

**PREVALENCE AND ANTIBIOTIC SUSCEPTIBILITY PATTERN OF
STAPHYLOCOCCUS AUREUS STRAINS FROM CLINICAL SAMPLES IN MINNA,
NIGERIA**

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Abstract

Introduction: Staphylococci form the commonest agent of hospital infections and pose a major problem because of their growing resistance to the commonly used treatments.

Aim: The aim of this study is to survey for the prevalence of antibiotic susceptibility pattern of *Staphylococcus aureus* strains from clinical samples to common antibiotics in Minna, Nigeria.

Method: All samples from wound swab, stool, blood, urine, urethra, endocervical swab, eye, ear, breast abscess etc submitted to General hospital Minna were cultured on sterile blood agar and mannitol salt agar and incubated at 37°C for 24hrs using standard microbiological techniques.

Results: Of the 323 different specimens, (79.26%) *S.aureus* isolates were reported. The highest carrier rate of *S. aureus* (90.91%) occurred in wound while the least (72.01%) was reported in others. The isolates were highly susceptible to fusidic acid (26.41%) oxacilin (24.32%) vancomycin (20.75%) and trimethoprim (18.86%).

Conclusion: fusidic acid with relatively higher susceptibility to clinical isolates of *S.aureus* can be used for management of these clinical conditions in our locality. The need for appropriate health education to reduce self medication and drug abuse is very imperative and desirous

Keywords: Antibiotic susceptibility, *Staphylococcus aureus*, Minna.

Introduction

Staphylococci form the commonest agent of hospital infections and pose a major problem because of their growing resistance to the commonly used treatments. The hospital environment may have about 30-40% carrier rate. Staphylococcal infections are characterised by intense suppurative inflammation of

local tissues with a tendency for the infected area to become encapsulated leading to abscess formation. The most common staphylococcal infection is the furuncle or boil. Approximately 2-3% of the population have chronic furunculosis.¹ *Staphylococcus aureus* has associated with different clinical conditions. For instance, it is still one of the most frequently encountered single bacterial species in

hospitals and continues to be frequent cause of burns and wounds sepsis. It produces pustules, carbuncles and impetigo. It frequently causes septicaemia osteomyelitis, bacteraemia and otitis.³

S. aureus exhibits remarkable versatility in their behaviour towards antibiotics.⁴ Therefore, the insight into the antibiotic profile in any community is very imperative and desirable for effective management of clinical conditions considering the relative differences in the pattern of susceptibility and resistance of *S. aureus* to antibiotics from one locality to another.

S. aureus had been isolated from several clinical specimens from different part of Nigeria.^{5,6,7,8,9,10} This study is therefore designed to investigate the antibiotics susceptible to *S. aureus* strains from clinical sources in Minna, Niger State of Nigeria. Ethical permission was obtained from the hospital.

Materials and Methods

Between December 2006 and June 2007, samples were obtained from urine, wound, urethra, etc of patients attending General hospital, Minna.

All samples from wound swab, stool, blood, urine, urethra, endocervical swab, eye, ear, breast abscess etc submitted to General hospital Minna were cultured on sterile blood agar and mannitol salt agar and incubated at 37°C for 24hrs using standard microbiological techniques.¹¹

Antibiotic Susceptibility Testing

The antibiotic susceptibility tests were carried out using the Mueller Hinton agar. All the antibiotics used were from oxid.

Statistical Analysis

The data obtained in this study were subjected to statistical analysis using graph pad prism, North Crystal 4-12* (Graph pad soft ware version 5.00(Trial), March 12,2007) and Microsoft Excel package.

Results

Table 1 showed the prevalence of *S. aureus* from clinical sources. Of 323 samples examined 256 (79.26%) showed positivity for *S. aureus* infection. The carrier rates of the samples in our study area were wound (90.91%), urine (73.56%), High vagina swab (73.21%), sputum (87.72%), eye (86.36%), ear (84%) and others (72.09%). The susceptibility of *S. aureus* to various antibiotics at 37°C is presented in Table 2. Fusidic acid has the highest susceptibility of (26.41%) followed by oxacillin (24.32%) and vancomycin (20.75%) trimethoprim has the least (18.86%). The difference in pattern of susceptibilities of the *S. aureus* from clinical sources to various antibiotics was statistically not significant (P<0.05).

