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Clinical Profile and Etiology of Children Presenting with Prolonged Fever: A Study in Tertiary Care Hospital in Bangladesh

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Abstract

Background: Children often undergo medical evaluation for fever, which can be difficult to diagnose as serious infection or viral illness. Fever of unknown origin (FUO) is categorized within prolonged fever lasts at least 7 days. **Objectives:** This study aimed to find a clinical and etiologic profile of children presenting with prolonged fever in tertiary care hospital in Bangladesh. **Methods:** This prospective observational study was conducted at the Department of Pediatrics, Monno Medical College and Hospital, Manikganj, Bangladesh from January 2020 to July 2021. A total of 100 children with fever for seven days or more were enrolled as the study subjects using a purposive sampling technique. **Results:** In this study, 55% of participants were aged 3-10 years, with a male-female ratio of 1.8:1. Most patients (69%) were well-nourished. All participants had fever, while 43% experienced vomiting, 32% abdominal pain, 24% cough, and 16% headache. Clinical findings included coated tongue (36%), hepatosplenomegaly (24%), isolated hepatomegaly (12%), and eschar marks (10%). The causes of prolonged fever identified were enteric fever (42%), rickettsia (21%), UTI (13%), combined enteric fever and UTI (8%), and pneumonia (7%). **Conclusion:** Male children aged 3 to 10 years are particularly prone to prolonged fever, regardless of nutritional status. Common symptoms include vomiting, abdominal pain, cough, headache, coated tongue, and hepatosplenomegaly. Potential causes of prolonged fever in children include enteric fever, rickettsia, and urinary tract infections. *[Journal of National Institute of Neurosciences Bangladesh, July 2024;10(2):104-409]*

Keywords: Clinical profile; etiology; children; prolonged fever; Fever of unknown origin

Introduction

Fever is a common symptom in illnesses affecting children and adolescents. It is an immune system response to infection, often considered beneficial and self-limiting[1]. However, while fever may help the body fight infection, it also tends to increase parental anxiety and pressure on pediatricians to diagnose and manage the condition quickly. A prolonged fever is typically defined as one that lasts at least 7 days[2]. within this category is fever of unknown origin (FUO), a term used when the underlying cause of prolonged fever remains elusive[3]. In most cases, fever in children arises from benign infections that do not require medical attention. Despite its prevalence, the natural progression of fever in children is not well understood. Interestingly, the duration of fever before seeking healthcare does not consistently predict the presence of serious bacterial infections[4]. Research has shown that children who remain febrile for seven days or more experience a significant decline in their health-related quality of life[5]. This prolonged duration of fever often leads to repeated visits to the emergency department, further amplifying concerns for both parents and healthcare providers[6]. A phenomenon termed "fever phobia" describes the heightened anxiety parents feel about potential adverse effects of fever[7]. This worry contributes to the frequent return visits to healthcare facilities and underscores the importance of parental education. Providing clear

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information about the expected duration of fever, signs to watch for, and appropriate management strategies can alleviate parental concerns and help optimize healthcare utilization[8,9]. Despite its clinical importance, fever of unknown origin in pediatrics remains a challenging diagnosis with slightly varying definitions across studies. The most widely accepted definition describes FUO as a fever above 38.3°C, occurring at least once daily for more than seven days, in a child who has undergone outpatient evaluation by a pediatrician, including a detailed history, physical examination, and initial investigations, all of which yield inconclusive results[10]. It is important to distinguish FUO from fever without source (FWS). FWS refers to fever lasting less than one week with no apparent cause. If FWS persists beyond seven days without an identifiable source, it may evolve into FUO. Recognizing this distinction is essential for guiding diagnostic and therapeutic decisions[11]. Overall, understanding the characteristics, progression, and implications of prolonged fever in children is crucial. This knowledge not only helps healthcare professionals provide accurate diagnoses and appropriate treatments but also aids in educating parents. Clear communication about the nature of fever, including when to seek medical attention, can reduce anxiety and improve the overall healthcare experience for families[12].

Methodology

Study Settings and Population: This was a prospective observational study that was conducted in the Department of Pediatrics, Monno Medical College and Hospital, Manikganj, Bangladesh from January 2020 to July 2021 for a period of one and half year. A total of 100 children aged 6 months to 18 years, each experiencing fever for 7 days or more, were enrolled in this study using a purposive sampling technique. Prolonged fever was defined as a fever lasting more than 7 days at the time of presentation. Suspected or confirmed cases of COVID 19 and known cases of any chronic illness were excluded. Besides, patients with known immunocompromised conditions were rejected.

