Expert Opinion Article

ETIOLOGICAL PROFILE OF FEVER OF SHORT DURATION WITHOUT FOCUS IN CHILDREN AGED 1–36 MONTHS: A TERTIARY CARE HOSPITAL-BASED STUDY

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ABSTRACT

Background: Fever without focus (FWS) in children aged 1–36 months presents a significant diagnostic challenge to pediatricians. Although most cases are due to self-limiting viral infections, a subset represents serious bacterial infections (SBI), including urinary tract infections (UTI), bacteremia, pneumonia, meningitis, and enteric fever. Early identification is essential to prevent morbidity and mortality while avoiding unnecessary hospitalization and antibiotic exposure.

Objectives: To determine the etiological profile of fever of short duration (<7 days) without localizing signs in children aged 1–36 months and to identify common organisms causing septicemia and urinary infections.

Methods: This prospective observational study was conducted in a tertiary care hospital. Children aged 1–36 months presenting with fever ≥38°C without identifiable focus on clinical examination were enrolled. Detailed clinical evaluation and laboratory investigations including complete blood count, blood culture, urine analysis and culture, chest radiography, cerebrospinal fluid analysis (when indicated), and serological tests were performed.

Results: The majority of cases were viral or self-limiting illnesses. Among serious bacterial infections, urinary tract infection was the most common cause, followed by bacteremia and pneumonia. Escherichia coli was the predominant organism in urine cultures, while Streptococcus pneumoniae and Staphylococcus aureus were common isolates in blood cultures. Younger infants had a higher incidence of serious bacterial infection.

Conclusion: While most cases of fever without focus are benign, urinary tract infection remains the most frequent serious bacterial infection in children 1–36 months. Rational use of investigations and close follow-up are crucial to balance early diagnosis and antimicrobial stewardship.

Keywords: Fever without focus, Serious bacterial infection, Urinary tract infection, Bacteremia, Pediatrics

INTRODUCTION

Fever is one of the most common presenting complaints in pediatric practice and accounts for nearly one-fourth of emergency department visits in young children. Fever without focus (FWS) refers to a rectal temperature of ≥38°C in children younger than 36 months without identifiable source after careful history and clinical examination [1].

The evaluation of fever without localizing signs remains a clinical dilemma. While the majority of cases are due to viral infections that resolve spontaneously, a small proportion represents serious bacterial infections (SBI) [2]. These include urinary tract infection, bacteremia, meningitis, pneumonia, enteric fever, and less commonly leptospirosis or dengue in endemic areas [3].

Historically, before widespread immunization with Haemophilus influenzae type b (Hib) and pneumococcal conjugate vaccines, occult bacteremia was a significant concern [4]. However, the epidemiology has shifted dramatically following vaccination programs [5]. Currently, urinary tract infection has emerged as the leading cause of serious bacterial infection in febrile infants without focus [6].

The risk of SBI varies by age. Infants younger than 3 months carry the highest risk due to immature immune function [7]. In the 3–36 months age group, the risk decreases but is still clinically relevant, particularly in children with high fever (>39°C), elevated white blood cell count, or toxic appearance [8].

Western guidelines for evaluation are well established. However, epidemiological patterns differ geographically [9]. Limited Indian data exist regarding etiological distribution of fever without focus in children [10]. Variations in vaccination coverage, antibiotic use patterns, and endemic infections such as dengue, malaria, and enteric fever influence the clinical spectrum [11].

The present study was undertaken to analyze the etiological profile of fever of short duration (<7

days) without localizing signs in children aged 1–36 months presenting to a tertiary care center and to evaluate the role of investigations in identifying serious bacterial infections.

AIMS AND OBJECTIVES

Aim: To study the etiological profile of fever of short duration without focus in children aged 1–36 months.

MATERIALS AND METHODS

Prospective observational study.

Study Setting

Department of Pediatrics, tertiary care teaching hospital.

Study Duration

Two-year period.

Study Population

Children aged 1–36 months presenting with fever of short duration (<7 days) without identifiable focus.