Discussion

The overall prevalent rate of 78.26% observed among the clinical isolate is comparatively higher than the report of Onanuga *et al*¹² who document a 36% isolates. Similarly Obiazi *et al*.¹⁰ reported a much higher carrier rate of (20.8%).

This Pattern of prevalence may be related to the level of *S. aureus* infection in our locality. The carrier rate of 90.91%, 87.72%, 86.36%, 84.00%, 73.56% and 73.21% reported on the wound swab, sputum, eye, ear, urine indicated high colonization with *S. aureus* than other samples like stool, blood, etc.

This present investigation deviates from Obiazi *et al*.¹⁰ Chigbu and Ezeronye⁵ where they observed a colonization rate of

45% and 50% respectively in the nostrils of their studied subjects. The highest prevalence of 90.91% in wound swab reported in our present investigation can be attributed to the level of contamination arising from the habit of some of the patients to treat their wound aseptically before seeking appropriate medical attention. Also possible contamination in the areas where low personal hygiene and poor health education still persists and the sexual abuse among youth can be a major *factor* advanced for the level in urine and high vaginal swab.

We found that *S.aureus* was more susceptible in our locality to fusidic acid followed by oxacillin, vancomycin and the least was trimetoprim Table 2, . The susceptibility of fusidic acid to *S.aureus* had been documented.¹³ Fusidic acid has been known to have a good invitro antibacterial activity against Staphylococcus species by inhibiting protein synthesis. This high activity against the isolates could be linked to the fact that fusidic acid is costly in the locality and is not routinely abuse like the other cheaper antibiotics. Fusidic acid was also very active, this could be linked to the mode of administration which is intravenous formulation and therefore not attractive and making abuse difficult

The resistant of clinical isolates to oxacillin and vancomycin is of great concern. Staphylococcal species resistant to oxacillin has been referred to as methicillin resistant -*Staphylococcus aureus* (MRSA). This investigation accords Obiazi *et al.*¹⁰; Ehinmidu⁶. They documented resistance of clinical isolates of *S.aureus* to penicillin, ampicillin and cloxacillin. The observation in trimethoprim resistance can be attributed in part to earlier exposure to this drug

which may have enhanced resistant development¹⁴. This assertion can further be strengthened by the high level of antibiotic abuse in our locality, arising from self medication which are often associated with inadequate dosage and failure to comply to treatment¹⁵ and availability of antibiotics to consumers across the counter with or without prescription.^{16,17}

This level of susceptibility to antibiotic in our locality is relatively low and therefore worrisome. This trend had been documented by Eke and Rotimi¹⁸; Kesah *et al.*,¹⁹; Egah *et al*²⁰ and Obiazi *et al.*¹⁰ in different parts of Nigeria.

In conclusion, fusidic acid with relatively higher susceptibility to clinical isolates of *S.aureus* can be used for management of these clinical conditions in our locality. The need for appropriate health education to reduce self medication and drug abuse is very imperative and desirous.

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Table 1: Prevalence of *Staphylococcus aureus* isolated from clinical samples

Source	No of sample	No positive for <i>S. aureus</i> (%)	No positive for Non- <i>S.aureus</i> (%)
Urine	87	64(73.56)	23(26.44)
Sputum	57	50(87.72)	7(12.28)
Eye	22	19(86.36)	3(13.64)
Wound	33	30(90.91)	3(9.09)
ECS/HVS	56	41(73.21)	15(26.79)
Ear	25	21(84.00)	4(16.00)
Others	43	31(72.09)	12(27.91)
Total	323	256(79.26)	67(20.74)

KEY: ECS- Endocervical swab, HVS-High vaginal swab

Others: Semen, Stool, Blood, Breast swab, Urethra swab, Cathetar, Aspirate, Umblical cord swab, Endotracheal swab, Throat swab, Breast swab, Skin snip, Abcesses.

Table 2. Susceptibility Pattern of *S. aureus* to different antibiotics.

Antibiotics	SusceptibleNo(%)	Resistant No(%)
Vancomycin	10(18.87)	43(81.13)
Fusidic acid	14(26.42)	39(73.58)
Trimethoprim	11(20.76)	42(79.25)
Oxacillin	13(24.53)	40(75.47)