Sample Collection Procedure: A systematic evaluation was conducted for each patient using a predesigned proforma. A comprehensive clinical history was taken, detailing the symptom profile, as well as the onset, duration, type of fever, and any associated symptoms. Both healthcare workers and parents documented the fever to eliminate the possibility of fraudulent reporting. Temperatures were recorded either axillary and/or orally, with serial temperature recordings charted throughout the treatment period. A thorough physical examination was performed on each patient. Final diagnoses were broadly classified into infectious and non-infectious categories, with further sub classifications based on specific etiologies.

Statistical Analysis: Statistical analyses was performed with SPSS software, versions 22.0 (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.). Continuous data that were normally distributed were summarized in terms of the mean, standard deviation, median, minimum, maximum and number of observations. Categorical or discrete data were summarized in terms of frequency counts and percentages. When values are missing, the denominator was stated. Chi-square test was used for comparison of categorical variables. Every effort was made to obtain missing data. A two-sided P value of less than 0.05 was considered to indicate statistical significance.

Ethical Clearance: All procedures of the present study were carried out in accordance with the principles for human investigations (i.e., Helsinki Declaration) and also with the ethical guidelines of the Institutional research ethics. Formal ethics approval was granted by the IRB of Monno Medical College. Participants in the study were informed about the procedure and purpose of the study and confidentiality of information provided. All participants consented willingly to be a part of the study during the data collection periods. All data were collected anonymously and analyzed using the coding system.

Results

A total number of 100 patients were recruited after fulfilling the inclusion and exclusion criteria. Among them the majority of participants 55.0% were aged between 3 to 10 years followed by 1 to 2 years, less than 1 year and 11 to 18 years which were 25.0%, 11.0% and 9.0% (Figure I).

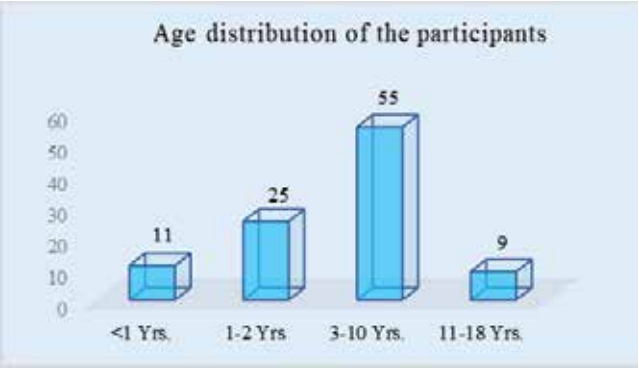

Figure I: Column chart showed age wise patients distribution (N=100)

Majority patients were male 65.0% and female were 35.0%.The male-to-female ratio was 1.8:1(Figure II).

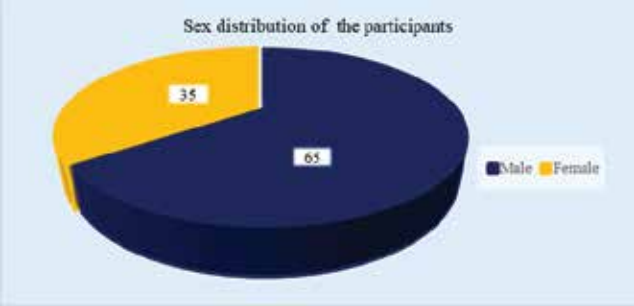

Figure II: Pie chart showed gender wise patients distribution (N=100)

Over two-thirds (69.0%) of the patients were well-nourished and one-thirds (31.0%) of patients were undernourished (Figure III).

Figure III: Ring chart showed distribution of patients according to nutritional status(N=100)

In terms of clinical presentation, we observed that all patients (100.0%) had fever, followed by vomiting in 43.0%, abdominal pain in 32.0%, cough in 24.0%, and headache in 16.0% of the cases.(Figure:IV)

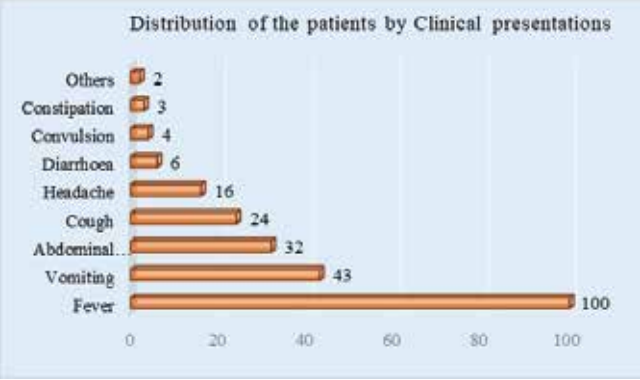

Figure IV: Bar chart showed clinical presentations of the patients (N=100)

