

Original Research Article

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## Multidrug Resistant Bacteria in Pediatric Patients: A Therapeutic Nightmare

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### ABSTRACT

Bacterial infections caused by multidrug resistant bacteria (MDR) are a constant challenge for physicians throughout the world. We processed 451 clinical samples (blood, urine, pus and body fluids) from pediatric patients during the period of July'11 to Oct'11 in Sassoon General Hospital, Pune. Objective is to identify the bacterial isolates from different clinical specimens and study their antibiotics susceptibility pattern. Bacterial infections could be detected in 155 (34.4%) patients. These bacteria were isolated from blood (61%), urine (23%), pus (14%) and body fluid (2%). 64.6% of the infections were from the ward and 35.5% from NICU. 88.4% were gram negative bacilli and 11.7% were gram positive cocci. The most common gram negative bacilli isolated were *Pseudomonas aeruginosa* (22%) followed by *Escherichia coli* (15.5%) and *Klebsiella pneumoniae* (15.5%). 62% of the isolates were MDR, of which 33% were carbapenemase producers. Among the non-fermenters 3.3% organisms were resistant to all drugs including colistin and polymyxin – B. Increasing drug resistant organisms emerging in health care settings is prolonging hospital stay and increasing the cost of health care. So there is an urgent need to formulate guidelines and rationalize the use of antibiotics curtail this pandemic of drug resistance.

#### Keywords

Multidrug resistant bacteria, Pediatric patients, Antibiotic

#### Article Info

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### Introduction

Patients admitted to NICU and PICU are at more risk to have infections with multi drug resistant bacteria. Infections caused by multidrug resistant (MDR) bacteria - constantly challenge physicians globally (Suchada Sritippayawan *et al.*, 2009). MRSA and ESBL producers are continuously increasing with time due to development of different drug resistant mechanisms by bacteria. Carbapenemase producing organisms

are increasing all over the world and unfortunately some bacteria are even resistant to polymyxin and colistin limiting treatment options (Grisaru-Soen *et al.*, 2007; Asensio *et al.*, 2000).

The main aim and objectives of this study includes to study the bacteriological profile of various infections in pediatric patients. And also to study the antimicrobial susceptibility patterns of bacterial isolates.

## Materials and Methods

Period-July 2011 to October 2011.

Location-Pediatric ward and NICU of Sassoon General Hospital, Pune.

Specimens-451 clinical samples of pus, urine, blood & body fluids cultured

Isolates were identified by standard microbiological procedures (Collee *et al.*, 2012; Collee *et al.*, 2012; Forbes *et al.*, 2007; Forbes *et al.*, 2007).

Antimicrobial susceptibility test done by Kirby Baur's disc diffusion method as per CLSI 2011

## Results and Discussion

Overall culture positivity rate was 34.4% in our study, which was more than (Tsering *et al.*, 2011) 22% and (Ramesh Bhat *et al.*, 2011) 22.8%. Whereas in (Prasad Gunjal *et al.*, 2012) study it was 51.69%.

In our study positive blood cultures were 61%, which is near to (Douglas *et al.*, 2004) 52%

but more than (Uslan *et al.*, 2007) 38% and (Sucu *et al.*, 2005) 46%.

Predominant isolate on culture in our study was Gram negative bacilli 88.4%, which is consistent with Tsering *et al.*, (2011) 61%, Ramesh Bhat *et al.*, (2011), 60% and Gunjal *et al.*, (2012) 61.9%.

