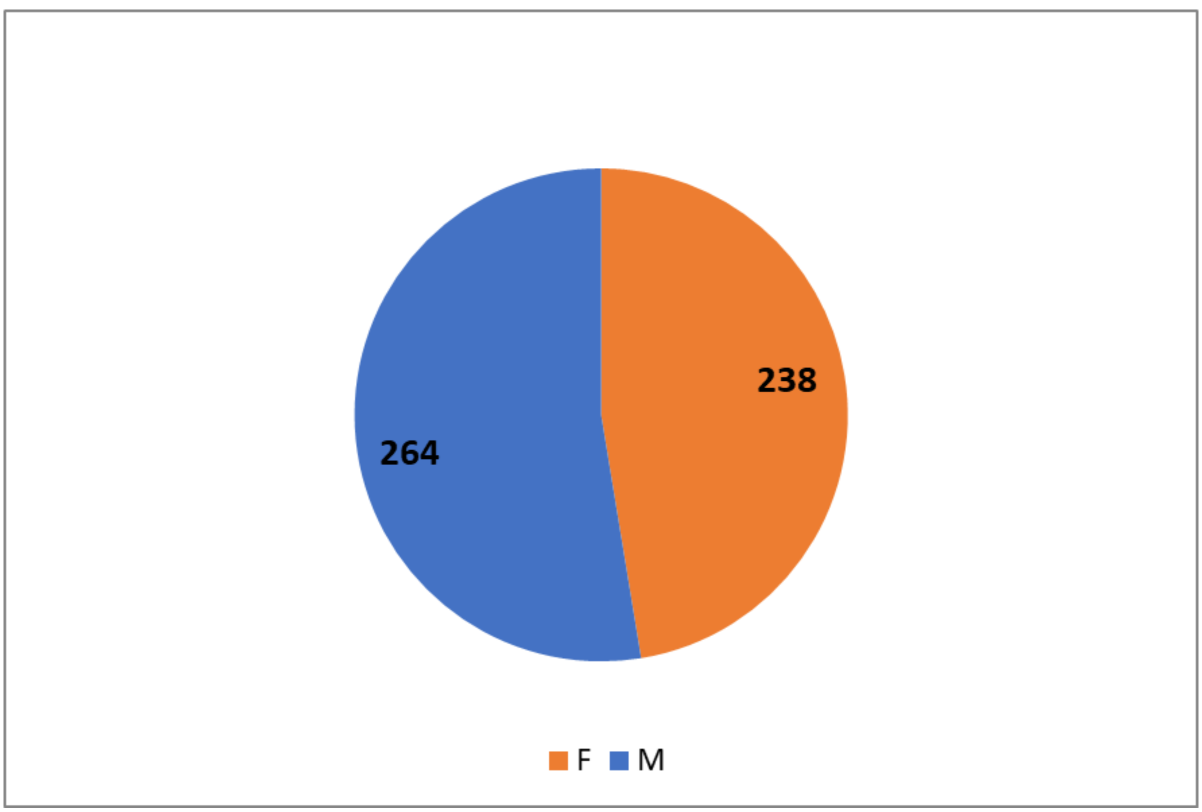

Figure.9 Distribution of *Staphylococcus* by originating department

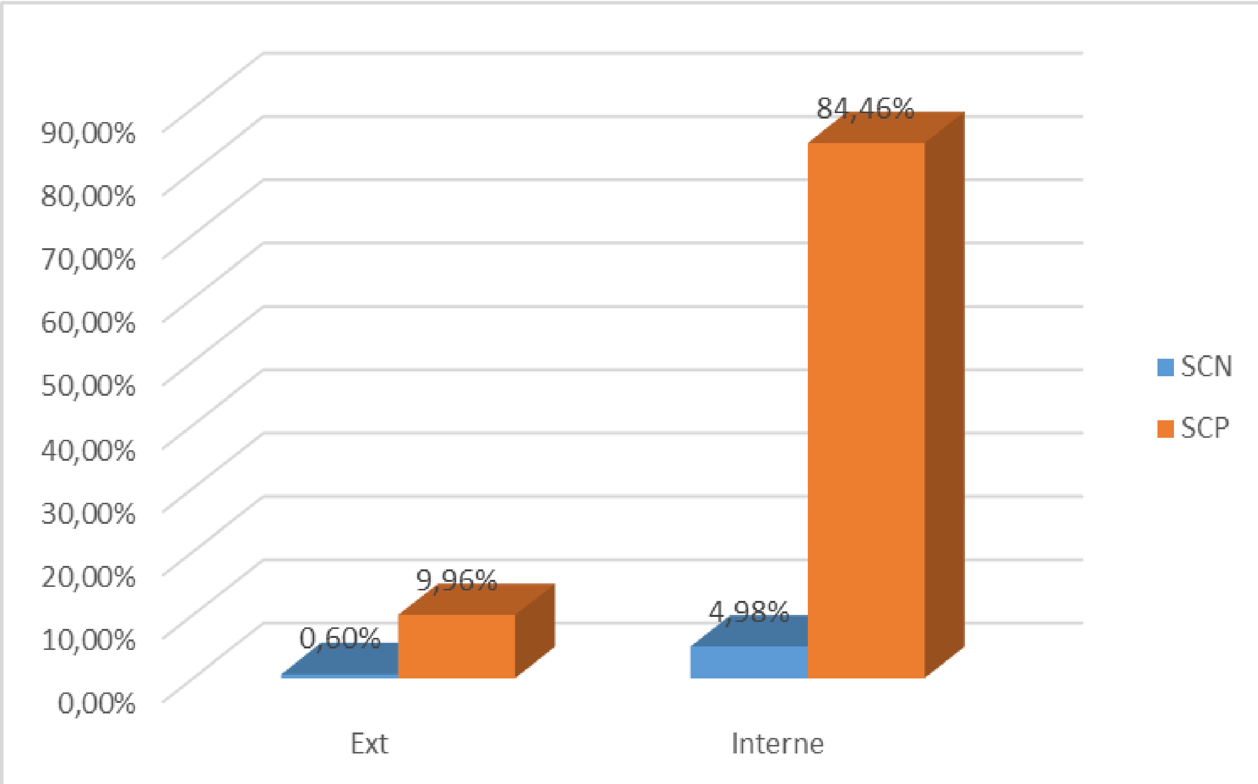

