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Clinical Presentation and Biochemical Characteristics of Acute Febrile Illness in Adult Patients

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Abstract **Original Research Article**

Background: Acute febrile illness (AFI) is a common clinical condition characterized by sudden onset of fever without an identifiable source at initial evaluation. It is frequently encountered in tropical and subtropical regions and may result from viral, bacterial, or parasitic infections. Because many diseases present with similar symptoms, diagnosis is often challenging. Evaluating the clinical presentation and biochemical characteristics of AFI is essential for accurate diagnosis, timely treatment, and improved patient outcomes. ***Objectives:*** To assess demographic profile, clinical presentation, and biochemical characteristics of adult patients presenting with acute febrile illness at a tertiary care center. ***Methods:*** This cross-sectional observational study was conducted at Ibn Sina Diagnostic & Consultation Center, Uttara, Bangladesh from January to December 2018. A total of 256 adult patients presenting with acute febrile illness were included. Data were collected using structured questionnaires, clinical examinations, and laboratory investigations including complete blood count and biochemical tests. Statistical analysis was performed using SPSS version 21.0, presenting results as mean, standard deviation, frequencies, and percentages. Ethical approval and informed consent were obtained. ***Result:*** Among 256 patients, the mean age was 38.6 ± 12.4 years; 32.0% were 18–30 years and 58.6% were male. Fever duration was 4–7 days in 43.0%. Dehydration (25.8%) was the commonest clinical finding. Thrombocytopenia occurred in 35.9%, leukocytosis in 28.1%. Elevated CRP was found in 43.8%. Dengue fever (28.9%) was the leading cause. Most patients recovered completely (77.3%), while mortality was 0.8%. ***Conclusion:*** Acute febrile illness commonly affects young adults; dengue predominates, with thrombocytopenia and elevated CRP frequent, emphasizing importance of early diagnosis and management.

Keywords: Acute Febrile Illness, Clinical Presentation, Biochemical Characteristics, Dengue Fever, Thrombocytopenia.

INTRODUCTION

Acute febrile illness (AFI) represents one of the most frequent and diagnostically challenging clinical syndromes encountered in medical practice globally, particularly among adult populations in tropical and subtropical regions [1]. Characterized by the sudden onset of fever lasting for less than two to three weeks without localizing features, AFI encompasses a wide spectrum of potential etiologies, ranging from benign self-limiting viral infections to severe life-threatening bacterial and parasitic diseases [2]. The nonspecific nature of the clinical presentation often including symptoms such as headache, myalgia, arthralgia, and malaise makes it exceedingly difficult for clinicians to distinguish between different pathogens based on history and physical examination alone [3]. This diagnostic ambiguity is particularly pronounced in low- and middle-income countries, where healthcare infrastructure may be limited and access to rapid, reliable point-of-care diagnostics is frequently unavailable [4]. The etiological landscape of AFI is complex and exhibits significant regional and seasonal variation. While malaria has historically been the predominant cause of fever in many endemic areas, declining transmission rates and the widespread implementation of rapid diagnostic tests have unveiled a substantial burden of other pathogens [5]. These include arboviruses such as dengue and chikungunya, bacterial zoonoses like leptospirosis and rickettsioses (including scrub typhus), and enteric fever caused by Salmonella enterica serovar Typhi and Paratyphi [6]. Studies conducted across South and

