

Exploring Paediatric Acute Febrile Illnesses in Tertiary Care Center

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Abstract: ***Introduction:** Pediatric febrile illnesses pose a significant threat to children's health, leading to substantial hospital admissions, morbidity, and mortality. Diagnosing these illnesses is a daunting task for clinicians and laboratories alike. **Methodology:** This prospective study, conducted at Sri Lakshmi Narayana Hospital in Pondicherry, India, between January 2024 and May 2024, enrolled 150 children aged 1 - 12 years. **Results:** The study included total 150 participants. Majority of the participants were males (57%). In total 18.6% suffered from unidentified infection sources. Pneumonia was the most predominant (21.3%). UTIs were the most common SBI in children under 3 years. Bacteremia occurred in 5.33% of patients. **Conclusion:** SBIs were identified in 23 hospitalized children (15.33%), with UTIs being the most common SBI. Children in this age group presenting with toxic symptoms should be thoroughly evaluated for SBIs.*

Keywords: Paediatric febrile illness, Serious bacterial infections, Child health, Pneumonia in children, Urinary tract infections

1. Introduction

Fever, a physiological response marked by elevated body temperature, is a common reason for pediatric medical consultations, accounting for 15 - 25% of primary care and emergency department visits [1, 2, 3].

Although fever can be alarming, the prevalence of serious infections in children is relatively low, estimated at less than 1% in primary care settings in developed countries. [5] However, this percentage can rise to 25% in emergency departments. [6] This narrative review aims to provide non-pediatric physicians with current information on the epidemiology, assessment, and management of fever in children.

Fever in children is typically caused by infections, but non-infectious causes such as immune-mediated, inflammatory, and neoplastic conditions can also occur. When the cause of fever cannot be identified through history and physical examination, it is referred to as "fever without source" (FWS) [7].

In industrialized countries, only a minority of children with FWS have serious bacterial infections (SBIs), such as urinary tract infections (UTIs), pneumonia, sepsis, or meningitis. Instead, most children with FWS have mild, self-resolving viral illnesses [8]. However, the presence of viral pathogens does not rule out the possibility of co-infection with SBI. Research has shown that even when a virus is detected, 40% of children can still have an SBI. Therefore, identifying a virus is not a reliable way to exclude SBI [9].

While the height of fever does not directly indicate the severity of illness, temperatures above 39 °C are associated with a greater likelihood of SBI [1]. Studies have shown that infants under 6 months with fever >39 °C are at increased risk of SBI [10]. Additionally, temperatures above 41 °C have been linked to a higher risk of meningitis [11]. It's essential to note that children with SBI may not always present with high fever; some may have normal temperatures or even be hypothermic.

Identifying the source of infection in children with fever can be difficult, even with detailed clinical histories and comprehensive examinations. To address this challenge, various criteria and protocols, such as the Boston Criteria and Philadelphia Protocol, have been developed to guide clinicians [12]. Management strategies are tailored based on clinical and laboratory assessments, categorizing patients into high - or low - risk groups.

Diagnosing the cause of fever can be particularly challenging in young children, especially in resource - constrained settings. The wide range of potential causes, including viruses, bacteria, and non - infectious agents, can lead to ambiguous symptoms and signs. This often results in the irrational prescribing of antibiotics and antimalarials.

Prompt diagnosis and treatment are crucial, as acute febrile illnesses can be life - threatening if left untreated. In under - resourced settings, misdiagnosis can lead to preventable fatalities. Research on children with fever without source in India is limited, and most existing guidelines are based on Western studies [13].

This study aims to investigate the etiology of children presenting to a tertiary referral center without localizing symptoms, providing vital data to this under - researched area.

2. Materials and Methods

A prospective study was conducted at Sri Lakshmi Narayana Hospital in India from January 2024 to October 2024. The study focused on children aged 1 - 12 years who presented with acute febrile illness (AFI) of less than five days duration.

To be included in the study, children had to meet specific criteria, including a fever duration of less than five days, a temperature above 38°C, and no localizing signs.

Conversely, children who had received antibiotics recently, had immunodeficiency or chronic illnesses, or had fever 48 hours post - admission were excluded from the study.

The study involved a comprehensive data collection process, including detailed medical history, socioeconomic status, immunization status, nutritional status, vital signs, and a thorough clinical examination.

