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Clinical Profile and Predictors of Prolonged Hospital Stay Among Patients Admitted with Acute Febrile Illness in Southern Rajasthan: A Retrospective Observational Study

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ABSTRACT

Background: Acute febrile illness (AFI) constitutes one of the leading causes of hospitalisation in tropical countries, accounting for substantial morbidity and ICU utilisation across tertiary care institutions in India. Southern Rajasthan, with its ecological diversity encompassing forest fringes, agricultural land, and tribal belts, harbours endemic foci of dengue, malaria, enteric fever, scrub typhus, and leptospirosis. Despite the regional burden, local data on the clinical profile and determinants of prolonged hospital stay (PHS) among AFI admissions are lacking from this geography.

Objectives: To describe the clinical and aetiological profile of adult patients admitted with acute febrile illness and to identify independent clinical and laboratory predictors of prolonged hospital stay (>7 days) at Pacific Institute of Medical Sciences (PIMS), Umarda, Udaipur.

Methodology: A retrospective observational study of 280 consecutive adult patients (≥18 years) admitted with AFI from January 2023 to December 2023 was conducted. Case records were reviewed for demographic data, clinical features, laboratory parameters, aetiology, and duration of hospitalisation. Prolonged hospital stay was defined as inpatient duration >7 days. Univariate and multivariate binary logistic regression using SPSS v25 identified independent predictors.

Results: Of 280 patients (mean age 38.6 ± 14.4 years, 61.1% male), 82 (29.3%) experienced prolonged hospital stay (>7 days). The most common aetiologies were dengue (36.4%), enteric fever (21.8%), malaria (16.1%), scrub typhus (9.3%), and leptospirosis (5.0%). Thrombocytopenia (platelet <50,000/mm^3; OR 4.63, 95% CI 2.41–8.91, p<0.001), presence of comorbidities (OR 3.87, 95% CI 1.98–7.57, p<0.001), haemoglobin <8 g/dL (OR 3.21, 95% CI 1.57–6.57, p=0.001), serum creatinine >1.5 mg/dL (OR 2.94, 95% CI 1.44–6.00, p=0.003), and hepatic dysfunction (ALT >3× ULN; OR 2.71, 95% CI 1.38–5.33, p=0.004) were independent predictors of prolonged stay on multivariate analysis.

Conclusion: Thrombocytopenia, comorbidities, anaemia, renal impairment, and hepatic dysfunction independently predicted prolonged hospital stay in AFI patients at this southern Rajasthan tertiary centre. Early risk stratification using these parameters can facilitate timely escalation of care, optimise resource allocation, and potentially reduce inpatient duration.

Keywords: acute febrile illness, prolonged hospital stay, dengue, malaria, enteric fever, Rajasthan, predictors, tropical fever

1. INTRODUCTION

Acute febrile illness (AFI) is defined as a syndrome of new-onset fever (temperature ≥38°C) lasting fewer than 14 days without a clinically apparent localising focus at presentation [1]. In tropical countries, AFI accounts for the single largest category of hospital admissions across medical wards, with substantial heterogeneity in aetiology spanning viral (dengue, chikungunya), protozoal (malaria), bacterial (enteric fever, leptospirosis, scrub typhus), and non-infectious aetiologies [16]. A landmark multicentre Indian study by Mørch et al. (2017) evaluated 1,564 patients with acute undifferentiated fever across seven states and demonstrated dengue, malaria, scrub typhus, leptospirosis, and bacteraemia as the dominant aetiological clusters, with significant inter-state variation [2]. The global burden of fever-related hospitalisations remains disproportionately concentrated in South and Southeast Asia, including India [3]. Rajasthan, with its unique ecological profile spanning arid western zones and the humid, forested tracts of the Aravalli range in the south, presents a distinctive epidemiological context for AFI. Southern Rajasthan — comprising districts such as Udaipur, Dungarpur, Banswara, Rajsamand, and Chittorgarh — has a significant tribal and rural population that

serves as a reservoir for vector-borne diseases including dengue and malaria, as well as rickettsial infections such as scrub typhus [4]. Regional studies from southern Rajasthan have documented scrub typhus and dengue coinfections of up to 5% in suspected AFI patients [12], while dengue fever has been reported with increasing frequency from Rajasthan's Hadoti region, with clinical presentations including dengue haemorrhagic fever and dengue shock syndrome [5].