Southeast Asia have demonstrated that scrub typhus and dengue are leading causes of acute undifferentiated febrile illness, with potentially severe complications including acute respiratory distress syndrome, acute kidney injury, and notable mortality rates [7]. The clinical overlap between these conditions frequently leads to diagnostic uncertainty, which in turn drives the empiric overuse of antimicrobial and antimalarial drugs, contributing significantly to the growing global threat of antimicrobial resistance. Given these diagnostic challenges, there is a critical need to better characterize the clinical presentation and biochemical features of AFI to guide early clinical decision-making and improve patient outcomes. Recent research has focused on identifying specific clinical predictors and host biomarker patterns that can differentiate between bacterial, viral, and parasitic etiologies [9]. Biomarkers such as C-reactive protein (CRP), procalcitonin (PCT), and various cytokines have shown considerable promise in distinguishing between different classes of infection, although their utility as stand-alone tests in resource-limited settings remains an area of active investigation [10]. Other studies have explored the role of routine hematological parameters—such as platelet counts, white blood cell differentials, and liver function tests—in predicting specific diseases like dengue hemorrhagic fever or scrub typhus-associated hepatitis [11]. The biochemical derangements observed in AFI patients often provide important diagnostic and prognostic clues. Thrombocytopenia, for instance, is a hallmark feature of dengue fever but is also commonly observed in scrub typhus, leptospirosis, and severe malaria [12]. Hepatic transaminase elevation is another frequent finding across multiple febrile illnesses, though the degree and pattern of elevation may offer discriminatory value [13]. Furthermore, acute kidney injury, electrolyte imbalances, and coagulation abnormalities are important complications that influence clinical management and predict disease severity [14]. Understanding the local epidemiology, clinical spectrum, and biochemical markers associated with AFI is essential for developing evidence-based diagnostic algorithms and therapeutic guidelines. This study aims to delineate the clinical presentation and biochemical characteristics of acute febrile illness in a cohort of adult patients presenting to a tertiary care center, thereby contributing valuable data to refine diagnostic approaches, reduce inappropriate antimicrobial use, and ultimately enhance the management of this pervasive and clinically significant syndrome [15].

OBJECTIVES OF THE STUDY

General Objective: To delineate the clinical presentation and biochemical characteristics of acute febrile illness among adult patients presenting to a tertiary care center, and to identify distinguishing features associated with common etiologies.

Specific Objectives:

- To determine the demographic profile (age, gender, occupation, and geographic distribution) of adult patients presenting with acute febrile illness.
- To describe the spectrum of clinical presentations, including the pattern of fever (duration, onset, and severity), and associated symptoms (such as headache, myalgia, arthralgia, rash, gastrointestinal symptoms, and bleeding manifestations).

METHOD AND MATERIALS

Study Design:

This was a cross-sectional observational study conducted at Ibn Sina Diagnostic & Consultation Center, Uttara, Bangladesh a private clinic providing diagnostic and consultation services. The study population consisted of 256 adult patients presenting with acute febrile illness. The study was carried out over a one-year period, from January 2018 to December 2018. The main objective was to evaluate the clinical presentation and biochemical characteristics of acute febrile illness in adults attending the clinic.

Data Collection and Study Procedure:

Data were collected using a structured questionnaire and clinical records. Upon obtaining informed consent, each patient underwent a comprehensive clinical evaluation, including history-taking and physical examination. Blood samples were collected for routine hematological and biochemical investigations, such as complete blood count, liver and renal function tests, and C-reactive protein. All information regarding symptoms, duration of illness, occupation, demographic details, and laboratory results was recorded systematically.

Inclusion Criteria:

Adult patients aged 18 years and above presenting with fever of recent onset (≤14 days) were included in the study. Patients were required to provide written informed consent, and their medical records had to be complete for essential laboratory investigations relevant to acute febrile illness.

Exclusion Criteria:

Patients with chronic illnesses such as chronic liver disease, chronic kidney disease, or immunodeficiency disorders were excluded. Also, individuals who had recent major surgery, hospitalization, or were on long-term immunosuppressive therapy were not included. Pregnant women and pediatric patients were excluded to maintain homogeneity of the adult study population.

Statistical Analysis:

Data were entered and analyzed using SPSS version 21.0. Quantitative variables, such as age,

laboratory parameters, and duration of fever, were expressed as mean ± standard deviation (SD). Categorical variables, such as gender, clinical symptoms, occupation, and laboratory abnormalities, were expressed as frequency and percentage. The association between clinical symptoms and biochemical parameters was analyzed using Chi-square test or Fisher's exact test, as appropriate. A p-value <0.05 was considered statistically significant.

