# PROFILE AND ANTIBIOGRAM PATTERN IN BLOOD STREAM INFECTION AMONG PAEDIATRICS AGE GROUP

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**ABSTRACT**
**Introduction:** Blood stream infection are one of the general cause of morbidity and mortality all over the world. Blood is usually sterile, but bacteria take place ephemerally in the blood stream after enthusiastic chewing or dental surgery or instrumentation of the genitourinary tract or bowel. The occurrence of blood stream infection either society acquired or hospital acquired has dramatically increased. **Aim:** To classify the micro-organisms causing blood stream infection in paediatric age group. **Material and Method:** During a one year period, 500 samples were occupied from bacteraemia suspected patients. Blood culture was done by using BacT/Alert 3D system. Further identification of organism was done by different biochemical test. Antimicrobial sensitivity pattern was determined by Kirby Bauer Disc diffusion method according to CLSI guidelines. **Result:** A total of 500 suspected blood sample were cultured by BacT/Alert 3d automated system. Out of 500 sample 200(40%) sample were found positive and 300(60%) sample found negative. **Conclusion:** The present study provides information about pathogens responsible for blood stream infection along with their sensitivity towards commonly used antimicrobial drug. Antibiotic sensitivity pattern of isolates provides useful guidelines to clinicians in initiating empiric therapy and help in management of blood stream infections.

**KEYWORDS:**- Blood stream infection, Blood culture, Antibiotic sensitivity pattern.

## INTRODUCTION

Blood stream infection(BSI) are one the most common cause of morbidity and mortality all over the world.[1] Blood is usually sterile, but bacteria occur transiently in the blood stream after vigorous chewing or dental surgery or instrumentation of the genitourinary tract or bowel.[2] The occurrence of blood stream infection either community acquired or hospital acquired has dramatically increased.[3] Blood stream infections are very frequent in pediatrics age group and these are one of the general causes of morbidity and mortality in neonates and children. In rising countries, the velocity of blood stream infections in children is about 20-50% and it is anticipated that one in five neonates is suffering from blood infections.[4]

Among gram negative bacteria *Acinetobacter spp., pseudomonas aeruginosa, E.coli, klebsiella, Haemophilus influenza, Neisseria meningitis* are responsible for BSI along with *Cougulase negative staphylococcus, staphylococcus aureus, Enterococc*i and *Alpha hemolytic streptococci* among gram positive bacteria.[5][6]

One of the main complications in the treatment of BSI is the rising conflict of bacteria to antibiotics. Rising drug confrontation among blood stream pathogen limit curative option and complicate patient's supervision.[7] To check the antibiotic resistance there, is requisite of uninterrupted inspection of records of clinical isolates along with implementation of strict manage policies in health care settings.[8] Today the only way to diminish mortality due to blood stream infection is premature diagnosis and suitable antimicrobial rehabilitation at the earliest.

The aim of our study was to recognize the majority of recurrent microorganisms in patient assumed from blood stream infection among paediatric age group along with the study of antibiotic sensitivity pattern of isolates.

## MATERIAL AND METHOD

Study was conducted on 500 patients suspected of blood stream infection attending in pediatrics department during January 2018 to October 2018. In this study through blood culture and antibiotic sensitivity test all the customary microbiological methods were followed.

Blood sample were composed aseptically for blood culture and sensitivity pattern. After collection, the blood was transferred into blood culture bottle then inocubated blood culture bottle is encumbered into programmed culture system i.eBacT/ALERT 3D according to producer tutoring. Positive bottles is identified by the machine. Then affirmative sample is subculture into Nutrient agar, 5% sheep blood agar and MacConkey agar. Culture dishes incubated at 37°C for 24 hours. After 24 hours oraganisms predictable by their culture characterstics gram staining, rapid test and various biochemical reactions. Isolated organisms will auxiliary progress for antimicrobal sensitivity test by using Mueller Hinton agar and antibiotic disc as per CLSI guidelines.[9][10]

## RESULTS

Analysis was conducted on 500 patients suspected of blood stream infection. The total number of culture positive cases was found to be 200 giving culture positive rate of 40%. Among positive culture, males were 270(54%) and females were 230(46%). The culture positive patients age ranged from one day to 18 years. Among positive culture, 30(15%) isolates were from 1-11 months patients, 70 (35%) isolates from 1-5 years patients, 30 (15%) isolates from 6-10 years patients, 20 (10%) from 11-18 years age group patients respectively.

Gram positive organisms were more than gram negative organisms. Most frequent pathogen identified among gram positive bacteria were *Staphylococcus aureus* 110 (55%), CONS (Coagulase Negative Staphylococcus) 50(25%) and gram negative bacteria Klebsiella 20(10%), Pseudomonas 20(10%) respectively.

Isolated gram negative organisms was highly sensitive to Polymixin- B 20(100%), Ampicillin followed by Ampicillin/Sulbactum, Gentamycin, Ceftazidime, Ceftrixone and Meropenem were sensitive to (50)% and Gram positive organisms was highly sensitive to Vancomycin (90.90)%

Imipenem, Oxacillin and Linezolid (81.82)%, Gentamycin, Clindamycin (72.73)%, Ampicillin/Sulbactum, Amoxicillin+Clavulinic Acid (63.64)%, Ampicillin, and Co-trimaxazole (54.55)%, penicillin (27.28)%, Ceftriaxone, Cephalothin were (18.19)%

According to this order showing resistance pattern Cephalothin were resistance (72.73)%, penicillin (45.45)% and Amoxicillin +Clavunilinic acid (36.37)% Gentamycin and Clindamycin (27.28)%, Imipenem, Linezolid (18.19)% for gram positive isolates.