Pacific Institute of Medical Sciences (PIMS), Umarda, Udaipur, is a major tertiary referral hospital serving a large catchment area in southern Rajasthan, including tribal populations from Rajsamand, Dungarpur, and Banswara. Despite the considerable burden of AFI at this institution, no published study has evaluated the clinical profile, aetiological distribution, or predictors of prolonged hospital stay (PHS) in AFI patients in this region. Duration of hospitalisation is an important surrogate marker of disease severity, resource consumption, and outcomes; studies from other Indian institutions have shown that parameters such as thrombocytopenia, comorbidities, renal impairment, and anaemia significantly prolong ICU and ward stay in febrile patients [6,7]. The present study was therefore designed to retrospectively characterise the clinical profile and identify independent predictors of PHS among AFI admissions at PIMS, Udaipur, during a full calendar year.

2. REVIEW OF LITERATURE

Ansari et al. (2021) published a landmark predictive modelling study using 1,360 dengue inpatient records from Max hospitals, New Delhi, employing logistic regression with elastic-net and random forest algorithms to identify predictors of prolonged length of stay (>5 days) [6]. Significant predictors included low haemoglobin, thrombocytopenia, high total leucocyte count (TLC), low or high haematocrit, requirement for blood transfusion, emergency admission, and assisted ventilation. Logistic regression achieved an AUC of 0.75. This was the first structured machine-learning approach to LOS prediction in dengue patients in India, and it aligns closely with the laboratory parameters examined in our study. Saadat (2016) conducted a prospective cohort study of 115 patients with undiagnosed febrile illness at Ayub Teaching Hospital, Pakistan, and demonstrated that low platelet count (p=0.001), high ESR (p=0.007), high TLC (p=0.029), and multisystem involvement (nervous, cardiovascular, respiratory, haematological, urogenital) were independently associated with prolonged hospitalisation [7]. These findings establish the cross-validity of haematological parameters as length-of-stay predictors across undifferentiated febrile presentations. Regarding regional disease burden, Ku shrestha et al. (2021) from AIMS & RC, Rajsamand, southern Rajasthan, described scrub typhus-dengue coinfection in 5% of 500 AFI patients, with high proportions manifesting pallor, icterus, and shock, suggesting severe disease burden requiring prolonged admission in this specific cohort [12]. Sharma et al. (2021) from a northern Indian study documented scrub typhus seroprevalence of 18.6% among pyrexia of unknown origin patients and identified significant coinfection rates with dengue and malaria, complicating clinical management [4].

On the specific disease burden: Verma et al. (2021) described the clinical profile of 295 malaria patients at a North Indian tertiary centre, with 23% having severe malaria defined by WHO criteria, and demonstrated that comorbid conditions, thrombocytopenia, and renal dysfunction significantly prolonged inpatient duration [13]. Sinha and colleagues (2020) demonstrated from Delhi that vivax malaria causes severe anaemia, renal failure, hepatic dysfunction, and cerebral malaria, all of which independently prolong hospital stay [13]. For dengue fever, an observational study from a south Indian service hospital of 751 confirmed dengue patients reported a mean hospitalisation of 5.73 (±2.75) days and identified warning signs and bleeding diathesis as markers of prolonged admission [8]. Meena et al. (2016) from Kota, Rajasthan, described haematological profiles of dengue fever including thrombocytopenia in 93.4% of patients, establishing the importance of platelet nadir in severity assessment [5].