Ethical Consideration:

The study protocol was approved by the Institutional Ethics Committee of Ibn Sina Diagnostic & Consultation Center. Written informed consent was obtained from all participants after explaining the study purpose, procedure, benefits, and potential risks. Patient confidentiality was strictly maintained, and all data were handled anonymously. The study adhered to the principles of the Declaration of Helsinki for research involving human subjects.

RESULT

Table 1: Distribution of Patients According to Age, Gender and Occupation (n=256)

Variables	Frequency (n)	Percentage (%)
Age Group (years)		
18–30	82	32.0
31–40	64	25.0
41–50	50	19.5
51–60	38	14.8
>60	22	8.7
Mean Age ± SD	38.6 ± 12.4 years	
Gender		
Male	150	58.6
Female	106	41.4
Occupation		
Service holder	72	28.1
Business	54	21.1
Farmer	38	14.8
Housewife	60	23.4
Student	20	7.8
Others	12	4.7

Table 1 shows the demographic characteristics of the study population. The highest proportion of patients belonged to the 18–30 years age group (32.0%), followed by 31–40 years (25.0%) and 41–50 years (19.5%). Only 8.7% of patients were above 60 years of age. The mean age of the patients was 38.6 ± 12.4 years.

In terms of gender distribution, 58.6% were male and 41.4% were female. Regarding occupation, the majority were service holders (28.1%), followed by housewives (23.4%) and businessmen (21.1%), while smaller proportions were farmers, students, and others.

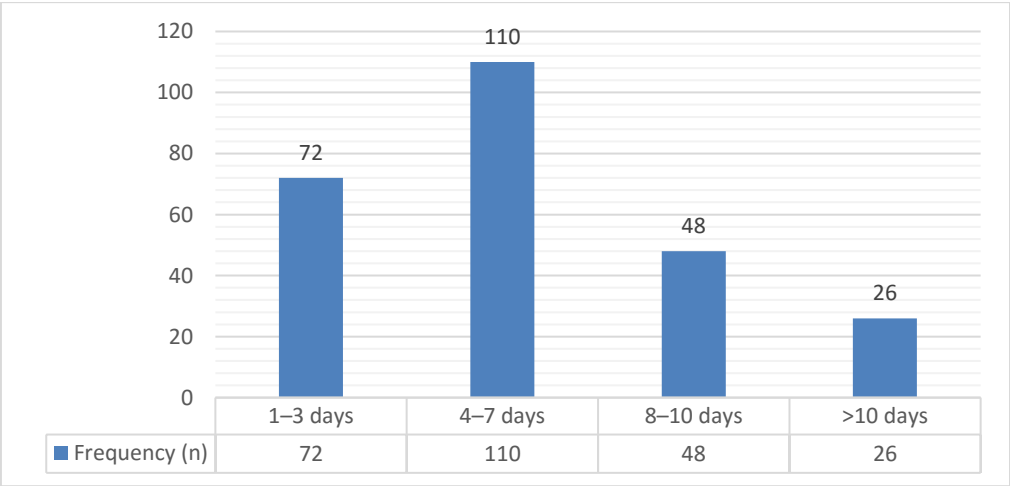

Figure 1: Duration of Fever Among Patients (n=256)

Figure 1 presents the duration of fever among the study participants. The majority of patients (43.0%) experienced fever for 4–7 days, followed by 28.1% who had fever for 1–3 days. A smaller proportion (18.8%) reported fever lasting 8–10 days, while 10.1% had fever for more than 10 days. This indicates that most acute febrile illness cases presented within the first week of symptom onset.

