# Descriptive study of sepsis among children hospitalized at pediatric department of Maiwand Teaching Hospital

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## ABSTRACT

**Introduction:** Sepsis is a serious and potentially life-threatening condition, particularly in children. It occurs when the body's immune response to an infection becomes dysregulated, leading to widespread inflammation, tissue damage, and organ dysfunction. **Objective:** To descriptive the sepsis among children hospitalized at pediatric department. **Methods:** A retrospective analysis of medical records of children admitted with a diagnosis of sepsis between January 2022 and May 2023 was conducted. Data were collected on demographics, clinical signs, diseases with sepsis, breast feeding, types tests, diagnosis, and antibiotic therapy were collected. The appropriateness of initial antibiotic choice and timely modifications based on clinical sings and on established guidelines were evaluated. **Results:** In the study, 60 patients with sepsis aged 1 to 10 years were included, with 48.8% being male and 51.7% being female. Of these, 97% were diagnosed with sepsis, while 3% were diagnosed with septic shock. The duration of hospitalization ranged between 1-8 days. In addition to clinical symptoms, sepsis was diagnosed by blood test in 71.7%, urine test in 23.3%, and sputum test in 3% of cases. The discharge rate was 71.7%, while the mortality rate was 3.3%. **Conclusions:** The study provides valuable insights into the clinical characteristics and management of sepsis and septic shock in children, with a relatively lower mortality rate compared to some other studies. Overall, the significance of early

recognition and treatment of sepsis in children, along with the appropriate use of laboratory tests to aid in diagnosis and guide treatment decisions.
**Key words:** sepsis, septic shock, child, antibiotics use.

## INTRODUCTION

Sepsis is a serious and potentially life-threatening condition, particularly in children. It occurs when the body's immune response to an infection becomes dysregulated, leading to widespread inflammation, tissue damage, and organ dysfunction. The World Health Organization (WHO) released a report in 2020 and emphasized the need for increased awareness, prevention, and management of sepsis in children, particularly in low- and middle-income countries. [1] Antibiotics are a life-threatening component of the management of sepsis in children. Sepsis is a life-threatening illness caused by an excessive immunological reaction to an infection, and timely antibiotic therapy is crucial to stop further organ damage and enhance results. The immediate delivery of antibiotics within an hour of the diagnosis of sepsis or septic shock is advised by the Surviving Sepsis Campaign (SSC) guidelines for the management of sepsis in children. Some advice using broad-spectrum antibiotics up until the causative organism is found and susceptibility testing is accessible, such as a thirdgeneration cephalosporin and vancomycin. [2]

A retrospective study published in 2020 funded the administration of antibiotics within 1 hour of recognition of sepsis, which need a reduction in mortality and length of hospital stay. [3] A multicenter study that was released in 2021 showed a link between early antibiotic administration within an hour of the diagnosis of septic shock and a reduced risk of mortality and organ failure. [4] The effect of various sepsis care bundles on outcomes in children with sepsis was assessed in a systematic review and meta-analysis that was published in 2021. According to the analysis, sepsis bundles, which include prompt antibiotic delivery, are related to better results, such as a decrease in death and length of hospital stay. [5]

The kind of antibiotics used for the cure of sepsis in kids depends on the probable causal organism(s), local resistance patterns, and the clinical and age state of the child. The Surviving Sepsis Campaign (SSC) rules for the

cure of sepsis in children recommend the use of broad-spectrum antibiotics, such as third-generation vancomycin and cephalosporin, up to the causative organism is recognized and susceptibility testing is available. Then the antibiotic regimen should base on culture results and local resistance patterns. [2] A retrospective study found that the usage of targeted antimicrobial treatment created on culture results was related to improved outcomes, including reduced mortality and length of hospital stay. [6]

The Infectious Diseases Society of America (IDSA) and the Pediatric Infectious Diseases Society (PIDS) have published a study on the treatment of community-acquired pneumonia in children, which can result in sepsis. Studies identify amoxicillin or amoxicillin/clavulanate as the initial treatment for mild CAP in young patients who had previously been healthy. The guidelines advise using broader-spectrum antibiotics, such as ceftriaxone or a macrolide, for children with severe CAP or risk factors for resistance organisms, such as recent antibiotic usage or hospitalization. [7] Guidelines for the management of newborn sepsis have been released by the American Academy of Pediatrics (AAP) (4). Infants with suspected early-onset sepsis (EOS) or late-onset sepsis (LOS) should receive empiric antibiotic therapy with ampicillin and gentamicin or ampicillin and cefotaxime, according to the recommendations. Depending on local patterns of resistance and the infant's clinical progress, different antibiotics may be chosen. [8]

Overall, the use of broad-spectrum antibiotics is recommended for the initial treatment of sepsis in children, with adjustment of the antibiotic regimen based on culture results and local resistance patterns. For specific conditions, such as community-acquired pneumonia and neonatal sepsis, guidelines recommend specific antibiotic regimens based on the likely causative organisms and local resistance patterns.

## METHOD & MATERIALS

It is a retrospective descriptive cross-sectional study that was conducted at the Internal Department of Pediatrics at the Maiwand Teaching Hospital in January 2022 - May 2023. All patients with sepsis or septic shock are diagnosed and receive antibiotics, including research. First, the diagnosis

of sepsis or septic shock was considered based on international criteria, blood test, urine test, and sputum test. The sample size includes all patient (≥ 1 month and <18 year) cases during one year that have been diagnosed with sepsis or septic shock. Patient file information is entered on a preprepared form. After the completion of data, SPSS VS 20 are used.

