Original Article

Acute Febrile Illness of Varied Etiology: Analogy in Clinical Presentation and Baseline Investigation

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ABSTRACT

Objective: Researchers examined acute febrile illness (AFI) manifestations together with laboratory test results from patients visiting a tertiary care facility in Karachi.

Study Design: Descriptive Cross-Sectional study

Place and Duration of Study: This study was conducted at the Dr. Ruth KM Pfau Civil Hospital together with Dow University Hospital in Karachi. Start of study October 2022 completion July 2023.

Methods: Researchers studied a population of 300 adults between 20 and 70 years old with fever duration between 3 and 14 days. The data collection included patient demographics along with symptoms and medical history in addition to CBC, LFTs, cultures, malaria/dengue tests, and radiological tests. The study utilised both descriptive and inferential analysis methods.

Results: The research examined a total of 300 patients who had an average age of 38.5 years (SD: 12.4) and a female participant ratio of 58.66%. All patients experienced fever, while body aches presented in 56.33% of cases, alongside headaches in 53.3% and joint pain in 51.3%. Pallor was detected in 45.66% of patients, followed by hepatosplenomegaly in 16.33% of patients, and 12.33% presented with jaundice. Lab tests identified E. coli in 12.0% of patients, alongside Salmonella in 9.7% and dengue in 18.9%, and malaria in 22.33% of the cases. Chest scans displayed both consolidation patterns and pleural effusion in 6.3% and 3.1% of cases, showing how full diagnostic evaluation matters for AFI patients.

Conclusion: Patient care in limited resource contexts requires better diagnostic systems and location-based guidelines for dengue and malaria with advanced detection methods, according to this research.

Key Words: acute febrile illness, dengue, malaria, diagnostic markers, comorbidities, tertiary care.

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INTRODUCTION

Acute febrile illness (AFI) occurs often in clinical settings and encompasses numerous infectious agents, including vector-borne parasites and respiratory, gastrointestinal, and enteric fever microorganisms. Diagnosis and treatment face difficulties in the tropical and subtropical regions because patients often experience similar symptoms, including fever and body pain alongside gastrointestinal problems.

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The city of Karachi experiences periodic febrile illness outbreaks due to its dense population distribution, thus requiring prompt diagnostic services for proper therapeutic approaches. Fever functions as a natural body mechanism that increases temperature when infections, inflammation, or medical conditions exist within the body. The body uses it as a protective mechanism that controls temperature through shivering and sweating despite being unrelated to disease. The normal body temperature exists between 97.5°F and 98.9°F. Medical specialists classify fever into low-grade (99–100°F), moderate (101–104°F), high-grade (above 104°F), and hyperpyrexia (above 106°F). Seizures can occur at extremely high temperatures.[1, 2] Patients with fever experience symptoms such as sweating, chills, body pain, and headaches while feeling weak, along with vomiting, diarrhoea, coughing, exhaustion, lethargy, depression, drowsiness, and dehydration.[3] AFI presents as a three- to fourteen-day fever in tropical and subtropical regions because of malaria, dengue, enteric fever, and respiratory infections.[4] The severity of malaria varies between different cases, while vivax malaria now demonstrates multiple and extensive symptom clusters. Dengue fever

causes different disease manifestations, which might lead to brain swelling.[5,6]

The difficulty in diagnosing AFI stems from its general symptoms that lead to delayed testing and end up requiring physicians to begin treatment without a confirmed diagnosis. Advanced laboratory diagnostics are absent from resource-limited settings, which produces challenges for accurate diagnosis that lead healthcare providers to overuse antimicrobials, thus generating antimicrobial resistance. This research examines how patients with AFI are evaluated in a tertiary care facility by assessing their symptoms and physical signs and test results with the goal of determining which traits best identify common infectious causes. This study establishes diagnostic patterns, which will enhance early detection along with optimising care methods and minimising incorrect antibiotic therapy implementation.

METHODS

The investigation took place at the medical departments of Dr. Ruth KM Pfau Civil Hospital Karachi and Dow University Hospital, Ojha Campus. Research lasted ten months, during which eight months were dedicated to data collection, followed by two months of statistical analysis.