Table 2: Associated Clinical Symptoms (n=256)

Symptoms	Frequency (n)	Percentage (%)
Headache	176	68.8
Body ache	168	65.6
Nausea/Vomiting	102	39.8
Rash	46	18.0
Abdominal pain	58	22.7
Cough	74	28.9
Diarrhea	34	13.3

Table 2 illustrates the associated clinical symptoms among patients with acute febrile illness. The most common symptoms were headache (68.8%) and body ache (65.6%). Gastrointestinal symptoms such as nausea or vomiting were observed in 39.8% of patients, while abdominal pain occurred in 22.7%. Respiratory symptoms like cough were present in 28.9%, whereas skin rash (18.0%) and diarrhea (13.3%) were less common.

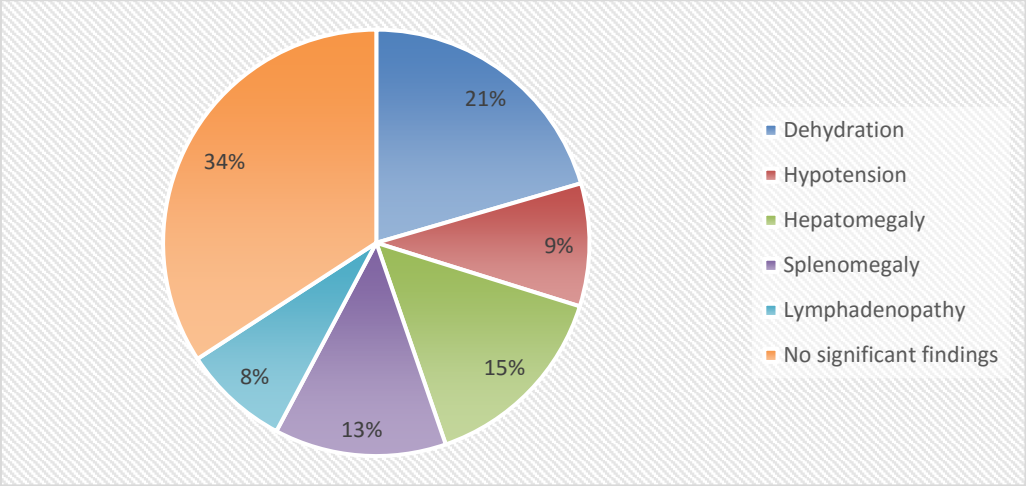

Figure 2: Physical Examination Findings (n=256)

Figure 2 shows the physical examination findings among patients with acute febrile illness. Dehydration was the most common finding (25.8%), followed by hepatomegaly (18.8%) and splenomegaly (16.4%). Hypotension was observed in 11.7% of cases, while lymphadenopathy occurred in 10.2%. However, 43.0% of patients had no significant abnormal physical findings during clinical examination.

Table 3: Hematological Findings (n=256)

Hematological Parameter	Frequency (n)	Percentage (%)
Leukocytosis	72	28.1
Leukopenia	66	25.8
Thrombocytopenia	92	35.9
Anemia	54	21.1
Normal hematological findings	88	34.4

Table 3 presents the hematological abnormalities among patients with acute febrile illness. The most frequent abnormality was thrombocytopenia (35.9%), followed by leukocytosis (28.1%) and leukopenia (25.8%). Anemia was detected in 21.1% of patients. However, 34.4% of the study population had normal hematological parameters.

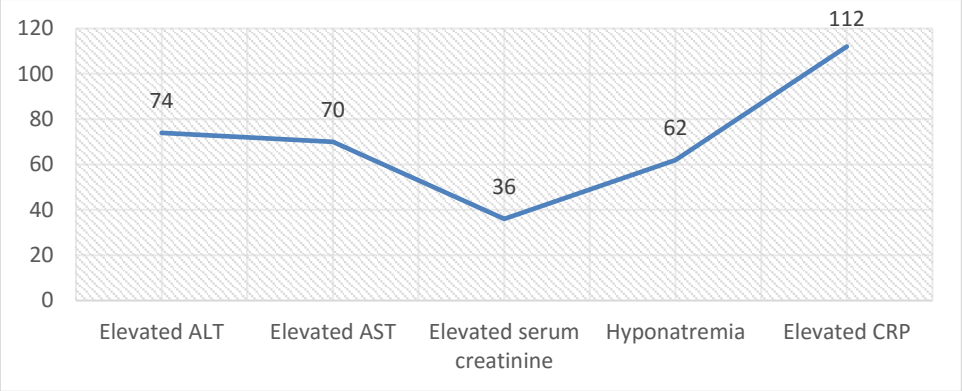

Figure 3: Biochemical Parameters (n=256)