Figure.10 Distribution of Staphylococcus strains by sample type

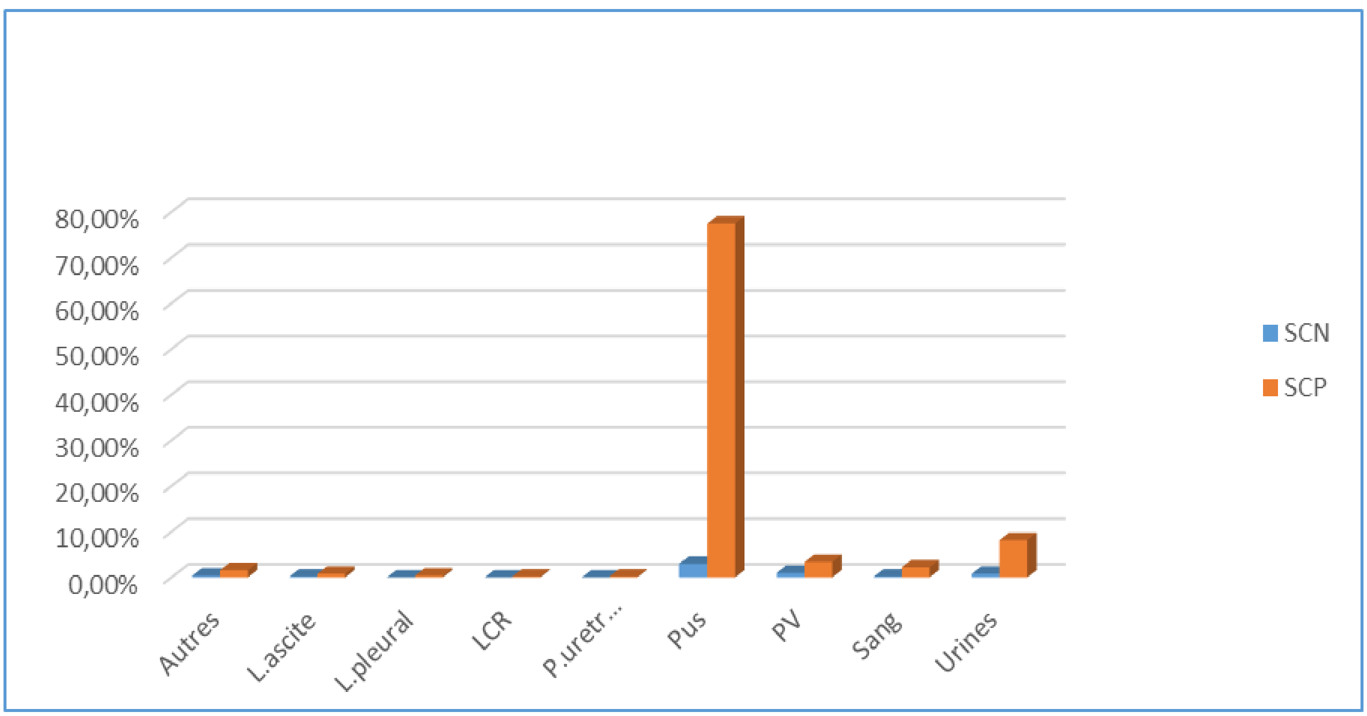

Figure.11 Antibiotic susceptibility of CPS strains.