Cruz Espinoza et al. (2019) in a systematic review and meta-analysis of 50 studies demonstrated that each additional day of illness prior to hospitalisation significantly increased the odds of typhoid fever complications including intestinal perforation and hepatitis [9]. Behera et al. (2021) described clinical and laboratory profiles of enteric fever in Odisha, confirming hepatomegaly, elevated liver enzymes, and leukopenia as standard features associated with longer recovery [10]. The relevance of comorbidities as prolongators of fever-related hospitalisation was demonstrated by Goyal et al. (2022) from a South Indian secondary care hospital, which found that diabetic patients hospitalised for infections had significantly longer stays and higher re-admission rates [7].

The above literature establishes that thrombocytopenia, comorbidities, haematological and biochemical derangements, and aetiological category are likely determinants of prolonged hospital stay in AFI, but no study has examined this comprehensively in a southern Rajasthan tertiary care cohort.

3. OBJECTIVES

Primary Objective:
To identify the independent clinical and laboratory predictors of prolonged hospital stay (>7 days) among adult patients admitted with acute febrile illness at Pacific Institute of Medical Sciences (PIMS), Umarda, Udaipur, Rajasthan during January–December 2023.

Secondary Objectives:
- To describe the sociodemographic and clinical profile of AFI admissions at PIMS during the study period.
- To determine the aetiological distribution of confirmed AFI cases at this southern Rajasthan tertiary centre.
- To compare clinical and laboratory parameters between patients with and without prolonged hospital stay using appropriate statistical tests.
- To determine the sensitivity, specificity, and AUC of significant predictors identified on logistic regression for predicting prolonged hospital stay.

4. METHODOLOGY

4.1 Study Design
Retrospective observational analytical study.

4.2 Study Setting
The study was conducted in the Department of General Medicine at Pacific Institute of Medical Sciences (PIMS), Udaipur. PIMS is a tertiary-level teaching hospital serving a large population from Udaipur and the surrounding districts of southern Rajasthan including Rajsamand, Dungarpur, Banswara, Chittorgarh, and Pratapgarh. The institution receives referrals from both urban and tribal-rural settings and operates a medical ICU with a broad caseload of tropical infections.

4.3 Study Period
January 2023 to December 2023 (12 months).

4.4 Study Population and Sample Size
The target population comprised all adult patients (≥18 years) admitted to the Department of General Medicine at PIMS with a primary diagnosis of acute febrile illness during the study period.

Sample size was estimated using the formula $n = Z^2pq/d^2$, where Z = 1.96 (95% confidence level), p = estimated proportion of prolonged hospital stay in AFI patients = 0.30 (30%, based on comparable Indian AFI studies [6,7]), q = 0.70, and d = permissible margin of error = 0.055. This yielded $n = (1.96)^2 \times 0.30 \times 0.70 / (0.055)^2 \approx 267$. A target of 280 records was set to accommodate incomplete documentation. The final enrolled cohort was n = 280 patients.

4.5 Sampling Method
Consecutive non-probability sampling was used. All hospitalised patients fulfilling the inclusion criteria whose complete inpatient records were retrievable from the medical records department (MRD) of PIMS from January to December 2023 were included sequentially until the target sample was achieved.

4.6 Data Collection Tool
A structured retrospective data extraction proforma was developed for the study. It comprised four sections: (i) demographics and anthropometric data (age, sex, residence, body weight, BMI); (ii) clinical presentation data (duration of fever before admission, temperature at admission, associated symptoms, presence of comorbidities, clinical signs at admission); (iii) laboratory parameters at admission (complete blood count, liver function tests, renal function tests, C-reactive protein, malarial antigen or smear, dengue NS1 antigen or IgM, Widal test, scrub typhus IgM ELISA, blood cultures); and (iv) outcome data (confirmed diagnosis, duration of hospitalisation, complications, final outcome). The proforma was pilot-tested on 20 records and refined for clarity and completeness prior to full deployment.

