

Microbiological Etiology of Fever at A Tertiary Care Center

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Abstract

Background: Acute febrile illness is a common cause of patients seeking health care settings posing a diagnostic and therapeutic challenge to the health care workers. Previous studies showed increase in the occurrence of mosquito born, water & food born pyrexia cases like dengue, chikungunya, malaria, enteric fever during rainy season. The clinical laboratory parameters gives etiological diagnosis that helps in providing relevant treatment to patients

Material And Methods: A total of 2200 patients with history of acute febrile illness admitted in medicine department from August 2019 to October 2019 at Sir Ronald Ross Institute of Tropical and Communicable Diseases were included in the present cross sectional study. Blood is collected from each patient for serological and hematological tests. Serological tests include WIDAL test, ELISA test for Dengue and Chikungunya. For malarial parasite thick & thin smear using Jaswant Singh- Bhattacharji (JSB) stain.

Results: Among 2200 patients dengue positivity was observed in 121 cases (5.5%), chikungunya positive were 28 (1.27%), malaria positive were 26 (1.18%), and WIDAL test positive in 252 (11.45%) samples. Total & differential leukocyte counts and platelet count were correlated. During the study period the highest incidence of dengue & chikungunya was observed in October with 8.73% & 2.8% respectively, whereas malaria in August with 2.39% and WIDAL test in month of September with 17%.

Conclusion: The knowledge of the incidence of mosquito born, water & food born febrile illness diseases help in proper clinical management and taking timely preventive measures.

Key Word: Acute febrile illness, Dengue, Malaria, Chikungunya, Enteric fever, WIDAL test, JSB

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I. Introduction

Fever is a common symptom of any infectious systemic illness which may act as an important cause of morbidity. Most of the febrile illnesses which are not specified, their cause for which treatment is rather generic, typically with antipyretics and antibiotics. Since evidence based epidemiological data on fever is insufficient in tropical areas, clinical decision making is compromised.^[1] Every year during and after the rainy season an epidemic of acute febrile illness is witnessed in tropical & subtropical regions.^[2] The majority of patients present with non-specific symptoms such as low-grade fever, general malaise, headache, arthralgia, myalgia, and rash; and usually without a focal point of infection. The symptoms and differential diagnosis of these diseases are similar, making accurate clinical diagnosis difficult without laboratory confirmation^[3] Vector-borne infections such as malaria and dengue are of major public health concern worldwide. The former is a parasitic disease transmitted by Anopheles mosquito, and the latter is a viral disease transmitted by Aedes mosquito. In a geographical area where both the vectors coexist, simultaneous occurrence of malaria and dengue in an individual cannot be ruled out. The two diseases share many clinical features and may be clinically indistinguishable. It is important; however, to differentiate between the two conditions, otherwise, it may result in a poor outcome due to complications like dengue haemorrhagic fever, dengue shock syndrome.^[4] Dengue fever also called as break bone fever is caused by the virus belonging to the family Flavivirus.^[5] According to WHO, annually 50 million cases of DF occur world over with a mortality of 2.5%^[6] Chikungunya (CHIK) fever is a viral disease caused by an alpha virus that is spread by bite of Aedes aegypti mosquito. The sudden onset of the disease including crippling arthralgia and frequent arthritis are clinically distinctive. The disease is almost self-limiting and rarely fatal^[7] Typhoid fever is a systemic prolonged febrile illness caused by certain Salmonella serotypes including Salmonella typhi, S. paratyphi A, S. paratyphi B and S. paratyphi C. Human beings are the only reservoir host for typhoid fever, and the disease is transmitted by faecally contaminated water and food in

