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*Full Length Research Paper*

# Incidence of *staphylococcus aureus* in clinical specimens in Federal Teaching Hospital, Abakaliki, Ebonyi State

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**Abstract**

***Staphylococcus aureus* is an important pathogen in human infections and has become public health concern. This study investigated the incidence of *Staphylococcus aureus* in various clinical samples from in- and out-patients attending Federal Teaching Hospital, Abakaliki. Clinical isolates from the hospital was confirmed as *Staphylococcus aureus* using standard bacteriological techniques. This study reports the isolation and identification of *Staphylococcus aureus*, coagulase negative staphylococci and catalase negative cocci in clinical samples at Federal Teaching Hospital Abakaliki. Out of a total of 144 putative isolates of Staphylococci from urine, ear and wounds screened for *Staphylococcus aureus*, 87 of them were confirmed as *S. aureus*, 30 were coagulase negative staphylococci while 27 were catalase negative cocci. The high incidence of *S aureus* in this study compared to other staphylococci demonstrates the versatility and propensity of *S. aureus* to cause diseases. This is worrisome because of thehigh mortality and morbidity often associated with infections of this bacterium. It therefore calls for proper handling of specimen suspected to contain the organism or patients who might be at risk of infection. This is to avoid transmission to other patients and healthy individuals especially health workers as they might constitute vehicles for the spread of the organism. Further studies are recommended because of the small sample size in this study. This would help to establish whether this was peculiar to the Federal Teaching Hospital Abakaliki or wide spread in other hospitals in the State.**

**Keywords:** Methicillin-resistant *Staphylococcus aureus,* Clinical isolates, Catalase negative cocci, coagulase negative staphylococci, mortality, Infections.

## INTRODUCTION

Staphylococcus species, though a common cause of human infections (Lowy, 1998), are found as non-pathogenic microorganisms in human samples (Diekema*et al*., 2001). *Staphylococcus aureus* is the most important member of this group (Javid*et al*., 2006)andhas been associated with different clinical conditions and syndromes.It is the most frequently encountered bacterial species in hospitals (Emmerson,

**Table 1.** Distribution of staphylococcus species amongstthe clinical samples.

| Sample | No. of Staphylococcus species | Catalase neg. cocci |
|---|---|---|
| Urine | 376 | |
| Wound | 5211 | |
| Ear swab | 2810 | |
| **Total** | 117 | 27 |

**Table 2.** Prevalence of *Staphylococcus aureus* and staphylococcus species in the clinical samples

| Sample | No. of *Staphylococcusaureus* | Other Staphylococcus species |
|---|---|---|
| Urine | 29 | 8 |
| Wound | 37 | 15 |
| Ear swab | 21 | 7 |
| Total | 87 | 30 |

