

CONCURRENT DENGUE, ENTERIC FEVER AND MALARIAL INFECTIONS IN FEBRILE PATIENTS ATTENDING TERTIARY CARE CENTRE, HYDERABAD, TELANGANA.

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ABSTRACT:

Background and Objectives: Dengue, Enteric Fever and Malaria still remain diseases of public health importance due to their endemicity. Individuals residing in endemic areas are at risk of contracting these infections either concurrently or an acute infection superimposed on chronic infection. Concurrent infection with two agents can result in an illness with overlapping symptoms. This study aims to identify these infections during the study period as they follow seasonal pattern and increasing the burden in India.

Materials and Methods: A cross sectional study conducted among febrile patients attending tertiary care centre, Hyderabad, Telangana from September to November 2021. A total of 85 febrile patients were investigated for Dengue, Enteric fever and Malaria using Dengue ELISA, WIDAL test and Malaria ELISA respectively.

Results: Of the 85 patients, Dengue IgM positive were 41(48.23%), Enteric fever positive were 19(17.64%) and Malaria positive were 9(10.58%). Those patients showing positive results for Enteric fever were further confirmed by WIDAL test with paired sera to rule out any cross reactivity among these agents. 15 patients exhibited concurrent infection, among them 6(7.05%) had coinfection of Dengue and Enteric fever, 4(4.7%) had coinfection of Enteric fever and Malaria, 4(4.7%) had Dengue and Malaria and 1 (1.17%) showed coinfection for all the three infections of Dengue, Enteric fever and Malaria.

Conclusion: Although febrile illness may have different aetiology, coinfections are challenging to the treating physician because treatment options are varied for the different febrile illness and concurrent infections may go unnoticed and patients may not receive appropriate treatment.

Keywords: Dengue, Enteric Fever, Malaria, Concurrent infection, Febrile illness.

INTRODUCTION:

Fever, also known as pyrexia or controlled hyperthermia is a complex physiologic response to disease mediated by pyrogenic cytokines and characterized by a rise in core temperature, generation of acute phase reactants and activation of immune systems.^[1] These fevers include Dengue, Malaria, Scrub Typhus, Leptospirosis, Typhoidal fever and some other fevers leading to very high morbidity and mortality.^[2] In acute undifferentiated fever (AUF), symptoms are not specific and if accurate diagnostic methods are not available, empirical treatment needs to be broad in order to avoid morbidity and mortality.^[3]

Enter fever, Dengue and Malaria still remain diseases of public health importance in the tropics. Individuals residing in endemic areas at risk of contracting these infections either concurrently or an acute infection superimposed on a chronic one.^[4]

Dengue fever also known as break bone fever, is an infectious tropical disease caused by the dengue virus. It is classified among the Neglected Tropical Diseases (NTDs). There are four strains of the virus, referred to as DENV-1, DENV-2, DENV-3 and DENV-4. Dengue is transmitted by Aedes mosquitoes, particularly *A. aegypti*. Dengue haemorrhagic fever (DHF) occurs when a person contracts a different strain of Dengue virus after a previous infection with a different strain.^[1] Dengue haemorrhagic fever (DHF) first emerged as a public health problem in 1954, when the first epidemics occurred in other regions of the world in the 1980s and 1990s caused by all four serotypes of Dengue virus.^[5]

Enteric fever also known as typhoid is transmitted by the ingestion of food or water contaminated with the feces of an infected person, which contain the bacterium *Salmonella typhi* and *Salmonella paratyphi*. The symptoms of Enteric fever closely resemble those of Dengue fever.^[6]

Malaria is a critical disease caused by *Plasmodium* species via bite of infected female *Anopheles* mosquitoes which is transmitted to humans. In 108 countries including India, two species of malaria parasite which are *Plasmodium falciparum* and *Plasmodium vivax* are endemic. The two diseases malaria and dengue infections have common clinical features.^[7]

Concurrent infection with the three different infective agents i.e., *Salmonella typhi*, DV and *Plasmodium* species lead to an overlap of their clinical features. This can pose a diagnostic challenge to the physician, especially in endemic areas.^[5] Therefore this study aims to find the

concurrent Dengue, Enteric fever and Malarial infections among febrile illness patients attending tertiary care centre, Hyderabad, Telangana.

MATERIALS AND METHODS:

Study Design: Cross Sectional Study

Study Setting: The study included 85 febrile patients attending tertiary care centre, Hyderabad, Telangana.