In this study, clinical findings included coated tongue in 36.0% of cases, hepatosplenomegaly in 24.0%, isolated hepatomegaly in 12.0%, and eschar marks in 10.0% of cases. (Figure: V)

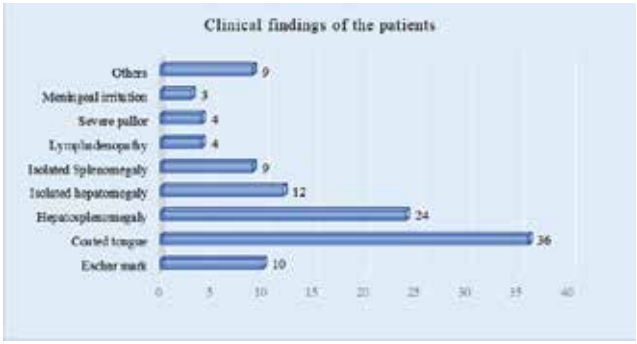

Figure V: Bar chart showed clinical findings of the patients (N=100)

Normal blood test results were observed in 24.0% of participants. Among the abnormalities, moderate anemia (hemoglobin 6-9 g/dL) was found in 12.0% of cases, leukocytosis (WBC > 11,000/cc) in 34.0%, leukopenia (WBC < 4,000/cc) in 14.0%, and thrombocytopenia (platelets < 150,000/cc) in 12.0% of cases.(Table:1)

Table 1: Findings of blood test among the patients

Characteristics	percent
Severe anemia (HB% <6g/dl)	4.0
Moderate anemia (HB%: 6-9g/dl)	12.0
Leukocytosis (WBC >11000/cc)	34.0
Leukopenia (WBC <4000/cc)	14.0
Thrombocytopenia (WBC >150000/cc)	12.0
Normal	24.0

In the investigations, 54.0% of cases tested positive for the Widal test, 23.0% had pus cells present, and 22.0% were positive for Rickettsial antigen (Table 2).

Table 1: Findings of blood test among the patients

Investigation	percent
Widal test (Positive)	54.0
Rickettsial antigen (Positive)	22.0
Chest X-ray (Opacities)	11.0
Urine R/M/E (Pus cell present)	23.0
CSF study (Positive)	3.0

The etiology of prolonged fever among the participants, it was found that enteric fever was the cause in 42.0% of cases, followed by rickettsial infection in 21.0%, urinary tract infection (UTI) in 13.0%, a combination of enteric fever and UTI in 8.0%, and pneumonia in 7.0% of cases

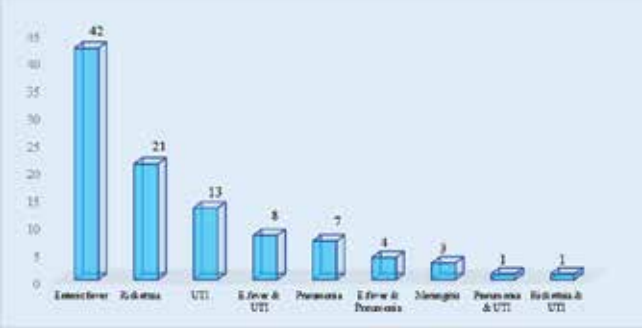

Figure VI: Bar chart showed etiology of prolonged fever of the patients (N=100)

Discussion

Prolonged fever in children is a common yet challenging clinical presentation in Bangladesh. In resource-limited settings, identifying the underlying etiology is crucial for effective management. This study highlights the clinical profile and probable causes of prolonged fever in Bangladeshi children, reflecting the epidemiological trends observed in tropical and developing regions.

Our findings suggest that infections remain the leading cause of prolonged fever in children, with typhoid fever, tuberculosis, and viral infections being the most common culprits. Similar studies in South Asia have reported enteric fever as a significant contributor, attributed to poor sanitation and contaminated water sources. The high burden of tuberculosis among Bangladeshi children, often presenting as extrapulmonary TB, aligns with national data on childhood TB prevalence. Viral infections, including Epstein-Barr virus (EBV) and dengue, also emerged as important etiologies, underscoring the need for robust virological diagnostics in clinical settings.