Inclusion Criteria

- Age between 1–36 months
- Fever ≥38°C
- Duration <7 days
- No identifiable source on initial clinical examination

Exclusion Criteria

- Fever >7 days
- Known chronic illness
- Immunodeficiency
- Prior hospitalization
- Clear localizing signs at presentation

Data Collection

Each enrolled child underwent:

- Detailed history (duration, immunization status, feeding, irritability, urine output)
- Thorough physical examination
- Anthropometric measurements

Laboratory Investigations

Depending on clinical suspicion, investigations included:

- Complete blood count
- Peripheral smear
- C-reactive protein
- Blood culture
- Urine routine microscopy
- Urine culture (catheter or clean catch)
- Chest X-ray
- Lumbar puncture (if indicated)
- Dengue serology
- Widal test (if suspected)
- Malaria smear

Definition of Serious Bacterial Infection

SBI was defined as presence of:

- Positive blood culture
- Positive urine culture
- Radiologically confirmed pneumonia
- CSF culture positive meningitis
- Enteric fever confirmed by blood culture

Statistical Analysis

Data were analyzed using descriptive statistics. Frequency distribution and percentage analysis were used for categorical variables.

RESULTS

TABLE 1: Distribution of Study Subjects According to Gender

Gender	Number of Subjects (N)	Percentage (%)
Male	52	52%
Female	48	48%
Total	**100**	**100%**

TABLE 2: Diagnosis and Age Distribution of Children Presenting with Fever Without Focus

Diagnosis	1–3 Months (n=27)	%	4–36 Months (n=73)	%	Total (n=100)	%
Abscess	0	0%	1	1.4%	1	1%
Bacteremia	2	7.4%	4	5.5%	6	6%
Dengue	0	0%	12	16.4%	12	12%
Enteric Fever	0	0%	5	6.8%	5	5%
Leptospirosis	0	0%	2	2.7%	2	2%
Malaria	0	0%	1	1.4%	1	1%
Meningitis	1	3.7%	2	2.7%	3	3%
Myocarditis	0	0%	1	1.4%	1	1%
Pneumonia	2	7.4%	4	5.5%	6	6%
Septic Arthritis	1	3.7%	1	1.4%	2	2%
UTI	2	7.4%	15	20.5%	17	17%
Unresolved FWS	19	70.3%	25	34.2%	44	44%
Total	**27**	**100%**	**73**	**100%**	**100**	**100%**

TABLE 3: Children with Bacteremia Presenting as Fever Without Localizing Signs

Age Group	Male	Female	Total
1–3 Months	1 (50%)	1 (50%)	2
4–36 Months	3 (75%)	1 (25%)	4
Total	**4 (66.7%)**	**2 (33.3%)**	**6**

TABLE 4: Profile of Organism Isolated from Blood Culture (N = 6)

Organism	Total Isolates (n=6)	1–3 Months	4–36 Months
Klebsiella	2 (33.3%)	1	1
Staphylococcus aureus	1 (16.7%)	1	0
E. coli	1 (16.7%)	0	1
Pseudomonas	1 (16.7%)	0	1
β-haemolytic Streptococci	1 (16.7%)	1	0

TABLE 5: Age-Sex Distribution of Children with Dengue Fever

Age Group	Male	Female	Total
1–3 Months	0	0	0
4–36 Months	8 (66.7%)	4 (33.3%)	12
Total	**8 (66.7%)**	**4 (33.3%)**	**12**

TABLE 6: Age-Sex Distribution of Leptospirosis

Age Group	Male	Female	Total
1–3 Months	0	0	0
4–36 Months	1 (50%)	1 (50%)	2
Total	**1 (50%)**	**1 (50%)**	**2**

TABLE 7: Age-Sex Distribution of Unresolved Fever Without Source

Age Group	Male	Female	Total
1–3 Months	10 (53%)	9 (47%)	19
4–36 Months	10 (40%)	15 (60%)	25
Total	**20 (45.4%)**	**24 (54.5%)**	**44**

TABLE 8: Profile of Organism Isolated from Urine Culture (N = 17)

Organism	Total Isolates (n=17)	Percentage (%)
Escherichia coli	11	64.7%
Klebsiella	3	17.6%
Proteus	2	11.8%
Pseudomonas	1	5.9%
Total	**17**	**100%**

