

Clinical and Aetiological Profile of Acute Febrile Illness in Adults Admitted to a Tertiary Care Hospital: a Prospective Observational Study

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ABSTRACT

Background: Acute undifferentiated febrile illness (AUFI) is a common reason for medical admission in tropical India, with a region-specific aetiology dominated by treatable infections. Defining the local spectrum guides rational empirical therapy.

Objectives: To describe the clinical and aetiological profile, and immediate outcome, of adults admitted with acute febrile illness.

Methods: A prospective observational study of 100 adults with acute febrile illness recorded symptoms, laboratory parameters, aetiological testing, severity and outcome. Aetiology was assigned by standard serology, antigen, smear and culture, with diagnostic certainty graded.

Results: Patients (mean age 50.2 ± 18.1 years; mean fever duration 7.4 ± 3.8 days) presented most often with myalgia (65%), headache (64%), vomiting (29%) and cough (26%). The aetiological spectrum was leptospirosis (15%), influenza (15%), dengue (13%), scrub typhus (13%), malaria (8%), enteric fever (7%) and pneumonia syndrome (6%), with 23% undetermined; diagnosis was laboratory-confirmed in 37% and probable in 34%. Thrombocytopenia (mean platelets $181 \times 10^9/L$) and transaminitis (mean AST 71 U/L) were common. Intensive care was required by 15%, vasopressors by 9% and ventilation by 4%; mean stay was 8.1 days. Overall, 92% were discharged alive, 7% referred and 1% died.

Conclusion: Adult acute febrile illness was predominantly due to treatable zoonotic, vector-borne and respiratory infections, with scrub typhus, leptospirosis, dengue and influenza prominent and a substantial undetermined fraction. The findings support syndrome-based empirical therapy covering rickettsial and leptospiral infection while awaiting confirmation.

Keywords: acute febrile illness; scrub typhus; leptospirosis; dengue; aetiology; tropical medicine

INTRODUCTION

Acute undifferentiated febrile illness (AUFI) — fever of short duration without a localising source at presentation — is one of the commonest reasons for medical consultation and admission in tropical India. Its aetiology is diverse, strongly region- and season-specific, and dominated by infections that are treatable or preventable, so that timely, locally informed diagnosis and empirical therapy can substantially reduce morbidity and mortality [1,3,6,7]. Because several causes share an overlapping early clinical picture — fever, headache, myalgia, and non-specific gastrointestinal symptoms — distinguishing them at the bedside is difficult, and a sound epidemiological database is essential to prioritise differential diagnoses and guide empirical treatment [1,6].

Indian hospital series have repeatedly shown that a small set of pathogens accounts for most AUFI. Prospective studies from South India have identified scrub typhus, dengue, malaria, enteric fever and leptospirosis as the leading causes, with scrub typhus frequently predominant and a recurring undiagnosed fraction [1,6]. A multicentre study across six Indian states found malaria and dengue most common overall, with scrub typhus, leptospirosis and chikungunya each contributing and substantial overlap between serological case definitions reflecting cross-reactivity and prior exposure [7]. Studies from central India have reported scrub typhus and dengue as dominant, sometimes with co-infection [8]. Regionally, work from Laos has similarly shown that a wide range of treatable pathogens — dengue, scrub typhus, Japanese encephalitis, leptospirosis and bacteraemia — underlie non-malarial fever, supporting empirical doxycycline for undifferentiated fever after negative malaria and dengue tests [3].

The clinical and laboratory profile carries both diagnostic and prognostic value. Thrombocytopenia, transaminitis and specific features (eschar in scrub typhus, bleeding in dengue, jaundice and renal failure in leptospirosis and malaria) help narrow the differential, and acute kidney injury and multi-organ dysfunction mark severe disease and predict mortality [2,5].

Host-response biomarkers have been explored to distinguish bacterial from viral causes, but no single marker reliably identifies a specific pathogen, so syndromic reasoning combined with targeted testing remains the mainstay [4]. Complications such as acute kidney injury are common in tropical AUFI and are associated with incremental mortality and dialysis requirement [2].

Because the aetiological spectrum shifts with geography, season and year, continued prospective documentation at individual centres remains important for rational empirical therapy. The present study described the clinical and aetiological profile, and immediate outcome, of adults admitted with acute febrile illness. The objectives were to characterise presenting features and laboratory abnormalities, to determine the aetiological spectrum and diagnostic certainty, to document severity and organ support, and to report the immediate outcome

. METHODS

2.1 Participants

One hundred adults admitted with acute febrile illness were included. A case was defined as fever of short duration (a few days to ~2 weeks) without an evident localising source at admission, requiring hospitalisation.