4.7 Aetiological Diagnostic Criteria
The following criteria were used to establish an aetiological diagnosis: (a) Dengue: positive NS1 antigen or dengue IgM ELISA (J. Mitra/SD Bioline kit), classified into dengue fever, dengue with warning signs, and severe dengue per 2009 WHO guidelines; (b) Malaria: peripheral blood smear positivity and/or positive rapid diagnostic test (RDT) for Plasmodium antigen; (c) Enteric fever: positive blood culture for Salmonella typhi or paratyphi, or positive Typhidot-M IgM in clinically compatible presentation; (d) Scrub typhus: positive IgM ELISA (SD Bioline or equivalent) in patients with compatible presentation (fever, eschar, lymphadenopathy, rash); (e) Leptospirosis: positive Leptospira IgM ELISA; (f) Undifferentiated/unresolved fever: patients with AFI not meeting criteria for any of the above despite diagnostic workup.

4.8 Outcome Definition
Prolonged hospital stay (PHS) was defined as inpatient duration of >7 days from admission to discharge or death. This cut-off was selected based on published literature on AFI hospitalisations in India [6,7] and represents the upper tertile of expected stay for uncomplicated tropical fever admissions.

4.9 Statistical Analysis
Data were entered in Microsoft Excel 2019 and analysed using SPSS v25.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation (SD) for normally distributed

data and as median (interquartile range) for skewed distributions. Categorical variables were expressed as frequency (n) and percentage (%). Independent samples t-test and Mann-Whitney U test were used to compare continuous variables between the PHS and non-PHS groups. Chi-square test or Fisher's exact test was used for categorical comparisons. Univariate binary logistic regression was performed for all candidate predictor variables demonstrating $p<0.20$ on bivariate analysis. Variables significant at $p<0.05$ on univariate analysis were entered into multivariate binary logistic regression (enter method) to identify independent predictors. Odds ratios (OR) with 95% confidence intervals (CI) were calculated. ROC curve analyses were performed for continuous predictors to determine optimal cut-offs and AUC. A two-tailed p-value <0.05 was considered statistically significant throughout.

4.10 Ethical Clearance

Ethical approval was obtained from the Institutional Ethics Committee of Pacific Institute of Medical Sciences (Ref: IEC/PIMS/2024/GEN/01) prior to commencement of data extraction. Since this was a retrospective record-based study with no direct patient involvement or intervention, individual informed consent was waived per the IEC approval conditions. Patient data were anonymised prior to analysis. The study was conducted in accordance with the principles of the Declaration of Helsinki (revised 2013) and Indian Council of Medical Research (ICMR) National Ethical Guidelines for Biomedical and Health Research (2017).

5. INCLUSION AND EXCLUSION CRITERIA

5.1 Inclusion Criteria

- Adult patients aged ≥18 years of either sex
- Admitted to the Department of General Medicine at PIMS, Umarda, Udaipur, from January to December 2023
- Primary presenting complaint of fever (temperature ≥38°C or documented history of fever) with duration ≤14 days at the time of admission and no clinically apparent localising focus on initial assessment
- Minimum hospitalisation duration of 24 hours
- Complete inpatient medical records available including clinical notes, investigation results, and discharge summary

5.2 Exclusion Criteria

- Patients <18 years of age
- Patients with a clearly localised source of fever on admission (e.g., pneumonia with radiographic consolidation, acute pyelonephritis with urine culture, surgical site infection, infective endocarditis)
- Known active malignancy, HIV/AIDS, active tuberculosis, or autoimmune disease as the primary admitting diagnosis
- Patients transferred from other institutions with partial or complete treatment already initiated
- Incomplete medical records precluding extraction of key study variables
- Patients who left against medical advice (LAMA) within 48 hours of admission

6. RESULTS AND ANALYSIS

6.1 Sociodemographic and Clinical Profile

A total of 280 patients meeting the inclusion criteria were enrolled. Eighty-two patients (29.3%) experienced prolonged hospital stay (>7 days), while 198 (70.7%) were discharged within 7 days (non-PHS group). Table 1 presents the sociodemographic and clinical profile of the study population.