## RESULTS

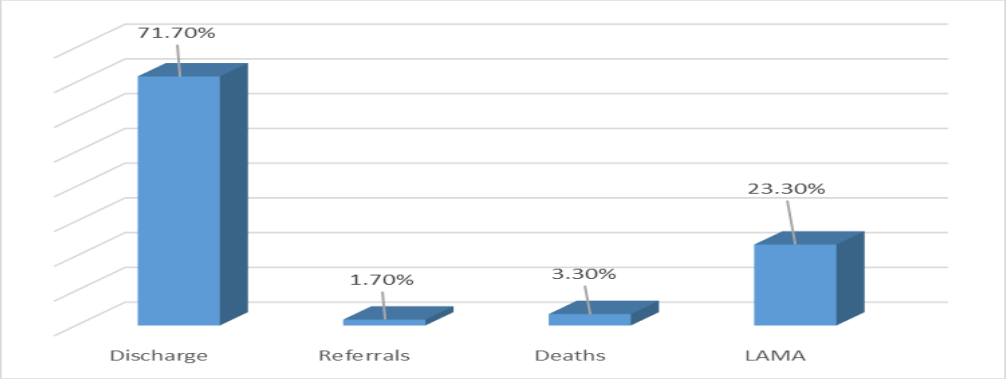
This descriptive cross-sectional study was conducted on the files of children with sepsis and septic shock in the pediatric department of Maiwand Teaching Hospital during 2018, which includes 60 patients with sepsis and septic shock. Out of all affected children, 29 (48.8%) were male and 32 (51.7%) were female, including 32 (53.3%) children in the age group of 1-12 months, 25 (41.7 %) children were in the age group of 1-5 years old, and 3 (5%) children were in the age group of 5-10 years old, and the average age of these children was 1.5 years. Of these, 58 (97%) children with sepsis and 2 (3%) children with septic shock were diagnosed and hospitalized. Children are hospitalized for between 1 and 8 days, with an average of 3.5 days. To diagnose sepsis, in addition to clinical symptoms, 71.7% of sepsis was diagnosed by blood test, 23.3% by urine test and 3% by sputum test. For the antibiotic use, see to Table 1, where the discharge rate is 71.7%, 1.7% for referrals, 3.3% for deaths and 23.3% for AEMAs, see Table 2.

Table 1. Antibiotics utilization for sepsis and septic shock patients

| Antibiotic (s) | N/patients | Percent |
|---|---|---|
| Ceftriaxone + Amikacin | 30 | 50 |
| Ceftriaxone + ampicillin | 22 | 7.3 |
| Ampicillin + gentamicin | 1 | 1.7 |
| Penicillin + gentamicin | 3 | 5 |
| Ceftriaxone | 3 | 5 |
| Ceftriaxone + ampicillin + vancomycin | 1 | 1.7 |
| Total | 60 | 100 |

Pneumonia in 14.8%, acute watery diarrhea in 59.3%, urinary tract infections in 22.2%, and anemia in 3.7% of children with septicemia have also been confirmed. The patients sign and symptoms included fever 100%, vomiting 61.7%, tachycardia 41.7%, tachypnea 38.3%, irritability 83.3%, confusion 30%, cough 50% and headache 25%. Only 39.3% patients received oxygen and 32.7% had Brest feeding during hospitalization.

Table 2. outcome of treatment in child with sepsis




LAMA: leave against medical advice

## DISCUSSION

Our result found the mortality rate among children with sepsis is 3.3% which A study between 2013 and 2014 shown that the Hospital mortality was 25% [8] and also 23.89% for 28 days and 10% for 7 days. The duration of hospitalization for children with sepsis and septic shock can vary depending on the severity of the illness and the response to treatment. The duration of hospitalization of children varied between 1-8 days, the average was 3.5 days. A study in 2018 evaluated the outcomes of children with sepsis and septic shock admitted to pediatric intensive care units in the United States. The study found that the median length of stay in the hospital was 8 days for children with severe sepsis and 15 days for those with septic shock. The study also found that children with septic shock had a higher mortality rate than those with severe sepsis. [9]

Our finding detected the 97% children with sepsis and 3% septic shock were diagnosed and hospitalized in Maiwand teaching hospital. The study published in 2019 in Brazil, the study found that the incidence of sepsis in

the PICU was 14.4%, and that the mortality rate for children with sepsis was 13.2%. The findings of this study are consistent with previous studies that have evaluated the incidence and outcomes of sepsis in children admitted to PICUs in other parts of the world. For example, a study published in the journal Critical Care Medicine in 2018 found that the incidence of severe sepsis and septic shock among children admitted to PICUs in the United States was approximately 3 per 1,000 admissions, with a mortality rate of 9.2%. [10]

The diagnosis of sepsis in children can be challenging due to the nonspecific nature of clinical symptoms and signs. Laboratory tests, including complete blood count, blood cultures, and inflammatory markers such as C-reactive protein and procalcitonin, are commonly used to support the diagnosis of sepsis and guide treatment.in this study addition to clinical symptoms, 71.7% of sepsis was diagnosed by blood test, 23.3% by urine test and 3% by sputum test.

## Conclusion

It is important to note that this study was conducted in a single hospital and may not be representative of the general population. Nonetheless, the findings of this study provide useful insights into the clinical characteristics and management of sepsis and septic shock in children. The mortality rate was relatively lower than some others studies. Overall, the text highlights the importance of early recognition and treatment of sepsis in children, as well as the appropriate use of laboratory tests to support the diagnosis and guide treatment decisions.

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