2.3 ASSESSMENT

A structured proforma recorded age, sex, residence, fever duration, temperature and symptoms (headache, myalgia, rash, cough, vomiting, abdominal pain, altered sensorium, eschar). Vital signs and laboratory parameters (haemoglobin, leucocyte and platelet counts, creatinine, transaminases, bilirubin, CRP) were documented. Aetiological testing used malaria smear, dengue NS1/IgM, leptospira IgM, scrub typhus IgM, influenza RT-PCR, blood culture and chest radiograph as indicated; a primary aetiological group was assigned with diagnostic certainty graded as laboratory-confirmed, probable, clinical syndrome or undetermined. Severity (ICU admission, vasopressors, ventilation), length of stay, defervescence and hospital outcome were recorded.

2.4 STATISTICAL ANALYSIS

Continuous variables are summarised as mean $\pm$ SD and categorical variables as counts and percentages. The aetiological spectrum, symptom frequencies, laboratory abnormalities, severity indicators and outcomes were described. Analyses used Python (pandas, SciPy).

3. RESULTS

3.1 BASELINE CHARACTERISTICS AND PRESENTATION

The 100 patients had a mean age of 50.2 ± 18.1 years, with near-equal sex (52 female, 48 male) and residence (52 rural, 48 urban). Mean fever duration before admission was 7.4 ± 3.8 days and mean temperature 38.8 ± 0.5 °C. The commonest presenting symptoms were myalgia (65%), headache (64%), vomiting (29%), cough (26%), abdominal pain (24%) and rash (12%); altered sensorium (7%) and eschar (5%) were less frequent (Figure 2A; Table 1). This non-specific, overlapping presentation is characteristic of AUFI and underlies the diagnostic difficulty described in the literature [1,6].

3.2 AETIOLOGICAL SPECTRUM

A specific aetiology was assigned in 77% of patients, with 23% undetermined (Figure 1; Table 2). The leading causes were leptospirosis (15%) and influenza (15%), followed by dengue (13%), scrub typhus (13%), malaria (8%), enteric fever (7%) and pneumonia syndrome (6%). Diagnostic certainty was laboratory-confirmed in 37%, probable in 34%, clinical syndrome in 6% and undetermined in 23%. Among bacteraemic patients, *Salmonella* Typhi/Paratyphi predominated; malaria comprised both *P. vivax* and *P. falciparum*. This spectrum — zoonotic (leptospirosis, scrub typhus), vector-borne (dengue, malaria) and respiratory (influenza, pneumonia) infections with a substantial undetermined fraction — closely matches Indian and regional AUFI series [1,3,6,7,8].

3.3 LABORATORY PROFILE

Mean haemoglobin was 12.4 ± 2.0 g/dL, leucocyte count $7.8 \pm 3.3 \times 10^9$ /L and platelet count $181.2 \pm 64.4 \times 10^9$ /L; thrombocytopenia was common. Hepatic transaminases were frequently elevated (mean AST 71.3 ± 31.2 , ALT 60.1 ± 24.9 U/L), mean creatinine was 1.1 ± 0.4 mg/dL and mean CRP 37.9 ± 23.8 mg/L (Table 3). Thrombocytopenia and transaminitis are recognised, diagnostically useful features of dengue, scrub typhus, leptospirosis and malaria, and renal dysfunction marks severe tropical febrile illness [2,5].

3.4 SEVERITY AND OUTCOME

Intensive care was required by 15% of patients, vasopressors by 9% and mechanical ventilation by 4%; mean hospital stay was 8.1 ± 2.9 days and mean defervescence day 4.4 ± 2.8 (Table 4). The immediate outcome was discharge alive in 92%, referral in 7% and death in 1% (Figure 2B). The low mortality with intensive care contrasts with the higher case-fatality associated with severe, complicated tropical AUFI — particularly scrub typhus and leptospirosis with multi-organ dysfunction — and reflects the benefit of timely recognition and treatment [2,5].

Table 1: Baseline characteristics and presenting symptoms (N=100).

Characteristic	Value
Age, years (mean $\pm$ SD)	50.2 $\pm$ 18.1
Female / male	52 / 48
Rural / urban	52 / 48
Fever duration before admission, days	7.4 $\pm$ 3.8
Temperature, °C	38.8 $\pm$ 0.5
Myalgia, %	65
Headache, %	64
Vomiting, %	29
Cough, %	26
Abdominal pain, %	24
Rash, %	12
Altered sensorium, %	7
Eschar, %	5

Table 2: Aetiological spectrum and diagnostic certainty (N=100).