The research included 300 patients between 20 and 70 years old who experienced AFI symptoms defined by their fever duration between 3 and 14 days. The study excluded patients with chronic renal failure along with chronic liver disease and HIV and autoimmune disorders and patients taking steroids or immunomodulatory medications.

All patients underwent documentation of demographic information combined with clinical history and full physical examinations. The laboratory assessment included complete blood count (CBC) and renal and liver function tests (RFTs and LFTs) with blood culture together with a urine detailed report (DR) and urine culture, malaria parasite examination, and dengue serology (NS1 antigen and IgM and IgG). The healthcare team obtained both chest X-rays and abdominal ultrasounds as imaging procedures for diagnostic confirmation. The study obtained approval from the Ethics Committee (Ref:IRB-2669/DUHS/approval/2022/1012) before initiation, ensuring the participants' confidentiality and providing a detailed explanation of the study.

The data analysis was accomplished through the use of SPSS version 23.0. Statistical analysis involved descriptive statistics to present results through both frequency distribution and percentage of occurrences while also employing means and standard deviations. The categorical variables received Chi-square testing, whereas ANOVA analysed continuous variables. The research adopted a significance level of $p < 0.05$ to establish statistical importance.

RESULTS

The study involved 300 patients who had an average age of 38.5 years (SD: 12.4). Female subjects accounted for 58.66% of the total patients, while patients between 30 and 50 years old composed 48.3% of participants. The prevalence of hypertension reached 47.3%, and diabetes mellitus affected 49.3% of patients, alongside 15% having chronic obstructive pulmonary disease. Table 1.

Table No.1: Patient Demographics and Symptoms Analysis Patient demographics: total patients: 300

Age distribution		Smoking Status	
Age 15 to 30 years	95 patients (31.7%)	Current Smokers	100 (33.33%)
Age 30 to 50 years	145 patients (48.3%)	Quit Smoking	57 (19.0%)
Age more than 50 years	60 patients (20.0%)	Never Smoked	143 (47.66%)
		Pan chewing	41 (13.7%)
Comorbidity			
Hypertension (HTN)	142 (47.3%)	Chronic Obstructive Pulmonary Disease (COPD)	45 (15.0%)
Diabetes Mellitus (DM)	148 (49.3%)	Asthma	35 (11.7%)
Male	124 (41.33%)	Female	176 (58.66%)

Table No.2 : **Symptoms Analysis**

Symptoms Analysis			
Fever	= 300 (100%)		
Chills & Rigors	158 (52.7%)	Confusion	54 (18.0%)
Cough (Dry/ Productive)	85 (28.3%)	Headache	160 (53.3%)
Diarrhea	146 (48.7%)	Throat Pain	75 (25.0%)
Constipation	143 (47.7%)	Joint Pain	154 (51.3%)
Shortness of Breath (SOB)	152 (50.7%)	Gum Bleeding	55 (18.3%)
Chest Pain	155 (51.7%)	Blood in Stool	16 (5.3%)
Pain in Abdomen	141 (47.0%)	Blood in Urine	63 (21.0%)
Rashes	111 (37.0%)	Jaundice	37 (12.33%)
Pallor	137 (45.66%)	Body Aches	169 (56.33%)

All patients presented with fever (100%). The most common symptoms in our patient group included body aches affecting 56.33% of individuals, headaches in 53.3% of patients, followed by joint pain in 51.3% of patients, and diarrhoea affecting 48.7% of patients. The symptoms of confusion and bleeding gums were found in 18.0% and 8.3% of patients, respectively. Table 2

Physical examination showed pallor in 45.66% of patients, alongside hepatosplenomegaly in 16.33% of the total and 12.33% presenting with jaundice. Among patients, the mean temperature measurement was 101.001°F (SD: 1.1778), and sinus tachycardia appeared in 65.66% of cases. Table 3.