Figure 3 shows the biochemical abnormalities among patients with acute febrile illness. Elevated C-reactive protein (CRP) was the most common biochemical abnormality (43.8%), indicating inflammatory processes. Elevated ALT (28.9%) and AST (27.3%) suggested hepatic involvement in several cases. Hyponatremia was found in 24.2%, while elevated serum creatinine was observed in 14.1% of patients.

Table 4: Etiological Diagnosis of Acute Febrile Illness (n=256)

Etiology	Frequency (n)	Percentage (%)
Dengue fever	74	28.9
Enteric fever	52	20.3
Viral fever (non-specific)	60	23.4
Malaria	24	9.4
Urinary tract infection	26	10.2
Others	20	7.8

Table 4 demonstrates the etiological causes of acute febrile illness. Dengue fever was the most common diagnosis (28.9%), followed by viral fever (23.4%) and enteric fever (20.3%). Other causes included urinary tract infection (10.2%), malaria (9.4%), and other infections (7.8%). These findings indicate that infectious diseases are the primary causes of acute febrile illness in adults.

Table 5: Outcome of Patients (n=256)

Outcome	Frequency (n)	Percentage (%)
Recovered completely	198	77.3
Improved with treatment	40	15.6
Referred to higher center	10	3.9
Complications developed	6	2.3
Death	2	0.8

Table 5 presents the outcome of patients with acute febrile illness. The majority of patients recovered completely (77.3%), while 15.6% showed improvement with treatment. A small proportion (3.9%) were referred to higher centers for advanced management, and 2.3% developed complications. The mortality rate was 0.8%, indicating generally favorable outcomes with proper management.

DISCUSSION

The present study provides a comprehensive analysis of the clinical presentation and biochemical characteristics of acute febrile illness among adult patients. The demographic findings reveal that the highest proportion of patients belonged to the 18–30 years age group (32.0%), with a mean age of 38.6 ± 12.4 years. This age distribution is consistent with observations from a study by Kasper *et al.,* in Cambodia, which reported that acute febrile illness predominantly affects young adults, with a median age of 27 years (interquartile range 18-41 years) in their cohort of 6,674 febrile patients [16]. The predilection for younger age groups may be attributable to greater occupational and outdoor exposure, as well as increased mobility and social interactions that facilitate pathogen transmission. Regarding gender distribution, our study demonstrated a male predominance (58.6%) compared to females (41.4%). This finding aligns with the demographic data reported by Nair *et al.,* who observed that among febrile patients with thrombocytopenia, 61.3% were males and 38.7% were females [17]. The higher proportion of males may reflect gender-specific differences in occupational exposure, healthcare-seeking behavior, or biological susceptibility to certain infections. Occupational analysis