Table 1: Sociodemographic and Clinical Profile of AFI Admissions (n=280)

Variable	PHS Group (n=82)	Non-PHS Group (n=198)
Age, years (mean ± SD)	44.8 ± 14.9	35.9 ± 13.2
Sex: Male	52 (63.4%)	119 (60.1%)
Residence: Rural	59 (71.9%)	118 (59.6%)
Comorbidities (any)	47 (57.3%)	53 (26.8%)
– Diabetes mellitus	24 (29.3%)	28 (14.1%)
– Hypertension	20 (24.4%)	22 (11.1%)
– Chronic kidney disease	8 (9.8%)	4 (2.0%)
Fever duration before admission (days, mean ± SD)	7.3 ± 2.8	4.6 ± 2.1
Temperature at admission (°F, mean ± SD)	102.9 ± 0.9	101.8 ± 1.1

Variable	PHS Group (n=82)	Non-PHS Group (n=198)
Hospital stay (days, mean ± SD)	10.4 ± 2.8	4.9 ± 1.6
ICU admission required	27 (32.9%)	11 (5.6%)
Mortality	6 (7.3%)	2 (1.0%)

PHS: Prolonged hospital stay (>7 days); SD: Standard deviation; ICU: Intensive care unit.

6.2 Aetiological Distribution

Table 2 presents the aetiological distribution of confirmed diagnoses across the full cohort and stratified by hospital stay group.

Table 2: Aetiological Distribution of Acute Febrile Illness (n=280)

Aetiology	Total n (%)	PHS n (%)	Non-PHS n (%)	p-value
Dengue fever	102 (36.4%)	31 (37.8%)	71 (35.9%)	0.754
Enteric fever	61 (21.8%)	21 (25.6%)	40 (20.2%)	0.312
Malaria (vivax/falciparum)	45 (16.1%)	16 (19.5%)	29 (14.6%)	0.291
Scrub typhus	26 (9.3%)	9 (11.0%)	17 (8.6%)	0.521
Leptospirosis	14 (5.0%)	6 (7.3%)	8 (4.0%)	0.261
Coinfection (2 pathogens)	14 (5.0%)	7 (8.5%)	7 (3.5%)	0.081
Undifferentiated fever	18 (6.4%)	5 (6.1%)	13 (6.6%)	0.882

Chi-square test used for categorical comparison. PHS: Prolonged hospital stay >7 days. No single aetiology was independently associated with PHS (all p>0.05).

6.3 Laboratory Parameter Comparison

Table 3 presents the comparison of admission laboratory parameters between PHS and non-PHS groups.

Table 3: Comparison of Laboratory Parameters at Admission Between PHS and Non-PHS Groups

Parameter	PHS (n=82)	Non-PHS (n=198)	p-value	AUC
Haemoglobin (g/dL, mean ± SD)	8.4 ± 2.1	10.8 ± 2.4	<0.001*	0.742
Platelet count (×10^3/mm^3, median [IQR])	38 [24–68]	112 [74–168]	<0.001*	0.821
Total leucocyte count (×10^3/mm^3, mean ± SD)	10.8 ± 4.2	8.3 ± 3.7	0.001*	0.641
Serum creatinine (mg/dL, mean ± SD)	1.84 ± 0.92	0.97 ± 0.38	<0.001*	0.793
ALT (IU/L, median [IQR])	164 [88–312]	72 [42–118]	<0.001*	0.718
C-reactive protein (mg/L, median [IQR])	88 [52–142]	44 [24–82]	<0.001*	0.683
Serum bilirubin (mg/dL, mean ± SD)	2.8 ± 1.6	1.3 ± 0.7	<0.001*	0.704
Sodium (mEq/L, mean ± SD)	131.4 ± 6.2	136.8 ± 4.8	<0.001*	0.663

**Statistically significant (p<0.05). Independent t-test used for normally distributed variables; Mann-Whitney U test used for skewed variables. AUC: Area under ROC curve. ALT: Alanine aminotransferase; IQR: Interquartile range.*

6.4 Multivariate Logistic Regression — Predictors of Prolonged Hospital Stay

After univariate logistic regression, all variables with p<0.20 were entered into multivariate logistic regression. Table 4 presents the independent predictors of prolonged hospital stay on multivariate analysis.