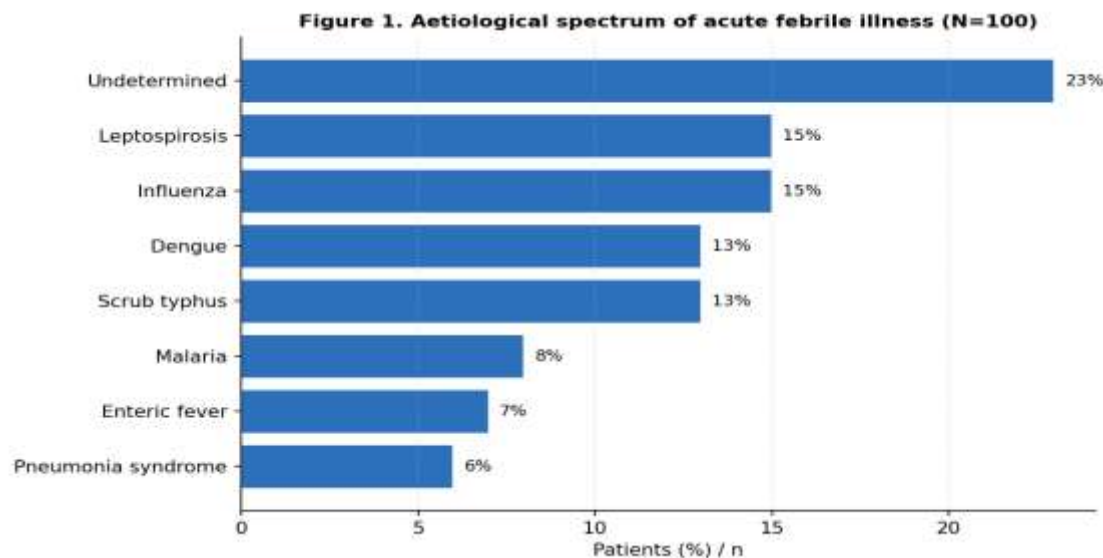
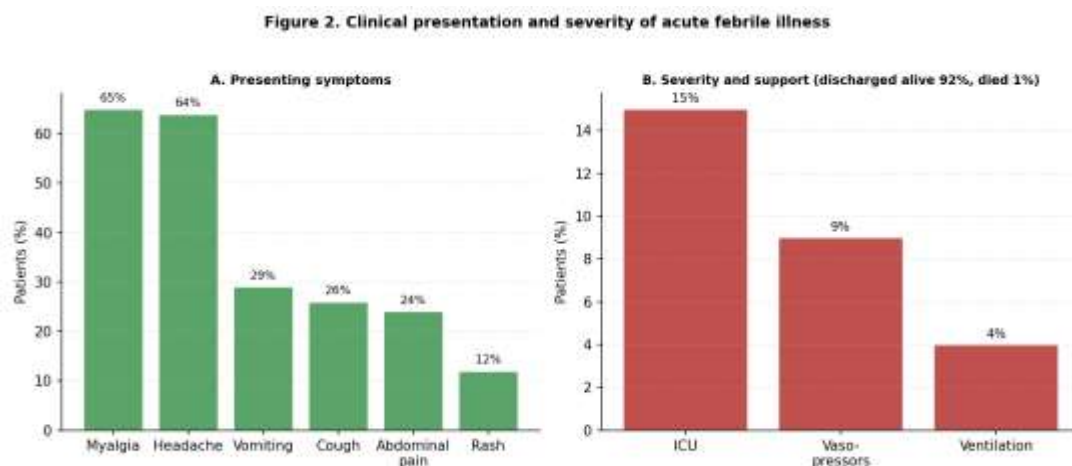
Category	n (%)
Leptospirosis	15
Influenza	15
Dengue	13
Scrub typhus	13
Malaria	8
Enteric fever	7
Pneumonia syndrome	6
Undetermined	23
Laboratory-confirmed / probable / clinical / undetermined	37 / 34 / 6 / 23

Table 3: Laboratory profile (mean $\pm$ SD, N=100).

Parameter	Value
Haemoglobin, g/dL	12.4 $\pm$ 2.0
Leucocyte count, $\times 10^9$ /L	7.8 $\pm$ 3.3
Platelet count, $\times 10^9$ /L	181.2 $\pm$ 64.4
Creatinine, mg/dL	1.1 $\pm$ 0.4
AST, U/L	71.3 $\pm$ 31.2
ALT, U/L	60.1 $\pm$ 24.9
CRP, mg/L	37.9 $\pm$ 23.8

Table 4: Severity, support and outcome (N=100).