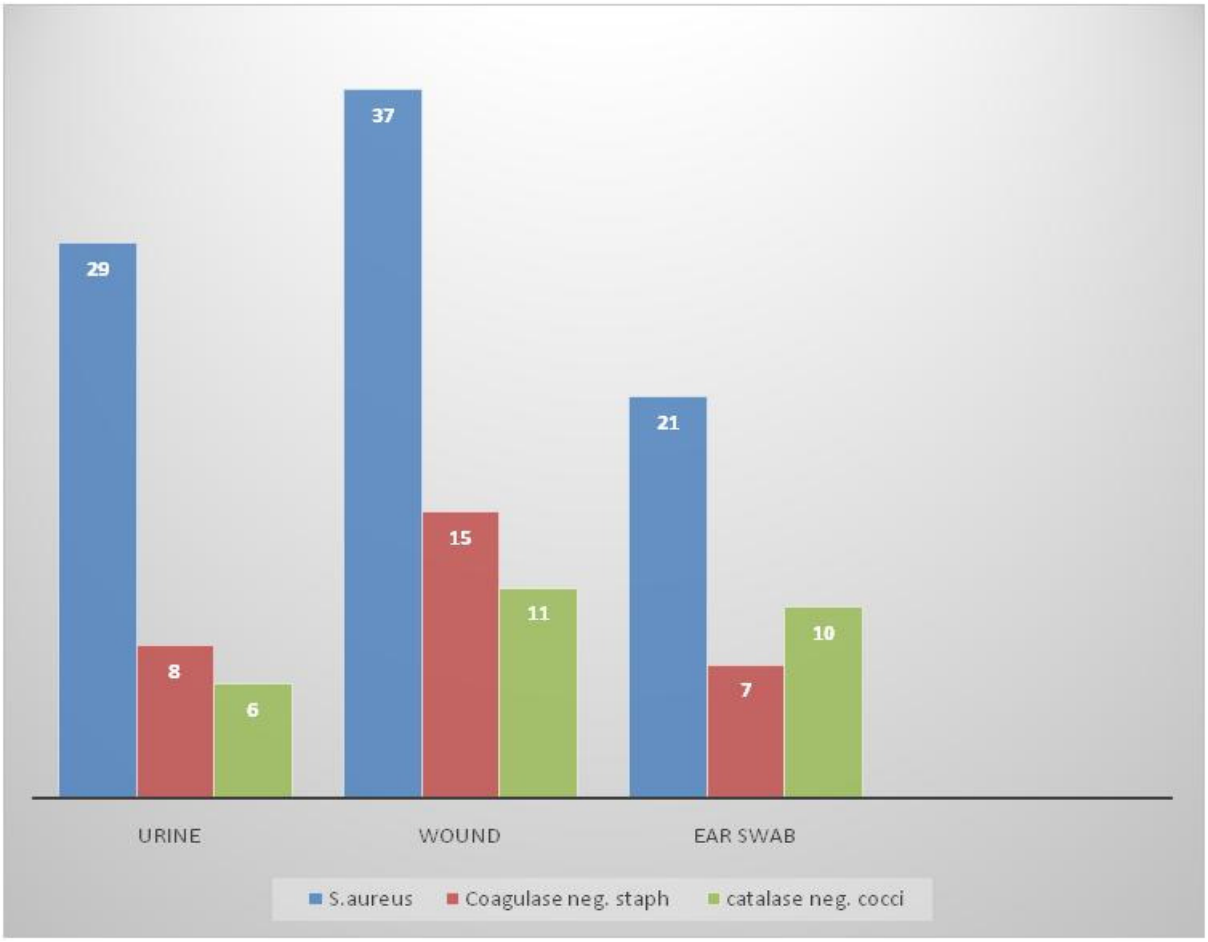


**Figure 1.** Distribution of Gram positive cocci in clinical samples in Federal Teaching Hospital Abakaliki

2004). The major reservoir of *Staphylococcus aureus* in hospitals are colonized and infected in-patients and colonized hospital workers. Carriers of *S. aureus* are at risk of developing endogenous infections or transmitting

infections to health care workers and patients. Transient carriage of the organism on the hands of health care workers accounts for the major mechanism for patient to patient transmission (Javid*et al*., 2006).

*S. aureus*has been isolated from several clinical specimens from different parts of Nigeria (Olukoya*et al*., 1995; Odunsanya, 2002; Chigbu and Ezeronye, 2003; Ehinmidu, 2003; Kolawole*et al.,* 2005, Nworie and Umeh, 2010, Nworie and Eze, 2010, Orji *et al*., 2012) and as contaminants on fomites, door handles of public conveniences amongst others (Nworie*et al*., 2012). Since the emergence of *S. aureus* strains with resistance to methicillin shortly after its introduction into clinical medicine (Jevons, 1961), it has established itself as a leading agent for a wide range of infections. Methicillin-resistant *Staphylococcus aureus* (MRSA) has become a common problem in hospitals, community and livestock causing a wide range of acquired infections (Kopp *et al*., 2004; Lodise and McKinnon, 2005; Nixon *et al*., 2006).

This study investigated the occurrence of *Staphylococcus aureus* in clinical samples at Federal Teaching Hospital, Abakaliki.

## MATERIALS AND METHODS

This study was carried out at Federal Teaching Hospital, Abakaliki, Southeast Nigeria. The Teaching Hospital is a tertiary health care facility that serves as a referral centre for Ebonyi and neighboring states. A total of 144 clinical isolatesof Staphylococci were collected from the microbiology laboratory of the hospital. The isolates were obtained from the following clinical specimens: Urine, wound and ear swab. All samples were analyzed and confirmed as *S. aureus*, coagulase negative staphylococci and catalase negative Gram positive cocci in Ebonyi State University (EBSU) Ultramodern Laboratory and Research Centre. Each sample was first cultured on blood agar and isolates with characteristic hemolysis on blood agar after incubation for 24 hours at 37$^{o}$C were subcultured on manitol salt agar (Oxoid Co. Ltd Uk) as described elsewhere (Olayinka *et al*., 2010). Isolates with characteristic golden yellow colonies on manitol salt agar and positive for Gram reaction, catalase and coagulase were confirmed as *Staphylococcus aureus*. Others that were coagulase negative were classified as staphylococcus species while those that were catalase negative were classified as catalase negative cocci.A latex agglutination test was also used to further confirm coagulase positive isolates as *S. aureus*.