Medical tests revealed Escherichia coli through urine cultures in 12.0% of patients, alongside Salmonella detection in 9.7% of blood cultures. Test results showed that 18.9% of patients had dengue infection, while malaria affected 22.33% of patients. The radiological investigations revealed lung consolidation in 6.3% of cases, alongside pleural effusion in 3.1%. Table 4

Table 3: Signs Analysis

Signs Analysis				
	Minimum	Maximum	Mean	St deviation
Temperature (°F)	99.0	103.0	101.001	1.1778
Systolic BP (mmHg)	110	150	129.97	11.413
Diastolic BP (mmHg)	70	90	79.90	6.187
Pulse (bpm)	60	100	79.75	11.367
Respiratory Rate	18	30	23.96	3.640
O2 Saturation (%)	94	99	96.38	1.730
BMI	14.69	41.26	24.81	4.66
R/R	18	30	23.96	3.64
JVP	9 (3%)	L.N	15(5%)	
Pallor	137 (45.66%)	Hepatosplenomegaly		49 (16.33%)
Jaundice	37 (12.33%)	Coated Tongue		79 (26.33%)
Cyanosis	2 (0.66%)	Chest	elevated respiratory rates (mean: 23.96 breaths per minute), crypts and bronchial breath in 35 (11.66%)	
Thyroid	19 (6.66%)	CNS	confusion and altered sensorium in 56 (18.66%)	
Dehydration	77 (25.66%)	CVS	Sinus tachycardia 197 (65.66%)	
Edema	10 (3.33%)	Muskuloskeletal	Myalgia 80 (26.66%) ; arthralgia 95 (31.66%)	

Table No.4: Summary of Organism Findings and Diagnostic Test Results

Urine C/S		Dengue Antigen	Dengue Antibodies
E. coli	36 (12.0%)	48 (12.6%)	72 (18.9%)
Pseudomonas	6 (2.0%)	X-ray Chest	
Staphylococcus aureus	8 (2.7%)	Consolidation	24 (6.3%)
		Patchy Infiltrate	6 (1.6%)
Streptococcus	12 (4.0%)	Pleural Effusion	12 (3.1%)
		Pulmonary Edema	6 (1.6%)
Blood C/S			
Klebsiella	10 (3.3%)	Ascites	42 (11.0%)
Salmonella	29(9.7%)	Mild Hepatomegaly	12 (3.1%)
Staphylococcus aureus	5(1.7%)	Splenomegaly	48 (12.6%)
Streptococcus	6 (2.0%)	Malaria	67 (22.33%)
Escherichia coli	25 (12%)		

DISCUSSION

This research delivers important knowledge about acute febrile illness (AFI) clinical characteristics as well as laboratory results of patients seeking care in tertiary facilities. The results demonstrate how multiple infection origins, shared illness features, and substantial comorbidity impact AFI diagnosis and treatment in this group. Researchers obtained significant information about the demographic background along with symptoms and test outcomes that occur in patients who have febrile illness.[7,8]

This study delivers crucial knowledge about the epidemiological and clinical traits as well as diagnostic test results from patients who have febrile illnesses. Our study results show consistency with previous research indicating younger adults, especially women, tend to develop febrile illnesses. Researchers studied 300 patients who demonstrated a mean age of 38.5 years within this middle-aged population group. The study sample included more females than males at 58.66% because females show either different healthcare behaviour patterns or a greater chance of developing certain febrile diseases[9]. A large number of patients between the ages of 30 and 50 years (48.3%) makes it important to focus public health initiatives on this population segment.

Subjects within this population group demonstrate elevated incidence rates of hypertension (47.3%), diabetes mellitus (49.3%), and chronic obstructive pulmonary disease (COPD 15%), which escalate the complexity of AFI infections. Such additional health conditions generate advanced disease severity while influencing treatment results, which in turn heighten mortality threats. The evidence of COPD makes this patient group vulnerable, so healthcare providers should maintain extra clinical awareness. Physicians should measure comorbidities during febrile patient assessments because they must implement thorough proactive approaches to enhance treatment results.[10]

All study patients (100%) displayed fever due to the research criteria for acute febrile illness. According to Khan et al[11], these common symptoms of body aches (56.33%), headaches (53.3%), joint pain (51.3%), and diarrhoea (48.7%) reflect conventional presentations of dengue, malaria, and enteric fever infections. The report suggests that uncommon symptoms such as confusion (18.0%) and gum bleeding (8.3%) warrant serious medical assessment due to their association with dengue hemorrhagic fever or systemic infections, according to Varatharaj[12]. Patients with important health conditions need careful clinical evaluation when such symptoms appear because they occur infrequently among febrile patients. A prompt diagnosis of hidden medical conditions becomes possible through detecting faint cues, which allows physicians to offer suitable treatment methods.[13]