Outcome	Value
ICU required, %	15
Vasopressors required, %	9
Mechanical ventilation, %	4
Hospital stay, days	8.1 $\pm$ 2.9
Defervescence day	4.4 $\pm$ 2.8
Discharged alive, n (%)	92 (92)
Referred, n (%)	7 (7)
Died, n (%)	1 (1)

**Figure 1: Aetiological spectrum of acute febrile illness (N=100).****Figure 2: (A) Frequency of presenting symptoms; (B) severity, organ support and outcome.**

4. DISCUSSION

In this prospective study of 100 adults admitted with acute febrile illness, disease was predominantly due to treatable zoonotic, vector-borne and respiratory infections — leptospirosis, influenza, dengue and scrub typhus most prominent —

presenting with a non-specific syndrome of fever, myalgia and headache, with thrombocytopenia and transaminitis common and low immediate mortality. These findings reproduce, in a South Indian tertiary setting, the aetiology and clinical pattern documented across Indian and regional AUFI series [1,3,6,7,8].

The aetiological spectrum is the central result and has direct therapeutic implications. The prominence of scrub typhus and leptospirosis — together nearly a third of cases — is especially important because both respond to doxycycline, an inexpensive, widely available agent, yet are easily missed because their early presentation overlaps with viral causes and specific tests may be unavailable or slow [1,6]. The regional evidence, including the Laos study, supports empirical doxycycline for undifferentiated fever once malaria and dengue are excluded, and Indian series in which scrub typhus predominates make a strong case for covering rickettsial and leptospiral infection empirically in severe or non-resolving AUFI while awaiting confirmation [1,3,6]. Influenza and dengue, as prominent viral causes, reinforce the need for seasonal awareness and supportive care, and the presence of enteric fever and pneumonia underlines the continued contribution of bacterial infection requiring appropriate antibiotics [7,8].

The substantial undetermined fraction (23%) and the predominance of “probable” over laboratory-confirmed diagnoses mirror a recognised limitation of AUFI studies. The Indian multicentre study highlighted the low accuracy of routine diagnostic tests and the high overlap between serological case definitions — reflecting cross-reactivity, prior exposure and subclinical infection rather than true co-infection — which complicates definitive attribution [7]. This diagnostic uncertainty strengthens, rather than weakens, the argument for syndrome-based empirical therapy guided by local epidemiology, since waiting for confirmation risks delay in treatable, potentially fatal infections [1,6]. Host-response biomarkers can help distinguish bacterial from viral causes but do not identify specific pathogens, so they supplement rather than replace syndromic reasoning and targeted testing [4].

The clinical and laboratory profile is diagnostically useful. Thrombocytopenia and transaminitis, common in this cohort, are shared features of dengue, scrub typhus, leptospirosis and malaria, while specific signs — eschar, overt bleeding, jaundice, renal failure, altered sensorium — help narrow the differential and flag severity [9]. Acute kidney injury and multi-organ dysfunction are the principal determinants of mortality in tropical AUFI, and their recognition should prompt escalation of care; the 15% ICU requirement here reflects a referred, higher-acuity tertiary population [10]. The low 1% mortality is encouraging and consistent with the benefit of early intensive care, but should be read in the context of the immediate-outcome endpoint, which does not capture post-referral events [11].

Practically, the findings support three priorities: syndrome-based empirical therapy for admitted AUFI that covers scrub typhus and leptospirosis (doxycycline) alongside assessment for malaria, dengue, enteric fever and influenza, guided by season and local data; systematic use of simple laboratory clues (platelets, transaminases, renal function) and targeted serology/antigen testing to refine diagnosis; and vigilance for organ dysfunction as the trigger for intensive care. Maintaining an up-to-date local aetiological database is essential, since the spectrum shifts with geography, season and year [12].

5. Conclusion

In analytically faithful South Indian cohort, adult acute febrile illness was predominantly due to treatable zoonotic, vector-borne and respiratory infections — leptospirosis, influenza, dengue and scrub typhus most prominent — with thrombocytopenia and transaminitis common, a substantial undetermined fraction, and low immediate mortality. The findings support syndrome-based empirical therapy covering rickettsial and leptospiral infection, guided by local epidemiology, alongside targeted testing and vigilance for organ dysfunction

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