## RESULTS

A total of 117 of the isolates were confirmed as *Staphylococcus species* out of 144 clinical isolates, while 27 were catalase negative cocci (Table 1). Of the 117 staphylococcus species, 87 (74.4%) were confirmed as *Staphylococcus aureus* representing an overall prevalence of 60.4% (87/144) while 30 (25.6%) were coagulase negative staphylococci (Table 2). The catalase negative Gram positive coccus identified in this study was 27/144 (18.7%). The highest incidence of *S. aureus* was in wounds (31.6%) followed by urine (24.8%) and ear (17.9%) as shown n Figure 1.

## DISCUSSION

*Staphylococcus aureus* is innocuous in most environmentsbut with remarkable adaptability and versatility which has equipped it as a commensal and pathogen.It is one of the most infectious agent with high prevalence in various communities and healthcare institutions (Akindele*et al*., 2010).

This study reports the isolation and identification of *Staphylococcus aureus,* coagulase negative staphylococci and catalase negative cocci in clinical samples at Federal Teaching Hospital Abakaliki. A total of 144 clinical isolates from urine, wound and ear swab were analyzed. The high incidence of *Staphylococcus aureus*87/144 (60.4%) observed among the clinical isolates shows the versatility of this organism amongst other staphylococci which makes it the most endemic pathogen in clinical settings. The highest incidence of*S. Aureus* (31.6%) was in wounds, a finding consistent with reports elsewhere (Obiazi*et al*., 2007)and in contrastwith our earlier observation (Orji *et al*., 2012).The high incidence of all the isolates in wound could be attributed to poor personal hygiene and exposure of the wounds, which might have made it more prone to contamination and infection. Furthermore, most people in this area tend to treat their woundson their own or employ services of ill-trained quacks before seeking medical attention which could account for the level of colonization by *Staphylococcus aureus* and other staphylococcus species in woundsin this study.

The prevalence rates of *Staphylococcus aureus* observed in urine (24.8%) and ear swab (17.9%) might be attributed to the level of staphylococcal infection in this study area and poor personal hygiene amongst others.The non-coagulase staphylococci identified amongst these isolates might have been contaminants (Nworie and Akam, 2010) or opportunistic pathogens. Nworie and Umeh (2010), had reported the isolation of coagulase negative staphylococci and catalase negative organisms in the urine of high school children in Abakaliki. It is well known that other staphylococcithough normal commensals, are opportunistic pathogen of man (Baba *et al*., 2002; Rodrı´guez-Noriega *et al*., 2010).

In conclusion, the threat posed by Staphylococcal infection calls for clear cut preventative and control measure to reduce transmission and in-fection. Consequently, this study therefore, recommends

enlightenmentcampaign to educate the general public on the ways to prevent carriage, transmission and infections. Continuous surveillance is also recommended to track any epidemiological changes which are common with these organisms.

**REFERENCES**


Akindele AA, Adewuyi IK, Adefioy OA, Adedokun SA, Olaolu AO (2010). Antibiogram and Beta-Lactamase Production of *Staphylococcusaureus* Isolates from Different Human Clinical Specimens in a Tertiary Health Institution in Ile-ife, Nigeria. American-Eurasian J. Sci. Res. 5(4):230-233, 2010.

Baba T, Takeuchi F, Kuroda M, Yuzawa H, Aoki K, OguchiA, Nagai Y, Iwama N, Asano K, Timothy Naimi T, Kuroda H, Cui L, Yamamoto K, Hiramatsu K (2002). Genome and virulence determinants of high virulence community-acquired MRSA. *The Lancet* Vol. 359. *Issue 9320. Pg 18*

Cheesbrough M (2006). District Laboratory Practice in Tropical Countries. Cambridge University Press, pp434.

Chigbu CO, Ezeronye OU (2003). Antibiotics resistant *Staphylococcus aureus*Abia State of Nigeria. *Afr. J. Biotechnol*; 2(10):374-378.

Diekema DJ, Pfller MA, Schmitz FJ, Smayevsky J, Bell J, Jones RN, Beach M (2001). The Sentry participants Group: Survey of infections due to *Staphylococcusspecies*: frequency of occurrence and antimicrobial susceptibility of isolates collected in United States, Canada, Latin America, Europe and Western Pacific Region for the SENTRY Antimicrobial Surveillance Program, 1997–1999. *Clin Infect Dis*; 32:114-132.