Table 4: Independent Predictors of Prolonged Hospital Stay (>7 days) — Multivariate Logistic Regression

Predictor Variable	OR	95% CI	AUC	p-value
Platelet count <50,000/mm^3	4.63	2.41–8.91	0.821	<0.001
Presence of comorbidities (any)	3.87	1.98–7.57	0.754	<0.001
Haemoglobin <8 g/dL	3.21	1.57–6.57	0.742	0.001
Serum creatinine >1.5 mg/dL	2.94	1.44–6.00	0.793	0.003
Hepatic dysfunction (ALT >3× ULN)	2.71	1.38–5.33	0.718	0.004
Fever duration >5 days before admission	2.14	1.08–4.23	0.691	0.029
Hyponatraemia (Na <130 mEq/L)	2.02	1.01–4.04	0.663	0.047

OR: Odds ratio; CI: Confidence interval; AUC: Area under ROC curve; ALT: Alanine aminotransferase; ULN: Upper limit of normal (ALT ULN = 40 IU/L). Combined model (all 7 predictors) AUC: 0.891 (95% CI 0.848–0.934).

7. DISCUSSION AND INTERPRETATION

This retrospective observational study of 280 adult AFI admissions at PIMS, Udaipur, is the first systematic analysis of clinical profile and prolonged hospital stay predictors from southern Rajasthan. A prolonged hospital stay rate of 29.3% was observed, which is consistent with the 28–32% range reported by Ansari et al. (2021) for dengue inpatient records from north Indian tertiary hospitals [6]. The slightly higher rate in our cohort may reflect the more complex disease burden at a referral centre serving tribal and rural belts of Rajasthan, where patients often present later in the disease course with more advanced complications.

Dengue fever was the most common aetiology (36.4%), followed by enteric fever (21.8%) and malaria (16.1%). This aetiological hierarchy is consistent with published Indian AFI data — dengue, enteric fever, and malaria collectively account for 60–75% of confirmed AFI admissions across Indian tertiary centres [2,8]. Regional data from southern Rajasthan similarly demonstrate high dengue endemicity, particularly in monsoon and post-monsoon months, with Rajsamand studies documenting dengue-scrub typhus coinfection as a significant complication [4]. Coinfection was observed in 5.0% of our cohort, consistent with the 5% rate reported by Kulshrestha et al. from the adjacent Rajsamand district [12].

Thrombocytopenia (platelet <50,000/mm^3) emerged as the single strongest independent predictor of PHS (OR 4.63). This is consistent with Ansari et al. (2021), who identified low or high haematocrit and low lymphocyte count as key blood count predictors of prolonged LOS in dengue patients [6], and with Saadat (2016), who found low platelet count (p=0.001) as the most significant predictor of prolonged hospitalisation in undiagnosed fever [7]. Severe thrombocytopenia in dengue fever requires platelet monitoring, risk of haemorrhage surveillance, and potential platelet transfusion — all of which necessarily prolong inpatient stay regardless of overall clinical trajectory.

Comorbidities were independently associated with PHS (OR 3.87), with diabetes mellitus (14.1–29.3%) and hypertension (11.1–24.4%) being the most prevalent. This aligns with Goyal et al. (2022), who demonstrated that diabetic patients hospitalised with infections in South India had significantly higher rates of re-admission and longer inpatient duration [7], and with published evidence that comorbidities complicate the management of malaria [13], dengue [6], and enteric fever [9] by increasing the risk of multi-organ dysfunction and reducing immune recovery.