endemic areas especially by carriers handling food. The World Health Organization (WHO) estimates about 21 million cases of typhoid fever with >600,000 deaths annually. The cases are more likely to be seen in India, South and Central America, and Africa i.e. in areas with rapid population growth, increased urbanization, and limited safe water, infrastructure, and health systems Although Widal test has been in use for more than a century, the value of the test to diagnose typhoid fever has been debated It relies classically on the demonstration of a rising titre of antibodies in paired samples 10 to 14 days apart. Furthermore, patient management cannot wait for results obtained with a convalescent-phase sample. For practical purposes, a treatment decision must be made on the basis of the results obtained with a single acute-phase sample [8] Co-infection of Dengue and Typhoid fever is rarely reported and are known to present with overlapping symptoms making the clinical diagnosis difficult. Dual infections tend to have prolonged fever, increased risk of complications and delayed in diagnosis.[9] Hence this study was carried out to describe disease- specific profiles based on their haematological and microbiological investigations.

II. Material And Methods

The present cross sectional comparative study was carried out at Sir Ronald Ross Institute of Tropical and Communicable Diseases, Nallakunta, Hyderabad, Telangana from August 2019 to October 2019 after obtaining institutional ethical committee approval. A total of 2200 acute pyrexia cases of both sexes aged between 16-60 years and giving consent were included in the study.

After obtaining written informed consent from each patient, 5ml & 2ml of blood in plain tube & EDTA tube respectively was collected. Blood without anticoagulant was centrifuged at 3000g for 10 minutes for separation of serum. Serum is used for WIDAL test using Tydal kit. ELISA test for Dengue and Chikungunya using MAC- ELISA kit supplied by NIV Pune & Panbio ELISA for NS1 antigen detection. By using EDTA blood, Complete Blood Picture & thick and thin smears for malarial parasite stained with Jaswant Singh-Bhattacharji stain were done.

III. Results

Early diagnosis of acute febrile illness in the developing tropical countries is the need of the hour. As many clinical features are overlapping and nonspecific, all these conditions present diagnostic challenges [10]

A total of 2200 patients admitted with AFI were included, of which 1168 (53%) were males and 1032 (47%) females. Maximum cases were reported in month of September 40.5% [Fig-1]. Commonest etiology of acute febrile illness in the present study was dengue 28.3% followed by chikungunya, malaria 6.5% & 6.0% respectively and WIDAL test positive were 59%. Male to female ratio was 1:0.8 showing that the males were more affected, that may be due to their exposure to outer environment [Fig-2]. Concurrent infection with dengue and typhoid in 16 cases, dengue and malaria in 2 cases reported. Age and gender wise distribution of positive cases shown in [Table-1]

This study revealed highest incidence of dengue and chikungunya in October 8.73% & 2.8% respectively. Malaria incidence was high in August with (2.39%). Highest positivity of WIDAL test was observed in month of September with 17% [Table-2]. Correlation of haematological parameters shown in [Table-3]

Figure-1 Month wise occurrence of acute febrile illness cases during study period **Figure-2** Gender wise distribution of positive cases

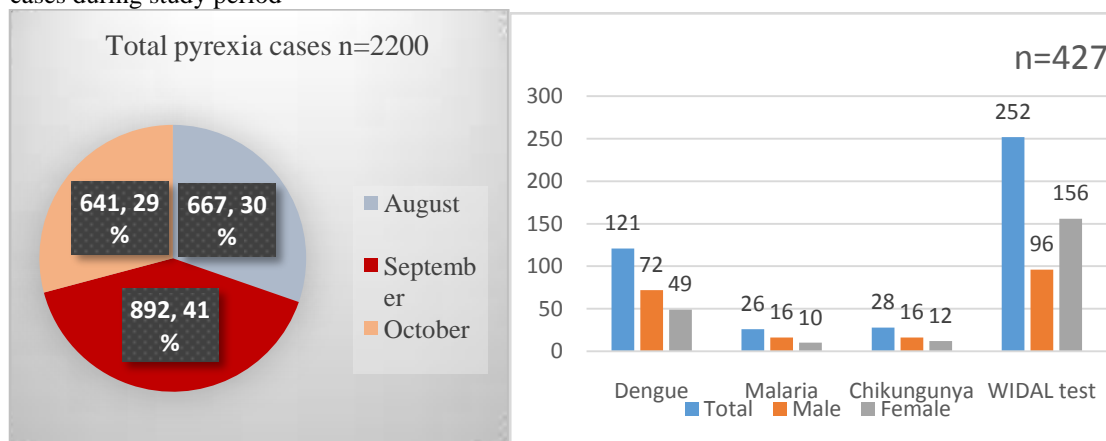


Table no-1 Age and sex wise distribution of identified positive cases [n=427]