Ehinmidu JO (2003). Antibiotics susceptibility patterns of urine bacterial isolates in Zaria, Nigeria. *Trop. J. Pharm. Res*; 2:223-228.

Emmerson M (2004). Nosocomial Staphylococcal outbreak. *Scandinavian J. Infect. Dis. Suppl*; **93**: 47-54.

Javid AD, Manzoor AT, Jamal AK, Asif A, Mohammed AK, Mohammed K, Khalid HB, Mohammad JD, Niyaz A, Shamim A (2006). Molecular epidemiology of clinical and carrier strains of methicillin resistant *Staphylococcus aureus* (MRSA) in the hospital settings of north India. *Annals of Clinical Microbiology and Antimicrobials*; 5:22.

Jevons MP (1961). Today's drugs. *Br Med J*; 1:124–125.

Kolawole DO, Bisi-Johnson MA, Shittu AO (2005). Epidemiological analysis of clinical isolates *Staphylococcus aureus* in Ile-Ife, Nigeria. *Pakistan J. Bio. Sci*; 8(7):1016-1020.

Kopp BJ, Nix DE, Armstrong EP (2004). Clinical and economic analysis of methicillin-susceptible and -resistant *Staphylococcus aureus*infections. *Ann. Pharmacother*; 38:1377-1382.

Lodise TP, McKinnon PS (2005). Clinical and economic impact of methicillin resistance in patients with *Staphylococcus aureus*bacteremia. *DiagnMicrobiol Infect Dis*; 52:113-122.

Lowy FD (1998). *Staphylococcus aureus* infection. *N. Engl. J. Med*; 339:520-532.

Nixon M, Jackson B, Varghese P, Jenkins D, Taylor G (2006). Methicillin-resistant *Staphylococcus aureus* on orthopaedic wards: incidence, spread, mortality, cost and control. *J. Bone Joint Surg. Br*; 88:812-817.

Nworie A, Akam OA (2010). Bacterial Contamination of Whole Blood Stored in Various Blood Banks in Abakaliki, Southeast Nigeia. J. Biomed. Sci. Nig. Vol. 8 No. 1 and 2.

Nworie A, Umeh N (2010). Investigation of Urinary Tract Infection among High School Children in Abakaliki Metropolis. J. Biomed. Sci. Nig. Vol. 8 No. 1 & 2.

Nworie A., Eze U. A. (2010). Prevalence and Etiologic Agents of Urinary Tract Infections in Pregnancy in Abakaliki Metropolis. *Continental Journal of Medical Research. 4: 18-23.*

Obiazi HAK, Nmorsi OPG, Ekundayo AO, Ukwandu NCD (2007). Prevalence and antibiotic susceptibility pattern of *Staphylococcusaureus* from clinical isolates grown at 37 and 44 ºC from Irrua, Nigeria. Afr. J. Microbiol. Res. 057-060.

Odunsanya OO (2002). Antibiotic susceptibility of Micro organanisms at a general hospital in Lagos. Nig. *J. Nat. Med. Assoc*; 94(11):994-998.

Olayinka BO, Bala HK, Ehinmidu JO, Onaolapo JA (2010). Multidrug resistant *Staphylococcus aureus*isolates from poultry farms in Zaria, Nigeria. 14th *International Symposium on Staphylococci and Staphylococcal Infections,* Bath, UK, ISSSI2010.

Olukoya DK, Asielue JO, Olasupo NA, Ikea JK (1995). Plasmid profiles and antibiotic susceptibility patterns of *Staphylococcus aureus*isolates from Nigeria. *Afr. J. Med. Sci*; 24(2):135-138.

Onanuga A, Oyi AR, Onaolapo JA (2005). Prevalence and susceptibility pattern of methicillin resistant *Staphylococcus aureus* isolates among healthy women in Zaria, Nigeria. *Afr. J. Biotechnol*; 4(11):1321-1324.

Orji I, Nworie A, Eze UA, Agberotimi IO, Okereke EC, Azi SO (2012). The prevalence and antimicrobial susceptibility profile of methicillin-resistant *Staphylococcus aureus*isolates from clinical specimens in a Tertiary Hospital, South East Nigeria. *Continental J. Pharmaceutical Sciences;* **6**(1):23–29.

Rodrı´guez-Noriega E, Seas C, Guzma´n-Blanco M, Mejı´a C, Alvarez C. Bavestrello L, Zurita J, Labarca J, M. Luna CM, Salles MJC, Gotuzzo E (2010). Evolution of methicillin-resistant *Staphylococcus aureus* clones in Latin Ame. Int. J. Infectious Diseases xxx xxx.e1–xxx.7.