Various laboratory tests were also conducted, such as blood counts, peripheral smear, malaria parasite smear, and urine microscopic examination. Additional tests, including lumbar puncture, dengue serology, and further testing for enteric fever and leptospirosis, were performed as indicated. Imaging studies, such as ultrasonography examination of the abdomen and micturating cysto - urethrogram, were also conducted as needed.

The patients were followed up until a definite diagnosis was made.

3. Statistical Analysis

The statistical analysis mainly involved the calculation of percentages. Categorical variables have been expressed in percentages and continuous variables in the median and interquartile range. The chi - square test was used to find the association between categorical variables. The result was considered statistically significant when the p - value obtained was <0.05.

4. Results

Bacteremia was identified in 8 patients (5.36%), primarily in the one - to three - month age group. Notably, all 5 patients were critically ill and received empirical treatment with ceftriaxone. Additionally, each of these patients presented with elevated leukocyte counts exceeding 15, 000/microliter.

UTIs were commonly observed in female children, presenting as nonspecific fevers. However, gender differences were insignificant in children under three months. Escherichia coli (E. coli) was the most frequently isolated organism, particularly in uncircumcised male patients. Over half of the UTI patients had elevated white blood cell counts. Antibiotic sensitivity testing revealed varied responses among E. coli, Klebsiella, and Pseudomonas strains.

Acute bronchiolitis was more prevalent in children aged one to 12months (6.65%) and pneumonia was prevalent (21%) in children aged one to 12 months and one to 36 months, presenting symptoms such as fever, cough, feeding difficulties, and lethargy. Radiographic findings typically included patchy or homogenous opacities. Treatment with ceftriaxone and amikacin was largely effective in managing pneumomonia.

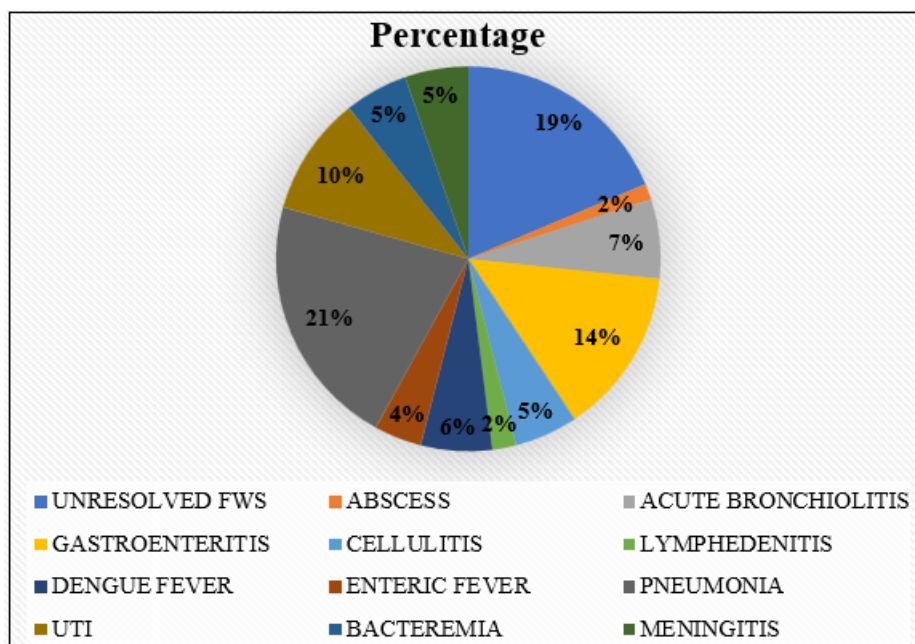


Figure 1: Distribution of total cases by diagnosis

Children suspected of having meningitis underwent lumbar punctures, and diagnoses were confirmed through cerebrospinal fluid (CSF) analysis. The treatment regimen, consisting of ceftriaxone and amikacin, yielded positive outcomes.

Dengue fever accounted for 6% (n = 9) of cases, presenting with a range of symptoms, from shock to petechial rash. The

primary treatment approach focused on fluid management to stabilize patients and manage symptoms.

FWS was identified in 18.6% (n = 28) of cases. Given its self - limiting nature, FWS was presumed to be of viral origin.

A subset of cases presented with gastroenteritis symptoms 42%, primarily affecting children under 60 months.