in our study revealed that service holders (28.1%) and businessmen (21.1%) constituted the largest groups, which may reflect the urban setting of our study population. Similarly, a study from Northeastern Kenya by Ndeereh *et al.,* found that occupational categories such as herders (63.5%) and livestock traders (25.4%) had significantly higher rates of zoonotic febrile illnesses, highlighting the importance of occupation-specific risk factors in AFI epidemiology [18]. The duration of fever in our study showed that the majority of patients (43.0%) presented with fever lasting 4–7 days, followed by 28.1% with fever of 1–3 days duration. This pattern is comparable to findings from Mueller *et al.,* in rural Cambodia, where the median duration of fever before presentation was 5 days (interquartile range 3–7 days) among patients with acute undifferentiated febrile illness [19]. Early presentation within the first week of illness is crucial for timely diagnosis and initiation of appropriate therapy, particularly in resource-limited settings where delayed presentation is associated with poorer outcomes. Physical examination findings revealed that dehydration was the most common abnormality (25.8%), followed by hepatomegaly (18.8%) and splenomegaly (16.4%). Hypotension was observed in 11.7% of cases, while lymphadenopathy occurred in 10.2%. These findings are consistent with the clinical spectrum described by Abhilash *et al.,* who reported that organomegaly and dehydration are common physical findings in patients with scrub typhus and dengue fever, with hepatomegaly present in 22.4% of their cohort1[6]. The presence of hepatosplenomegaly in a significant proportion of patients underscores the systemic nature of many tropical febrile illnesses and their propensity for reticuloendothelial involvement. Hematological abnormalities were prevalent in our study population, with thrombocytopenia being the most frequent abnormality (35.9%), followed by leukocytosis (28.1%) and leukopenia (25.8%). Anemia was detected in 21.1% of patients. The high prevalence of thrombocytopenia is particularly noteworthy and has been extensively documented in the literature. A study by Kumaran on the incidence and causes of thrombocytopenia at a tertiary care center reported that febrile illnesses, particularly dengue and malaria, are leading causes of thrombocytopenia in adults, with prevalence rates ranging from 30% to 60% depending on the underlying etiology [20]. Nair *et al.,* similarly found that among febrile children with thrombocytopenia, viral fevers (27.78%) and dengue (22.2%) were the most common causes, highlighting the strong association between thrombocytopenia and specific infectious agents [21]. Biochemical abnormalities in our study demonstrated that elevated C-reactive protein (CRP) was the most common finding (43.8%), indicating significant inflammatory processes. This is consistent with the findings of a Chinese study on the application of blood tests in acute infectious febrile patients, which reported that CRP elevation is a sensitive but nonspecific marker of inflammation, with particularly high levels observed in bacterial infections [22]. Elevated ALT (28.9%) and AST (27.3%) suggested hepatic involvement in a substantial proportion of cases, reflecting the hepatotropic nature of many pathogens causing AFI, including dengue virus, scrub typhus, and enteric fever. Hyponatremia was found in 24.2% of patients, while elevated serum creatinine was observed in 14.1%. These electrolyte and renal function abnormalities are well-recognized complications of various febrile illnesses and may be associated with increased disease severity. Guo et al., in their analysis of severe fever with thrombocytopenia syndrome in China, reported that hyponatremia and elevated liver enzymes were independent predictors of poor prognosis, emphasizing the prognostic significance of biochemical parameters in AFI [23]. The etiological spectrum in our study revealed dengue fever as the most common diagnosis (28.9%), followed by viral fever (23.4%) and enteric fever (20.3%). Other causes included urinary tract infection (10.2%), malaria (9.4%), and other infections (7.8%). This distribution is broadly consistent with the findings of a large multinational study by L'Azou et al., which reported that among febrile children in 10 Asian and Latin American countries, approximately 10% of febrile episodes were confirmed as dengue, with substantial variation in incidence across different geographic regions [24].

Limitations of the Study:

This study has several limitations that should be acknowledged when interpreting the findings. First, the study was conducted at a single tertiary care center, which may limit the generalizability of the results to primary care settings or community-based populations where the spectrum of AFI may differ. Second, the cross-sectional design precludes the establishment of causal relationships and limits the ability to assess temporal changes in clinical and biochemical parameters over the course of illness.

CONCLUSION

The present study provides valuable insights into the clinical presentation and biochemical characteristics of acute febrile illness among adult patients in a tertiary care setting. The findings demonstrate that AFI predominantly affects younger adults, with a male preponderance, and that most patients present within the first week of symptom onset. Dengue fever emerged as the most common etiological diagnosis, followed by viral fever and enteric fever, reflecting the endemicity of arboviral infections in the region. The study highlights that thrombocytopenia is the most frequent hematological abnormality, while elevated C-reactive protein is the predominant biochemical finding, underscoring the inflammatory nature of these illnesses.

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