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MICROBIAL PROFILE AND ANTIMICROBIAL RESISTANCE PATTERNS IN ACUTE OSTEOARTICULAR INFECTION IN CHILDREN	KEY WORDS: osteomyelitis ,septic arthritis ,osteoarticular infection

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ABSTRACT	Acute osteomyelitis and septic arthritis are critical infections in children, mainly caused by bacteria. Understanding the epidemiology of these infections and the antimicrobial resistance patterns is essential for optimizing treatment. This retrospective cross-sectional study aimed to describe the microbial profile and antimicrobial resistance in children with acute osteoarticular infections hospitalized between January 2019 and April 2022. Among 78 children, 21 had confirmed microbiological diagnoses, with Staphylococcus species being the most common pathogen. Specifically, 11 out of 14 cases were Staphylococcus aureus, four of which were methicillin-resistant (MRSA). Notably, only 61% of the isolated microorganisms were sensitive to cephalosporins, which are commonly used empirically for treatment. This study highlights the evolving bacterial resistance and the need for tailored antibiotic regimens in pediatric osteoarticular infections.
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INTRODUCTION	
Background	Acute osteomyelitis and septic arthritis are two major infections in children primarily caused by bacteria. Prompt diagnosis and appropriate treatment are important to prevent disability.
	The epidemiology of these infections is constantly evolving and region-specific data on current strains and their antimicrobial resistance patterns are essential to optimize treatment.
	Current guidelines for the management of acute osteomyelitis recommend Cloxacillin and Cephalosporins as first line empirical antibiotics for acute osteoarticular infections.

Aim	The aim of this study is to describe the microbial profile and antimicrobial resistance patterns of acute osteoarticular infection.
Methodology	This was a retrospective study done among children hospitalised in a teaching hospital between Jan 2019 to April 2022. Those aged <18 years admitted with a diagnosis of acute osteomyelitis or septic arthritis were included .
	The clinical and microbiological details were noted from the hospital records .The data was computed for statistical analysis.

RESULTS	
	- The commonest sites in osteomyelitis were femur (33%) and tibia (17%) (Figure 1).Among septic arthritis ,knee (49 %) followed by hip (26%) were the common sites(figure 2) - Microbiological diagnosis was established in 26.9 % (23.7% with osteomyelitis and 36.8 % with septic arthritis). The commonest organism was staphylococcus (14/21) of with 11 were Staph aureus and 3 were CONS. Among the 11 staph aureus reported ,4 were Methicillin resistant staph aureus (Figure 3). - The other organisms isolated were E.coli (2), Enterococcus Faecium (2),Actinobacterium (2), Aeromonas hydrophilia (1). - Overall only 61 % of the microorganisms isolated were sensitive to cloxacillin, 43 % were sensitive to Cephalosporins