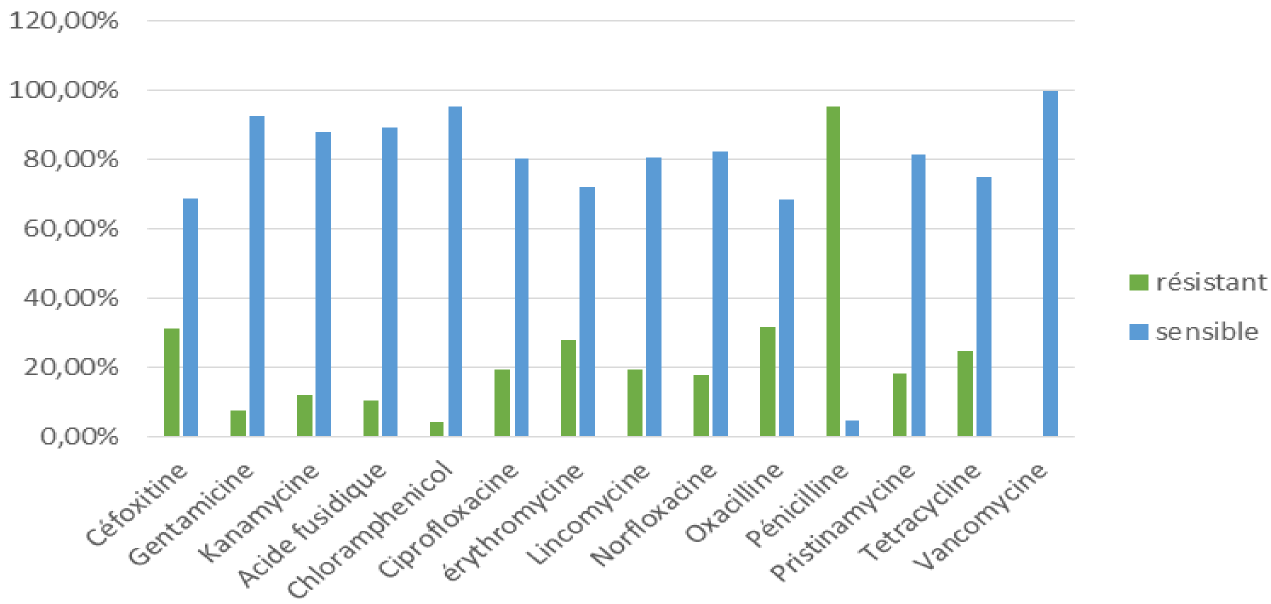

Figure.12 Antibiotic susceptibility of CNS strains

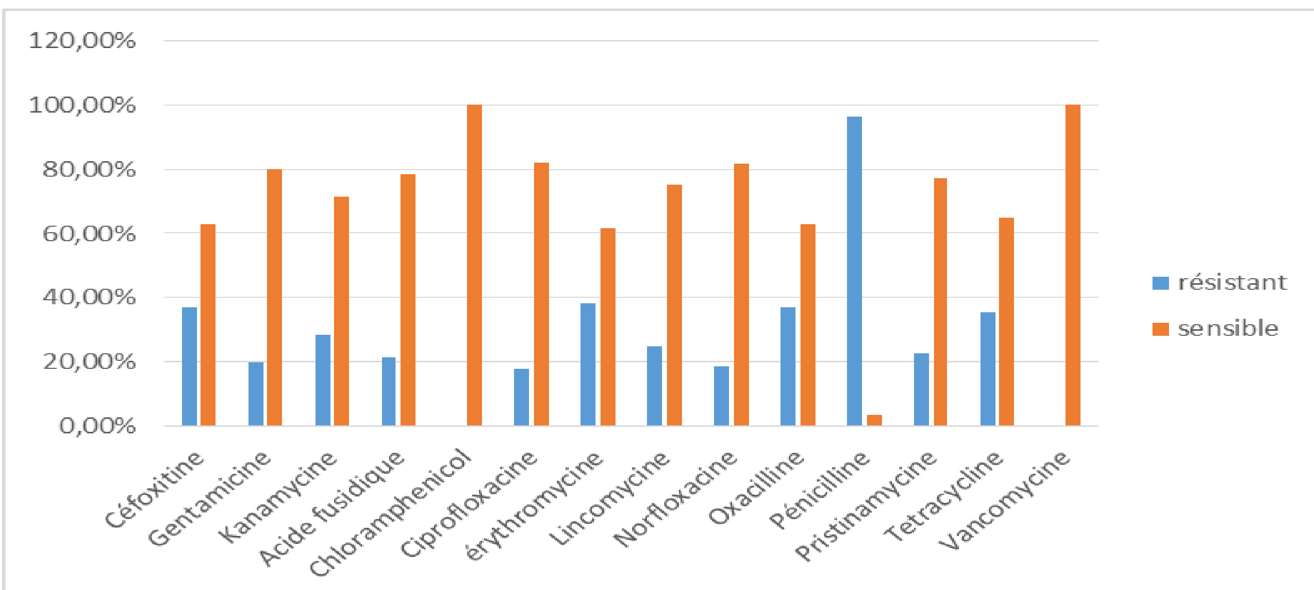

Table.1 Distribution of different isolated Staphylococcus species.