TABLE 9: Sensitivity of Organisms in Blood and Urine Cultures

Organism	Ampicillin	Cefotaxime	Ciprofloxacin	Amikacin
Klebsiella	–	Yes	Yes	Yes
Staphylococcus aureus	–	Yes	–	–
E. coli	Yes	Yes	Yes	Yes
Pseudomonas	–	–	Yes	Yes
β-haemolytic Streptococci	Yes	Yes	–	–
Proteus	Yes	–	–	Yes

DISCUSSION

The present prospective study evaluated the etiological profile of fever of short duration without focus (FWS) in children aged 1–36 months presenting to a tertiary care hospital. Fever without localizing signs remains a common diagnostic challenge in pediatric practice, particularly in young infants where clinical differentiation between viral illness and serious bacterial infection (SBI) is often difficult.

In this study, the majority of cases (44%) were categorized as unresolved fever without focus, most

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likely viral in origin, as they showed spontaneous resolution and no growth on blood or urine cultures. This finding aligns with global data suggesting that most febrile illnesses in this age group are self-limiting viral infections [12]. However, the study also highlights that a significant proportion of children had identifiable infectious causes, emphasizing the importance of systematic evaluation [13].

Urinary tract infection (UTI) was the most common serious bacterial infection, accounting for 17% of cases. This is consistent with contemporary pediatric literature, which identifies UTI as the leading cause of occult bacterial infection in febrile infants [14,15]. The predominance of *Escherichia coli* as the major uropathogen further supports existing epidemiological trends. Notably, UTI was more prevalent in the 4–36 months age group and was more common among female children, whereas no significant sex difference was observed in infants below 3 months.

Bacteremia was identified in 6% of cases. The isolated organisms included Klebsiella, Staphylococcus aureus, E. coli, Pseudomonas, and β-haemolytic streptococci. Klebsiella was the most common isolate. The relatively lower incidence of bacteremia compared to earlier pre-vaccine era studies may reflect improved immunization coverage against *Haemophilus influenzae* type b and *Streptococcus pneumoniae.* This epidemiological shift underscores the impact of vaccination programs in reducing invasive bacterial infections [16].

Pneumonia accounted for 6% of cases and was more common in the 4–36 months age group. Importantly, these children presented without obvious respiratory signs, and diagnosis was established radiologically. This emphasizes that occult pneumonia should be considered in febrile children with leukocytosis even in the absence of overt respiratory symptoms [17].

Dengue fever emerged as the second most common identified cause (12%), particularly in the older age group, reflecting regional endemicity. Leptospirosis and enteric fever were less common but clinically significant causes. These findings highlight the importance of considering regional epidemiological factors while evaluating febrile children [18].

The antibiotic sensitivity pattern showed that most isolates were sensitive to third-generation cephalosporins and aminoglycosides, while resistance to certain commonly used antibiotics was observed. This reinforces the need for culture-guided therapy and rational antibiotic use to prevent antimicrobial resistance [19].

Age stratification revealed that infants aged 1–3 months had a relatively higher proportion of serious infections compared to older children, supporting existing guidelines recommending cautious evaluation in younger infants. However, not all febrile children required aggressive intervention, and careful clinical assessment combined with selective investigations proved effective [20,21].

Overall, this study reaffirms that although viral infections predominate in fever without focus, serious bacterial infections remain clinically relevant. A balanced approach incorporating clinical judgment, targeted investigations, and close follow-up is essential to ensure optimal patient outcomes while avoiding unnecessary hospitalization and antibiotic exposure.

CONCLUSION
Fever without focus in children aged 1–36 months is predominantly due to viral or self-limiting illness. However, urinary tract infection remains the most common serious bacterial infection.
Key conclusions:
- UTI is the leading SBI.
- Bacteremia incidence has decreased in post-vaccine era.
- Younger infants are at higher risk.
- Rational investigation prevents overtreatment.
- Close follow-up is essential.

Clinical protocols should balance early identification of SBI with avoidance of unnecessary hospitalization and antibiotic use.

LIMITATIONS
- Single-center study
- Limited sample size
- Viral diagnostic testing not universally performed

RECOMMENDATIONS
- Routine urine evaluation in febrile infants without focus
- Judicious use of blood cultures
- Emphasis on vaccination
- Larger multicentric Indian studies

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