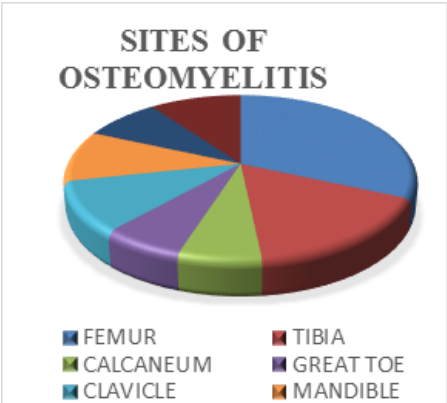


Figure 1:sites Of Osteomyelitis

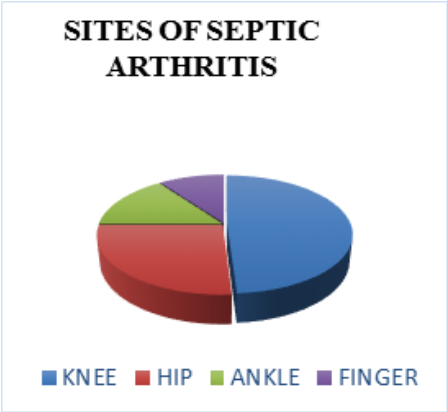


Figure 2: sites Of Septic Arthritis

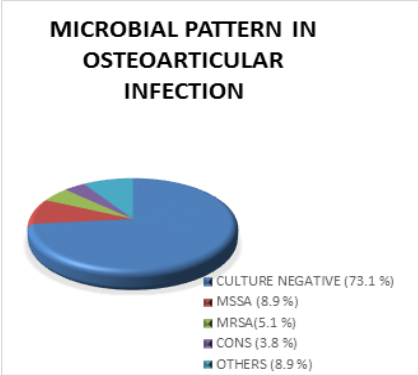


Figure 3- Microbial pattern in osteoarticular infection

DISCUSSION-

Acute hematogenous osteomyelitis and septic arthritis are bacterial infections of the bones and joints, respectively¹ often leading to long-term morbidity if not promptly treated. In my study, *Staphylococcus aureus* was the most frequently isolated pathogen (66.6% of positive cultures), with methicillin-resistant *Staphylococcus aureus* (MRSA) accounting for 36% of these cases. Similar to my study study done by kang SN has stated that *S. aureus* remains the most common cause of acute hematogenous osteomyelitis and septic arthritis in children, followed by group A beta-hemolytic *Streptococcus*, *Streptococcus pneumoniae*, and *Enterobacter*³. This highlights *Staphylococcus aureus* as the leading cause of osteoarticular infections globally, although the prevalence of MRSA varies significantly across regions.

Clinical practice guidelines by the infectious diseases society of america has stated that initial empirical antibiotic should include clindamycin or vancomycin, alongside nafcillin or ceftriaxone, as these combinations offer effective coverage for most methicillin-sensitive *S. aureus* (MSSA) and methicillin-resistant *S. aureus* (MRSA) while being less toxic for children. The study also stated that emergence of highly virulent and resistant bacterial strains has significantly increased the difficulty in managing these infections.³

My study further revealed a significant challenge with antimicrobial resistance. Only 43% of the isolated organisms were sensitive to cephalosporins, which are commonly used as first-line empirical therapy. These findings reflect growing global concerns about the resistance of gram-positive bacteria to β -lactam antibiotics, including cephalosporins and cloxacillin. This is in line with other studies suggesting that the widespread use of these antibiotics has contributed to the selective pressure, leading to the emergence of resistant strains. The study's finding of non-staphylococcal organisms such as *Escherichia coli* and *Enterococcus faecium* in a small percentage of cases (14.2%) also highlights the need for broader-spectrum antibiotic coverage in certain clinical scenarios. This indicates the potential for polymicrobial infections, especially in complicated osteoarticular infections, where empirical therapy must cover both gram-positive and gram-negative pathogens.

In terms of infection sites, in my study the femur and tibia were the most commonly affected bones in osteomyelitis, while the knee and hip were most commonly involved in septic arthritis. In acute hematogenous osteomyelitis - most common site involved being femur as bloodborne bacteria seed into the trabecular network of a child's bone making the knee and hip the common sites^{4,5} similar to my study, in which femur and tibia were the most commonly affected bones in osteomyelitis, while the knee and hip were most commonly involved in septic arthritis.

Long-term consequences of acute hematogenous osteomyelitis or septic arthritis, such as severe development retardation or chronic joint degeneration, can be devastating, particularly in young children. These problems are particularly common with virulent organisms such as methicillin-resistant *Staphylococcus aureus* (MRSA)⁶. Effective treatment typically involves administering the right antibiotic at the correct dose and duration, often alongside surgical intervention when necessary.⁷ This study emphasizes the need for region-specific data on antimicrobial resistance patterns to guide empirical therapy.

With increasing resistance to first-line antibiotics, there is an urgent need to update treatment protocols to reflect current microbial profiles. Tailoring antibiotics based on local resistance patterns and promoting antibiotic stewardship will be crucial to improving outcomes in paediatric osteoarticular infections.

Conclusion And Clinical Significance-

The increasing resistance to cephalosporins and cloxacillin

noted in this study calls for a relook at the choice of first line empiric antibiotic therapy for acute osteoarticular infection

Abbreviations-

MRSA-Methicillin sensitive staphylococcus aureus

MSSA-Methicillin sensitive staphylococcus aureus

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