Isolats	Frequency	Pourcentage
SCN	28	5,58 %
SCP	474	94,42 %
TOTAL	502	100,00 %

Similarly, a study conducted at the Dakar University Hospital in Senegal showed that 92% of *S. aureus* strains produced penicillinase, indicating near-universal resistance to penicillin G (Dia *et al.,* 2014). These findings confirm that penicillin can no longer be considered a reliable empirical treatment for *S. aureus* infections, given the very high prevalence of resistant strains. The methicillin resistance observed in our study (31%) is comparable to rates reported in Ethiopia (34.5% to 36.9%) (Addis *et al.,* 2025). However, it is higher than the rates observed in Senegal (6.5%) and in another Ethiopian study (9.3%) (Dia *et al.,* 2014; Gebremeskel *et al.,* 2022). These variations could be explained by differences in the study populations, antibiotic pressure, and detection methods used. Furthermore, vancomycin remains fully effective in our study (0% resistance), confirming its major role in treating infections caused by resistant staphylococci. This result aligns with data reported at the Fann University Hospital in Dakar, where no resistance was observed in blood isolates from HIV-infected patients. In contrast, significant levels of resistance were observed for certain antibiotics such as ciprofloxacin (19.57%), erythromycin (28.00%), and gentamicin (7.40%); these rates are higher than those reported in Libya, where observed resistance rates remain low—specifically for ciprofloxacin (3.31%), erythromycin (18.02%), and gentamicin (2.94%) (Atia *et al.,* 2021). Resistance to lincomycin (25%) and pristinamycin (22.73%) remains moderate but higher than that observed in Cameroon (Kengne *et al.,* 2020). Among coagulase-negative staphylococci (CoNS), very high resistance to penicillin (96.43%) is also observed; similar rates have been reported in other studies—including 100% resistance in South Africa and 86% elsewhere—confirming the high resistance of these strains to this antibiotic (Asante *et al.,* 2021; Nicolosi *et al.,* 2020), a phenomenon attributed to frequent β-lactamase production. The methicillin resistance observed in our study (37.04%) is comparable to that reported in staphylococcal strains isolated at Fann Hospital in Dakar, where oxacillin resistance of 40.7% was observed (Lakhe *et al.,* 2018). However, it remains lower than the rate reported in the literature (48.8%; Abbasi Montazeri *et al.,* 2020). Similarly, erythromycin resistance (38.46%) remains significantly lower than that observed in the study by Abbasi Montazeri *et al.,* (2020), which was 84.1%. These differences could be attributed to geographical variations, the populations studied, and local antibiotic usage practices. Nevertheless, the results highlight relatively high resistance rates to tetracycline (35.29%) and kanamycin (28.57%), although these remain lower than the rates reported for the same antibiotics—46.00% for tetracycline and 42.00% for kanamycin (Socohou *et al.,* 2020). Conversely, resistance rates for ciprofloxacin (17.86%) and gentamicin (20%) remain relatively moderate and close to those described in other studies (Deyno *et al.,* 2018; Socohou *et al.,* 2020); in contrast, the study