**Table 1: Culture Positive and Negative sample.**

| S.N | Group | Number | Percentage |
| --- | --- | --- | --- |
| 1 | No. of positive sample | 200 | 40% |
| 2 | No. of negative sample | 300 | 60% |
| 3 | Total no. of sample process | 500 | 100% |

**Table no. 2 Different Organisms isolated from clinical sample.**

| S.N | Group | Number | Percentage |
| --- | --- | --- | --- |
| 1 | *Pseudomonas species* | 20 | 10% |
| 2 | *Staphylococcus aureus* | 110 | 55% |
| 3 | *Coagulase negative staphylococcus* | 50 | 25% |
| 4 | *Klebsiella spp.* | 20 | 10% |
| TOTAL | | 200 | 100% |

**Table no. 3 Age wise distribution of sample and isolation.**

| Age | No of sample | Positive sample | Percentage |
| --- | --- | --- | --- |
| <1 month | 90 | 50 | 25% |
| 1-11 month | 55 | 30 | 15% |
| 1-5 year | 160 | 70 | 35% |
| 6-10 year | 135 | 30 | 15% |
| 11-18 year | 60 | 20 | 10% |

## DISCUSSION

Blood stream infection are extensive array of confusion that can fluctuate from bacteraemia to incurable septicaemia.[11] If bacteria proliferate in blood stream this circumstance is referred as septicaemia.[12] Septicaemia is one of the significant origin of mortality all around the world.[13] with interruption in the identification and healing of septicaemia there is a possibility of amplify in the humanity rate up to 50%. In current years quantity of septicaemia belongings has been rising considerably. Gold standard to know the etiological representative of blood stream infection is blood culture.[14]

The current study gives information about bacterial isolates causing bloodstream infection. It also provides information about antibiotic sensitivity pattern and has important role in management of septicaemia cases.[15]

The present study was conducted in Teerthanker Mahaveer Medical College and research centre, Moradabad (U.P) 500 clinically suspected cases of septicaemia were included for the study.

An Analysis was conducted on all blood culture reports obtained during January 2018 to October 2018 from new

born admitted to the department of Paediatrics, the Neonatal Intensive Care Unit (NICU), Surgical Intensive Care Unit (SICU) and Paediatrics Intensive Care Unit (PICU).

Severe sepsis remains one of the leading causes of death in children. Physical signs and symptoms, though useful in indentifying possible cases, have limited specificity. Definitive diagnosis is by bacteriological culture of blood samples to identify organisms and establish antibiotic susceptibility.

Out of the 500 clinically suspected cases of sepsis in our study, 200 blood cultures were positive.

The variation in the positivity rate among studies may be due to most the patient are given antibiotics before they come to the hospital or may be due to self –medication which is common practice.[16] Difference in positivity rate from place to place is also due to different blood culture systems used in laboratories, amount and number policies between countries.[17]

A high blood culture positivity rate in septicaemia children around (44%) had been reported by Kavita Prabhu et al[17] in Yenopoya medical college, Manglore. Another study a blood culture positive rate of 42% by Ghanshyam D. Kumar in a tertiary care in hospital in New Delhi.

Blood culture was positive in (26.9%) samples by A. K. Mane[18] et al in an Institute of Medical Science and Research Centre and Lata Mangeshkar Hospital, Digdoh, Nagpur.

However, a lower positivity rate (18.2%) was observed by S.I Nwadioha[19] et al which was comparable with the present study Allow blood culture isolation rate in this study might be due to several reasons, like administration of antibiotics before blood collection or anaerobic bacteraemia.

In our study most common isolates were *Staphylococcus aureus* (55%) followed by *Coagulase Negative Staphylococcus* (25%), *Pseudomonas spp.*(10%), *klebsiella spp.* (10%).

## CONCLUSION
In our study, both gram positive and gram negative bacteria were isolated from assumed patients of blood stream infection. Gram positive bacteria isolated in high number (57.69%) as compared to gram negative bacteria. Male and female are both are prone to blood stream infection but in our study females (55%) are more infected with BSI as compared to males (45%). The reason behind is not so clear.

The commonest organisms recovered from our study was *Staphylococcus aureus, Coagulage Negative staphylococcus, klebsiella*, *pseudomonas specie*s. The

antibiotics [Vancomycin, Ticarcillin, Oxacillin and Linezolid] are the most effective against *Staphylococcus aureus* and Imepenem, Amikacin and Ampicillin/sulbactum against gram negative bacteria. It was not possible to explore risk factors associated with the acquisition of a BSI due to the lack of a suitable control group of children without Blood stream Infection.

The present study provides information about pathogens responsible for blood stream infection along with their sensitivity towards commonly used antimicrobial drug. Antibiotic sensitivity pattern of isolates provides useful guidelines to clinicians in initiating empiric therapy and help in management of blood stream infections.

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