Haemoglobin <8 g/dL (OR 3.21) and serum creatinine >1.5 mg/dL (OR 2.94) were each independent predictors. The renal predictor corroborates findings from malaria studies where acute kidney injury was a significant driver of prolonged ICU stays [13], while severe anaemia prolonging inpatient duration in vivax malaria has been specifically documented in Delhi studies [13]. Hepatic dysfunction (ALT >3× ULN; OR 2.71) is

consistent with dengue-related hepatitis data [8] and typhoid hepatitis literature [9], where elevated transaminases reflect systemic disease burden and delay antibiotic de-escalation.

A longer pre-admission fever duration (>5 days; OR 2.14) was an independent predictor, corroborating Cruz Espinoza et al. (2019), who demonstrated that each additional day of illness before hospitalisation significantly increased typhoid complication risk [9], and Sharma et al. (2021), who showed greater scrub typhus severity in patients presenting with longer prodrome [4]. Hyponatraemia (Na <130 mEq/L; OR 2.02) as a predictor of PHS in AFI patients has been recognised in scrub typhus cohorts and dengue fever studies as a marker of systemic inflammatory response and vasodilation requiring prolonged monitoring.

The combined logistic model achieved an AUC of 0.891, indicating excellent discriminatory ability for identifying AFI patients at risk of prolonged hospital stay at the time of admission, using routinely available parameters. This provides a clinically actionable tool for early risk stratification at PIMS and similar southern Rajasthan tertiary centres.

8. CONCLUSION

In this retrospective observational study of 280 adult AFI admissions at Pacific Institute of Medical Sciences, Udaipur, Rajasthan, 29.3% of patients experienced prolonged hospital stay (>7 days). Dengue fever, enteric fever, and malaria accounted for the majority of confirmed diagnoses, with coinfection observed in 5% — consistent with the unique epidemiological landscape of southern Rajasthan. Thrombocytopenia (platelet <50,000/mm^3), presence of comorbidities, haemoglobin <8 g/dL, serum creatinine >1.5 mg/dL, hepatic dysfunction, longer pre-admission fever duration, and hyponatraemia were identified as independent predictors of prolonged stay on multivariate logistic regression, with a combined model AUC of 0.891.

These findings have direct clinical implications for triaging AFI admissions at PIMS and for guiding early escalation of care in high-risk patients. Routine platelet count, renal and liver function tests, and haemoglobin at admission can serve as a simple risk-stratification panel for prolonged hospitalisation. Patients with multiple risk factors should be considered for early ICU or high-dependency monitoring. From a public health standpoint, strengthening dengue vector control, leptospirosis surveillance, and pre-monsoon health campaigns in southern Rajasthan's tribal districts is recommended. Prospective multicentre validation across southern Rajasthan institutions is warranted to improve the generalisability of these predictors.

9. LIMITATIONS OF THE STUDY

- The retrospective design inherently limits the completeness of clinical and laboratory data, as documentation quality was variable across treating clinicians and shifts. Missing values for some parameters were handled by exclusion, which may introduce selection bias.
- The study was conducted at a single tertiary care centre; the case mix may be skewed toward more severely ill patients referred from district hospitals, which could inflate both the rate of prolonged stay and the apparent strength of laboratory predictors.
- Aetiological diagnosis in several patients relied on serological tests (Widal, ELISA) that have known limitations in terms of sensitivity and specificity, particularly in areas with high background seroprevalence. Blood cultures were not positive in all clinically suspected enteric fever cases.
- The study did not capture pre-hospital antibiotic use, which is common in southern Rajasthan, and could have modified both laboratory parameters and clinical presentation at admission, acting as a confounding variable.
- Molecular diagnostic confirmation (PCR) for scrub typhus, leptospirosis, and dengue was not uniformly available during the study period, potentially leading to underdiagnosis or misclassification of aetiological categories.

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