

Original Research Article

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Dominance of *Staphylococcus aureus* in clinical specimens in Islami bank hospital, Rajshahi, Bangladesh

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ABSTRACT

Background: *Staphylococcus aureus* is a medicologically important pathogenic bacteria which is largely responsible for the thousands of human health hazards. This study investigated the incidence of *Staphylococcus aureus* in various clinical samples from in- and outpatients attending Islami Bank Hospital, Rajshahi, Bangladesh.

Methods: 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 Islami Bank Hospital, Rajshahi, Bangladesh.

Results: 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.

Conclusions: This is worrisome because of the high 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 Islami Bank Hospital Rajshahi, Bangladesh or wide spread in other hospitals in the country.

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, are found as non-pathogenic microorganisms in human samples.^{1,2} *Staphylococcus*

aureus is the most important member of this group and has been associated with different clinical conditions and syndromes. It is the most frequently encountered bacterial species in hospitals. 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.³ *S. aureus* has been isolated from several clinical specimens from different parts of Nigeria and as contaminants on fomites, door handles of public conveniences amongst others.⁴⁻⁷ Since the emergence of *S. aureus* strains with resistance to methicillin shortly after its introduction into clinical medicine, it has established itself as a leading agent for a wide range of infections.⁸ Methicillin-resistant *Staphylococcus aureus* (MRSA) has become a common problem in hospitals, community and livestock causing a wide range of acquired infections.⁹⁻¹¹ This study investigated the occurrence of *Staphylococcus aureus* in clinical samples at Islami Bank Hospital, Rajshahi, Bangladesh.

METHODS

This study was carried out at Islami bank hospital, Rajshahi, Bangladesh. The leading hospital is a tertiary health care facility that serves as a referral centre for northern part of Bangladesh. A total of 144 clinical isolates of *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 ultramodern laboratory and research centre of Islami bank medical college and hospital, Rajshahi, Bangladesh. Each sample was first cultured on blood agar and isolates with characteristic hemolysis on blood agar after incubation for 24 hours at 37°C were subcultured on manitol salt agar (Oxoid Co. Ltd UK) as described elsewhere. 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.

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. 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 in Figure below

Table 1: Prevalence of *Staphylococcus aureus* and *Staphylococcus* species in the clinical samples.

Samples	Sample No.	<i>Staphylococcus</i> spp.		Total	Catalase	Coagulase
		<i>S. aureus</i>	Other spp.			
Urine	45	29	08	37		
Wound swab	64	37	15	52	27	30
Ear swab	35	21	07	28		
Total	144	87	30	117		

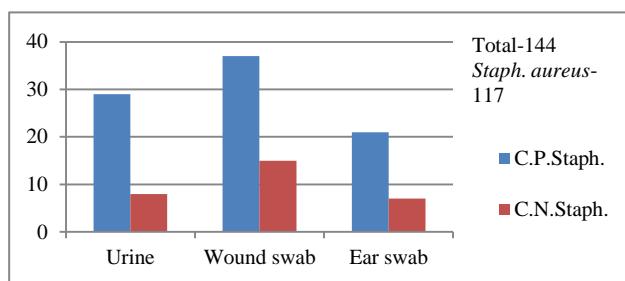


Figure 1: Distribution of *Staphylococcus* in clinical samples. C. P- catalase positive, C. N- catalase negative.

DISCUSSION

Staphylococcus aureus is innocuous in most environments but with remarkable adaptability and versatility which has equipped it as a commensal and pathogen. It is one of the most infectious agents with high

prevalence in various communities and healthcare institutions.¹² This study reports the isolation and identification of *Staphylococcus aureus*, coagulase negative staphylococci and catalase negative cocci in clinical samples at Islami Bank Hospital, Rajshahi, Bangladesh. 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 and in contrast with our earlier observation.^{13,14} 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 wound son 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 wounds in 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 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 *Staphylococci* though normal commensals, are opportunistic pathogen of man.^{15,16} In conclusion, the threat posed by Staphylococcal infection calls for clear cut preventative and control measure to reduce transmission and infection. Consequently, this study therefore, recommends enlightenment campaign 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.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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