This study was to determine the clinical and etiologic profile of children presenting with prolonged fever at a tertiary care hospital in Bangladesh. In this study, the majority of participants (55.0%) were aged between 3 to 10 years, which is consistent with the age distribution observed in others studies has been showed 67.0% were 4 to 11years[13],53% were 3 to 9 years[14]. In this study majority patients were male 65.0%.Most of the study has been conducted in different state of India shown that the male patients were predominant[15,16]. This study has been shown that two-thirds of the patients were well-nourished and one-thirds of patients were undernourished which is dissimilar to some study. Data has been taken from the nationally representative Bangladesh Demographic Health and Survey conducted in 2014 that about 43% undernourished children were prone to significant infection. Clinically, all patients presented with fever. Additionally, a significant number of patients reported symptoms such as vomiting, abdominal pain, cough, and headache which is consistent to other study[17].

Additionally, in this study, clinical findings such as coated tongue, hepatosplenomegaly, isolated hepatomegaly, and eschar marks were observed. Similar clinical features were highlighted by Nijman et al. in their study[18]. A previous study emphasized that the urgency of subsequent evaluations and the decision to manage the patient as an outpatient or to hospitalize them depends significantly on the child's condition at the initial visit. In our study, normal blood test results were observed in nearly one-fourth of the participants. Additionally, moderate anemia, leukocytosis, leukopenia, and thrombocytopenia were found in similar proportions among the participants[19]. However, several other studies reported findings that differ from ours[20,21].

Regarding further investigations, the majority of cases tested positive for the Widal test, while nearly one-fourth had pus cells present, and around one-fifth tested positive for Rickettsial antigen. In our analysis of the causes of prolonged fever among participants, we found that 42.0% of cases were due to enteric fever, 21.0% to rickettsial infection, 13.0% to urinary tract infection (UTI), 8% to a combination of enteric fever and UTI, and 7.0% to pneumonia. In contrast, studies by Antoon et al[22] and Javed et al[23] identified a wider range of etiological factors than our study. The results of this study could be useful for future research in this area. This was a single-centered study with a small sample size and conducted over a short period. As a result, the findings may not provide an accurate representation of the situation across the entire country.

Autoimmune diseases, including systemic lupus erythematosus (SLE) and juvenile idiopathic arthritis (JIA), were identified in a subset of children. These findings are consistent with global trends but are often underdiagnosed in Bangladesh due to limited access to specialized rheumatologic care and diagnostic facilities. Malignancies such as leukemia and lymphoma were observed in a small proportion of cases, emphasizing the importance of considering malignancy in prolonged fever cases unresponsive to conventional therapies.

Clinically, the majority of children presented with persistent fever, weight loss, lymphadenopathy, and hepatosplenomegaly. These non-specific symptoms necessitate a systematic approach to diagnosis,

balancing empirical antibiotic therapy with targeted investigations. Limited availability of advanced diagnostic tools in many hospitals contributes to diagnostic delays and prolonged hospital stays, increasing both healthcare costs and morbidity.

Early and accurate diagnosis of prolonged fever is essential to reduce complications and improve outcomes. Strengthening laboratory facilities, ensuring widespread availability of blood cultures, serological tests, and molecular diagnostics, and promoting antimicrobial stewardship programs are necessary steps. Additionally, public health initiatives aimed at improving hygiene, vaccination coverage, and early tuberculosis screening can play a pivotal role in reducing the burden of prolonged fever in Bangladeshi children. Future research should focus on large-scale epidemiological studies to better characterize disease patterns and improve diagnostic algorithms tailored to Bangladesh's healthcare infrastructure.

Conclusion

In conclusion, fever remains a common and significant health concern among children in Bangladesh, often caused by infectious diseases such as enteric fever, rickettsia, and urinary tract infections. Common accompanying signs and symptoms include vomiting, abdominal pain, cough, headache, coated tongue, hepatosplenomegaly and eschar marks. Addressing this issue requires a comprehensive approach, including timely medical intervention, widespread health education for caregivers, and improved access to healthcare services. Collaborative efforts between healthcare providers, policymakers, and communities can help ensure better health outcomes for Bangladeshi children and reduce the long-term impacts of recurrent fever on child health and development.

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Conflict of interest
Other than technical and logistic support from the scientific partner the investigators did not have any conflict of interest in any means.

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Contribution to authors
Hossain M, Farid MS, Aslam ASM conceived and designed the study, analyzed the data, interpreted the results, and wrote up the draft manuscript. Arafat S, Rasel M, Ahmed S, Jahan T involved in the manuscript review and editing. Jahan T, Yusuf MA contributed in statistical analysis and manuscript writing. All authors read and approved the final manuscript.

Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate
Ethical approval for the study was obtained from the Institutional Review Board. As this was a prospective study the written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

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