Age group in years	Dengue		Malaria		Chikungunya		WIDAL test	
	Male	Female	Male	Female	Male	Female	Male	Female
16-25	52	34	5	4	4	3	69	81
26-35	11	11	3	1	6	4	15	56
36-45	7	3	3	4	2	4	8	11
46-55	1	1	4	1	3	0	2	7
56-65	1	0	1	0	1	1	2	1

Table no-2 Month wise distribution of positive cases [n=427] **Table no-3** Thrombocytopenia and leucopenia in positive cases results

Month	Dengue	Malaria	Chikungunya	WIDAL test
August	28 (4.19%)	16 (2.39%)	4 (0.6%)	63 (9.4%)
September	37 (4.14%)	8 (0.8%)	6 (0.8%)	109 (17%)
October	56 (8.73%)	2 (0.3%)	18 (2.8%)	80 (12%)

AFI	Total	Thrombocytopenia	Leucopenia
Dengue	121	21 (17.3%)	49 (40.4%)
Malaria	26	-	2 (7.6)
Chikungunya	28	-	4 (14.2%)

IV. Discussion

Acute febrile illness defined as pyrexia with <2 weeks in duration in which treatment on the line of etiological agents advised. The predominance of this AFI is usually observed during monsoon period.[1]

In the present study among the 2200 patients admitted with acute febrile illness 53% were males and 47% females, which is in concordance with Ragini et al. 54.2% males and 45.8% females. Males were more commonly suffering from fever, this may be due to their easy exposure to mosquitoes because of their outdoor activities. Monsoon period is convenient time for mosquitoes to breed. Drinking water also gets easily contaminated during this period. All these leads to clustering of dengue, chikungunya, Malaria, Typhoid cases [2]

Among 2200 cases 427 (19.4%) showed positive results for dengue, chikungunya, Malaria and WIDAL test. Most common cause in our study was dengue 28.3%. which was similar to previous studies like Shelke YP et al [1], Ragini et al [2], Shanmugan et al. [5], Rani et al. [11], 17.4%, 25%, 38.5%, 27% respectively.

In the present study out of 28.3% dengue positive, IgM positivity was 24.7% and NS1 ELISA was 75.2%, correlated with previous studies [Table-4]

Table no 4

Study	Dengue Positives	NS1 antigen	IgM antibody
Shelke YP et al, 2017 [1]	17.4%	72.34%,	27.65%
Shanmugan et al, 2016 [5]	38.5%	45.6%	76.8%
Present study 2019	28.3%	75.2%	24.7%

Among 121 cases of dengue fever 49 had leucopenia and 21 had thrombocytopenia, closely related to study conducted by Yogeeshha et al [6] 45 had leucopenia and 69 had thrombocytopenia.

Next to dengue in our study was chikungunya 28 (6.5%) followed by Malaria 26 (6%), Ragini et al also showed malaria positivity of 8% like similar to our study.

Positive agglutination in WIDAL slide test for both O & H antibody in the present study was 59%, and is in concordance with study by Andualem et al [8] 49.3%. In developing countries WIDAL test remains one of the best, easily accessible, economic, and simple method for the diagnosis of typhoid fever with paired sera testing.

V. Conclusion

Evaluation of acute febrile illness cases using clinical laboratory parameters help in clinical management. The knowledge of epidemiology of these infections help in taking up the seasonal control measures.

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