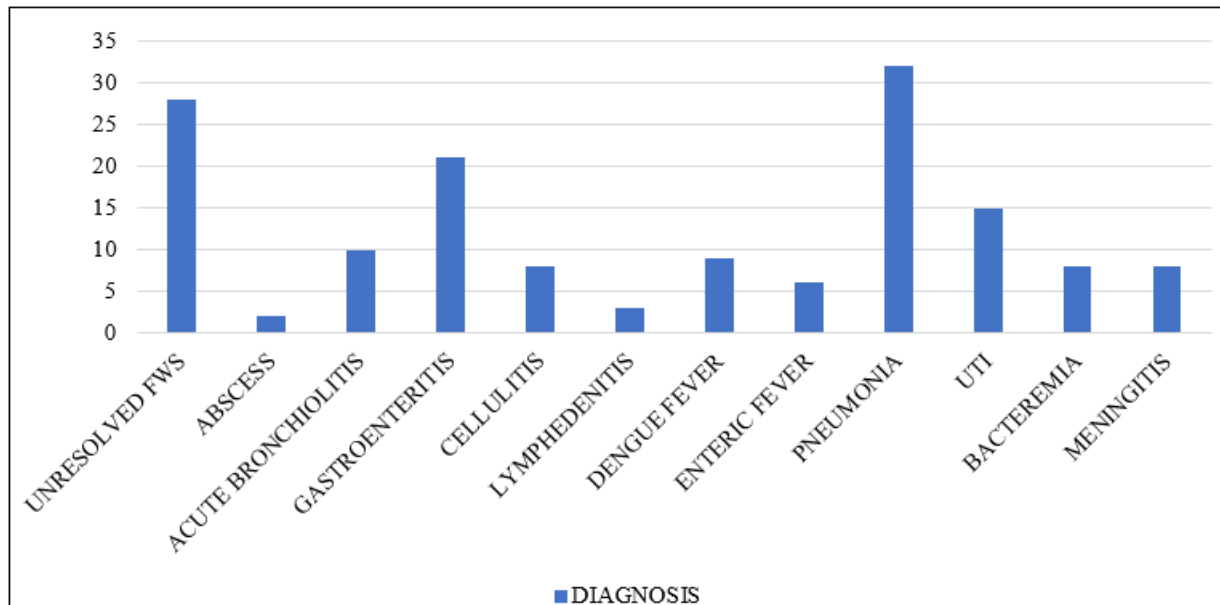


Figure 2: Total number of cases per diagnosis

The study's results demonstrated a notable variation in the distribution of illnesses across different age groups. Pneumonia emerged as the most common diagnosis across all age groups. In contrast, bacteremia and meningitis were found to be more prevalent in younger age groups.

5. Discussion

This study, conducted at Sri Lakshmi Narayana Hospital in Puducherry, investigated children aged one month to 12 years admitted with fever without localizing signs. Of the 176 cases identified, 150 met the inclusion criteria.

The results showed that 15.3% of patients had serious bacterial infections (SBI), while 18.6% had unidentified causes, suggesting a possible viral etiology.

Urinary tract infections (UTIs) were the most prevalent SBI, affecting all age groups, with a higher incidence in females. International studies corroborate these findings, although the incidence rates vary. For instance research from Brazil and United States indicates varying prevalence rates of UTI in children with fever without localising signs. [14, 15]

The study also found that bacterial meningitis accounted for 5.3% and 6% of cases, respectively. While the findings align with international studies [16, 17]. Dengue fever accounts for 6%, this finding aligns with other studies that reported higher incidence of dengue in similar clinical setting [18]. The relatively small sample size limits the generalizability, highlighting the need for future research with larger populations.

6. Conclusion

This study, conducted at Sri Narayana hospital, investigated the causes of febrile illnesses in children aged one month to 12 years without clear localizing symptoms. The key findings revealed a lower incidence of serious bacterial infections (SBIs) at 15.3%, suggesting geographical variations compared to Western studies. Urinary tract infections (UTIs)

were the most common SBI, predominantly affecting females, consistent with international data. Bacterial meningitis was identified in 5.3% of cases, aligning with global reports. Dengue fever accounted for 6% of diagnoses, likely linked to a concurrent epidemic. Notably, 18.6% of febrile episodes remained unexplained, classified as fever without source (FWS), and typically resolved on their own. This study provides valuable insights into pediatric fever causes in a resource - constrained setting, highlighting lower SBI rates compared to Western counterparts. The findings emphasize the need for expanded research with larger cohorts and advanced diagnostics to reinforce these results.

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