by Koksal *et al.,* (2009) reports much higher prevalence rates, reaching 67% for ciprofloxacin and 90% for gentamicin. Finally, no resistance was observed for vancomycin or chloramphenicol; this differs from some studies reporting significant resistance—25% (Socohou *et al.,* 2020)—but aligns with other recent work showing 0% resistance. However, this study has certain limitations, notably its single-center design, the predominance of superficial samples, the absence of molecular confirmation (mecA gene), and the lack of detailed clinical data, which may limit the scope of the conclusions. From a clinical perspective, these results highlight the need for continuous monitoring of bacterial resistance. High resistance to penicillin limits its use as a first-line treatment, whereas vancomycin remains an effective therapeutic option, although its use must be strictly regulated to prevent the emergence of resistance. These data also underscore the importance of strengthening infection prevention and control measures (WHO, 2024; Ministry of Health of Senegal, 2022).

Conclusion and Future Perspectives

Out of a total of 19,211 samples collected during the study period, 502 *Staphylococcus* strains were isolated, representing a prevalence of 2.61%. Among these, coagulase-positive staphylococci—predominantly *Staphylococcus aureus*—far outnumbered coagulase-negative staphylococci. Analyses revealed a predominance of isolates from pus samples, confirming the major role played by these bacteria in suppurative infections. Distribution based on sociodemographic characteristics showed variations according to age and sex, as well as a higher frequency of isolates among hospitalized patients.

Regarding antibiotic resistance, high resistance to penicillin was observed across all strains, accompanied by varying levels of resistance to several classes of antibiotics. Conversely, vancomycin retained full efficacy, remaining a key therapeutic option. These results reflect a concerning trend in staphylococcal antibiotic resistance within the hospital setting, highlighting the need for regular microbiological monitoring and the continuous adaptation of treatment protocols.

Future Directions

- ✓ Conduct in-depth microbiological and molecular analysis
- ✓ Integrate the One Health approach and prevention strategies

Recommendations

- ➢ Strengthen microbiological diagnostic capabilities
- ➢ Integrate molecular approaches into resistance surveillance
- ➢ Promote a rigorous antibiotic use policy
- ➢ Strictly enforce hospital hygiene measures
- ➢ Strengthening national strategies to combat antimicrobial resistance also remains essential to limit the spread of multidrug-resistant strains.

Author Contributions

Arfang DIAMANKA: Investigation, formal analysis, writing—original draft. Amadou NDIAYE: Validation, methodology, writing—reviewing. Said Souniati:—Formal analysis, writing—review and editing. Insa Diaw FALL: Investigation, writing—reviewing. Ngor FAYE: Resources, investigation writing—reviewing.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical Approval Not applicable.

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

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