Physical examination results showed pallor in 45.66% of patients who present with AFI, which could indicate two possible conditions: anaemia or serious systemic illness. Evaluation of the liver and spleen found enlargement in 16.33% of cases as well as jaundice in 12.33% of patients, indicating that additional diagnostic assessments are needed to determine the underlying infectious or haematological causes[14]. Clinical findings showed evidence of systemic inflammation through patients' recorded average temperature of 101.0°F (SD: 1.1778), and sinus tachycardia presented itself in 65.66% of cases due to infection-induced stress.[15] The absence of distinct disease markers allows healthcare professionals to evaluate disease severity as well as monitor its progression since these nonspecific indicators require continuous monitoring and prompt medical interventions.

Medical tests showed various causes precipitating each condition. E. coli bacteria were found through urine tests in 12.0% of patients, indicating that urinary tract infections served as potential infection sources[16]. The detection of Salmonella in 9.7% of blood cultures during tests indicated enteric fever as the likely reason for AFI in these endemic areas[17]. Dengue infection combined with malaria accounted for significant portions of cases (18.9% and 22.33%, respectively) because both diseases remain highly endemic in the research area[18,19]. The University of Gondar Hospital in Ethiopia studied febrile illness aetiologies that reached a diagnosis rate of 20.5%, and malaria and dengue infections were commonly occurring[20]. The collected data verifies that malaria remains a major cause of fever symptoms, and medical personnel might neglect arboviral infections. The research combined with the Ethiopian study demonstrates the requirement for better testing methods, particularly molecular approaches, to identify unique febrile illness causes and reduce clinical dependence. Patients with SARI (Severe Acute Respiratory Infection) tended to show consolidation at 6.3% and pleural effusion at 3.1% during radiological examinations due to atypical pneumonia or tuberculosis infection[21]. Research results demonstrate that patients may develop dangerous conditions that need immediate medical response. The high numbers of active dengue (18.9%) infections and malaria (22.33%) supply key evidence to demonstrate that endemic regions need better diagnostic procedures.

Multiple Indian healthcare centres participated in research by Mørch et al[22], which delivered important data about acute undifferentiated fever (AUF) causes in epidemic-prone regions. Hospitalised patients presented with malaria in 23% of cases, alongside dengue in 17% and scrub typhus in 10%, and 7% had leptospirosis, while chikungunya occurred in 6% of patients. The laboratory analysis discovered a major convergence point between dengue and chikungunya infections because dengue virus was found in 26% of chikungunya patient blood samples. Processing febrile illness diagnoses requires innovative diagnostic methods because endemic areas present complicated diagnostic scenarios.

Initial presentation side effects of AFI together with laboratory results make it difficult to identify the correct diagnosis accurately. Rapid diagnostic tests along with localised management protocols become essential because dengue and malaria affect many patients in this cohort[23]. A multidisciplinary strategy becomes necessary to handle acute and chronic health problems because patients have significant medical

illnesses[24]. The study demonstrated that diagnostic difficulties and missed subclinical infections needed clarification. Standard diagnostic techniques failed to accurately measure combined infections based on data collected by the study. The collected observational data validates diagnostic approaches that distinguish various typical febrile illnesses within our resource-limited area.

This study has several limitations. The exclusive use of one intervention centre restricts how broadly healthcare practitioners can generalise study findings throughout other localities or healthcare service areas. Diagnostic biases in this study emerged from depending on clinical and laboratory data, while the lack of molecular diagnostic methods likely resulted in failing to detect some possible aetiologies[25]. Research should implement state-of-the-art diagnostic equipment together with multiple medical facility collaborations to produce stronger research results in the future.

CONCLUSION

Research at the tertiary care level demonstrates the necessity for standardised diagnostic methods to deal with AFI alongside its associated ailments. The research findings provide key clinical markers and laboratory values, which will help create local testing and treatment methods to enhance patient results. The high prevalence of comorbidities and infectious agents necessitates a comprehensive approach to diagnosis and management. Future efforts should dedicate resources to long-term evaluation of treatment success because preventive public health measures that fight comorbidities will boost disease management and patient health restoration.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Darshan Kumar, Shaheen Bhatty
Drafting or Revising Critically:	Pawan Kumar, Syed Muhammad Kashif
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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