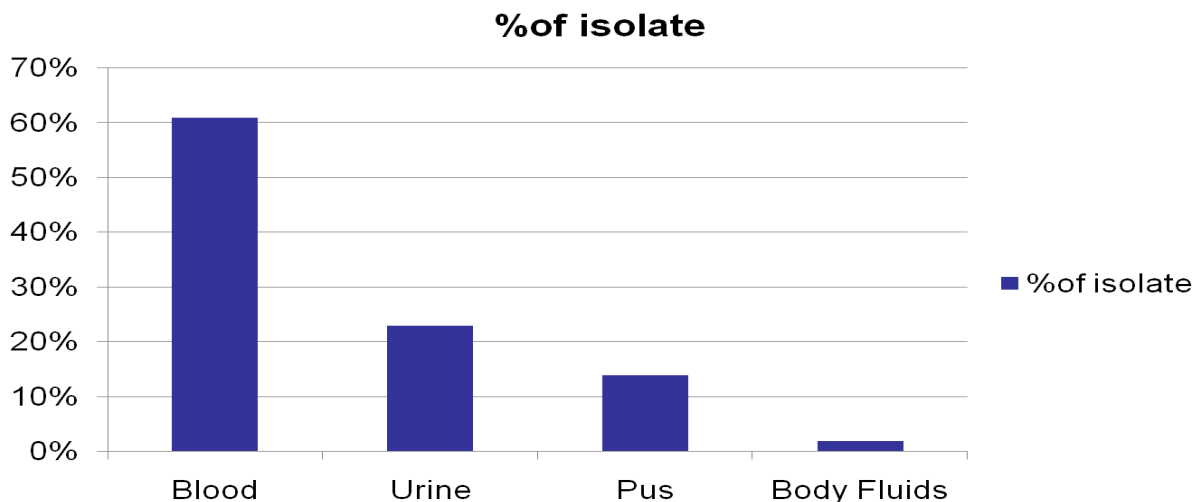
Among these bacteria *Pseudomonas aeruginosa* was the most common 21.9% whereas *Enterobacter* 15.38%, *Klebsiella pneumoniae* 26.66% and *E. coli* 44.6% were isolated Tsering *et al.*, (2011), Ramesh Bhat *et al.*, (2011) and Gunjal *et al.*, (2012) respectively.

Among gram positive isolates MSSA was most common 6.45% followed by MRSA 1.93%.

Multi drug resistant isolates were 62% of which 33% were carbapenemase producers, 3.3% were Non-fermenter resistant to colistin and 1.93% were MRSA.

Prevalence of bacterial infection in pediatric patients was 34.4%.

Chart-1 Sample wise distribution of isolates (n=155)



**Table.1 Distribution of all isolates (n=155)**

Organism	No. of isolates	% of isolates
<b>Gram negative bacilli</b>	<b>137</b>	
<i>Pseudomonas aeruginosa</i>	34	21.93%
<i>E.coli</i>	24	15.5%
<i>Klebsiella pneumoniae</i>	24	15.5%
<i>Acinetobacter spp.</i>	23	14.83%
<i>Citrobacter spp.</i>	12	7.74%
<i>Enterobacter spp.</i>	10	6.45%
<i>Proteus</i>	7	4.51%
<i>Non-fermenter</i>	2	1.29%
<i>Brevundimonas vesicularis</i>	1	0.64%
<b>Gram positive cocci</b>	<b>18</b>	
<i>MSSA</i>	10	6.45%
<i>MRSA</i>	3	1.93%
<i>Streptococcus spp.</i>	3	1.93%
<i>Enterococcus spp.</i>	2	1.29%

**Table.2 Distribution of drug resistance n=155**

Organisms	% of isolates
<b>MDR</b>	62%
<b>Carbapenemase producer</b>	33%
<b>Non-fermenter Resistant to Colistin</b>	3.3%
<b>MRSA</b>	1.93%

MDR-Strain resistant to two or more group of antibiotics.

Carbapenemase producer-Strain resistant to Imipenem & or Meropenem.

**Table.3 Sample wise distribution of MDR isolates n=155**

Clinical sample	No. of MDR organisms	% of MDR organisms
<b>Blood</b>	55	35.48%
<b>Urine</b>	25	16.12%
<b>Pus</b>	10	6.45%
<b>Body Fluids</b>	3	1.93%

### Antimicrobial resistance pattern

#### Enterobacteriaceae

Antibiotics	% of resistance
<b>Cefepime</b>	88.75%
<b>Cotrimoxazole</b>	73.2%
<b>Cefotaxime</b>	64.7%
<b>Piperacillin + Tazobactam</b>	61.96%

### Non-fermenters

Antibiotic	% of resistance
Cefepime	84.4%
Cefoxitin	82%
Cotrimoxazole	77.6%
Ceftazidime	77.5%
Cefotaxime	72%

### Gram positive cocci

Antibiotic	% of resistance
Penicillin	80%
Erythromycin	40%
Gentamycin	30%
Ciprofloxacin	30%
Tetracyclin	30%

Septicemia (61%) was the most common type of infection followed by urinary tract infections (23%).

Majority isolates were Gram negative bacilli (88.4%), among them *P. aeruginosa* was most common (21.93%).

MDR isolates were -62%. Among them Carbapenemase producers were 33%,

MRSA isolates were 1.93% and Non-fermenters resistant to colistin were 3.3%.

Increasing drug resistant organisms emerging in health care settings is prolonging hospital stay and increasing the cost of health care.

So there is an urgent need to formulate guidelines and rationalize the use of antibiotics to curtail this pandemic of drug resistance.

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