Current prevalence of Methicillin resistant staphylococcus aureus health centers in Enugu state, Nigeria

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Abstract:

Methicillin resistant *Staphylococcus aureus* (MRSA) have been implicated in various infections with some level of contribution to mortality and morbidity. This study sought to isolate MRSA and determine its prevalence among clinical specimens collected at two different hospitals on Enugu State, Nigeria. The specimens collected were: urine (10), Stool (10). Nasal cavity (7), armpit (10), vagina (10) and wound samples (13). Twenty six specimens showed growth of *S. aureus* of which 10 showed the growth of MRSA. The samples from wounds, armpits and vagina showed the highest frequency of MRSA. Results obtained emphasize the need for continuous surveillance for MRSA in core clinical settings.
The *Staphylococcus aureus* is renowned for its role as leading cause of serious infections among humans (Tong *et al.*, 2015). The high incidence of antibiotic resistance among *S. aureus* in humans has been associated with increased cost of healthcare, coupled with huge burden of disease among different populations (CDC, 2012). Among the antibiotic resistant strains of *S. aureus*, increased attention has been devoted to the methicillin resistant *S. aureus* (MRSA) due to its significance in clinical environments globally (Al-Taib *et al.*, 2010; Diekema *et al.*, 1999; Rodrigues *et al.*, 2015). The most common infections associated with MRSA in the clinical environments include sepsis, skin and soft tissue infections, endocarditis and neonatal meningitis (Rodrigues *et al.*, 2015; David and Daum 2010; Mandell and Wunderink, 2012).

It has been observed that the increased prevalence of MRSA infections in clinical settings carries the risk of upsurge in community acquired MRSA (David and Daum 2010). However, some reports have recently emerged that indicate that the prevalence of MRSA is reducing globally, due partially to the enforcement of stringent infection control measures in developed countries (Ventola, 2015). Whether this trend is also observable in developing countries is debatable. Current knowledge about the prevalence and epidemiology of MRSA in core clinical settings is essential, as this will assist in fine-tuning and updating infection control measures to reduce the risk of hospital associated infections caused by *S. aureus*. Therefore, this study seeks to determine the current prevalence of MRSA in different hospitals in Enugu State, Nigeria.

Sixty clinical samples were collected from patients that reported at the University Teaching hospital in Enugu State, Nigeria and the Park Lane teaching Hospital. The numbers of clinical specimens collected are as follows: urine (10), Stool (10), Nasal cavity (7), armpit (10), vagina (10) and wound samples (13). Swabs were taken from the nasal cavities, armpits, wounds and the vagina. All swabs, urine and stool samples were inoculated directly onto Nutrient agar plates supplemented with 6.5% NaCl. The nutrient agar plates were incubated at 37°C for 24 hours. The distinct colonies that showed colonial morphologies consistent with *S. aureus* were subcultured onto Mannitol Salt agar (MSA) plates and incubated at 37°C for 24 hours. All the colonies that grew distinctly on MSA plates were subjected to coagulase tests and susceptibility to methicillin (10µg) using agar disk diffusion method. Those isolates that showed characteristic zones of inhibition less than or equal to 10mm were designated as methicillin resistant *S. aureus* (MRSA).

In this study, 26 out of the 60 clinical samples collected showed growth of *S. aureus*. Among these 26 clinical samples, 10 samples carried the MRSA. The armpit samples showed the highest carriage of *S. aureus* while the faecal samples had the least. The percentage of the clinical samples that carried *S. aureus* is shown in Figure 1. The MRSA isolates identified in this study were also well distributed among the clinical specimens as shown in Figure 2. The wound samples had the highest burden of MRSA with three isolates. The samples from armpits and HVS carried 2 isolates of MRSA each while the stool, urine and nasal swabs had the lowest carriage of MRSA with 1 isolate each (Figure 2).

![Fig. 1: Proportion of *S. aureus* among clinical samples](image-url)
The healthcare associated MRSA infections have constituted a serious clinical and public health crisis globally, and the results obtained in this study are indicative of the presence of MRSA within the clinical environments under study. *Staphylococcus aureus* were recovered from all the samples collected with highest frequencies observed among wounds, armpits, nasal cavities and vagina. The highest prevalence of MRSA among the wound samples could be possibly explained in terms of the ubiquity of surgical procedures and high cases of wounds reported at the hospitals. This result is consistent with previous studies that have indicated that MRSA predominates among wound and surgical site infections in core clinical settings (Sisirak et al., 2010; Al-Talib et al., 2010; Arora et al., 2010). The presence of MRSA among vaginal samples in this present study carries the risk of maternal and neonatal infections (Top et al., 2012). It has been noted that the epidemiology and antibiotic susceptibility of vaginal MRSA may show variation across different clinical settings (Bigos et al., 2014). Despite the presence of commensal *S. aureus* in the armpits, the presence of MRSA increases the risk of community acquired MRSA (Knight et al., 2012). Nasal carriage of MRSA has become routine, especially among health care workers and also implies high risk of dissemination of MRSA into the community (Khanal et al., 2015; Shibabaw et al., 2013). The detection of MRSA among urine samples used in this study is also consistent with previous works and it is a huge predictor to urinary tract infections (Muder et al., 2006). These findings obtained in this study highlight the need for continuous surveillance of MRSA in clinical settings with emphasis of prevention of hospital acquired MRSA.

**References:**