Study Duration: The study was done from September 2021 to November 2021

Inclusion Criteria:

- All the febrile patients attending to tertiary care centre.
- People who gave consent

Exclusion Criteria:

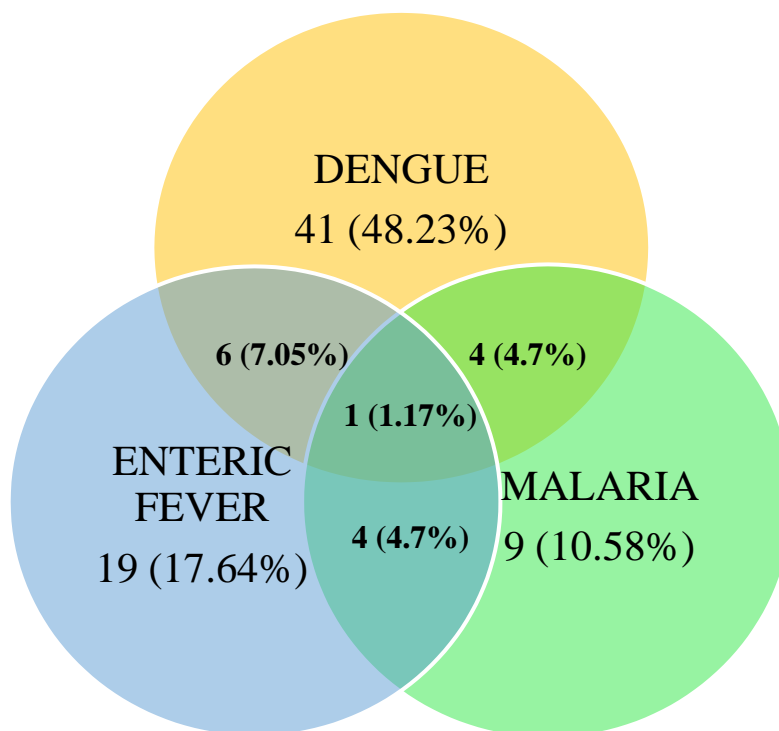
- Patients who did not give consent

All the 85 samples from febrile patients were subjected to Dengue IgM ELISA, WIDAL test and Malaria Antigen ELISA (pLDH antigen) tests. To rule out any cross infections, paired sera were obtained and WIDAL test was done and confirmed for Enteric fever. The results were statistically analysed.

RESULTS:

Among the total 85 patients, 41 (48.23%) cases tested positive for DENV, 19 (17.64%) cases tested positive for Enteric fever and 9 (10.58%) cases tested positive for Malaria

Coinfections were seen in 15 cases of which Dengue and Enteric fever coinfection seen in 6 (7.05%), Enteric fever and Malaria seen in 4 (4.7%), Dengue and Malaria were seen in 4 (4.7%) and all the three coinfections of Dengue, Enteric fever and malaria was seen in one case (1.17%).



DISCUSSION:

The emergence and coexistence of infections with a potential for global spread are a significant health concern, especially in countries with low sanitation levels and limited health resources.^[10] Malaria, Typhoid and Dengue fever are the most common acute febrile illnesses in India.

Among the febrile patients in the present study, most of the samples were positive for single infection, Dengue positives were 41 (48.23%), Enteric fever were 19 (17.64%) and Malaria were 9 (10.58%).

Dengue was observed to be the major cause of febrile illness in the present study, which was correlating with the studies conducted by; Garima Mittal et al which showed Dengue as most common among the febrile illness accounting for 37.54% followed by Enteric fever – 16.5% and Malaria – 6.8%.^[12], Arvind et al, showed that Dengue was the most common cause of AFI – 52.1%, Enteric fever – 4.1% and Malaria – 3.93%.^[13] and Mekkattukunnel A. A. et al, showed that Dengue was the leading cause for febrile illness accounting for 43.5%.^[14]

The present study showed 7.05% co-infection of Dengue and Enteric fever which was similar to the study done by Srikanth Kumar, et al which had 9%.^[9] The study of A. E. Moses, et al^[11] showed 1.4% co-infection of Enteric fever and Malaria which was much less compared to our study i.e. 4.7% and also 4.7% co-infection of Dengue and Enteric fever was observed in the

present study, whereas study done by Srikanth Kumar, et al showed 12% and study done by A.E. Moses, et al showed 0.7%.

It is increasingly recognized that tropical fevers present with overlapping clinical features. Hence, knowledge of local epidemiology and aetiology is very important in the early management.^[8] Co-infections could occur principally by two different mechanisms either by contracting multiple infections at the same time or increased pathogenicity of a simultaneous subclinical infection due to immune reactions.^[3] Other febrile illnesses should be considered, especially when the clinical course of a patient differs from the natural disease course or when a patient is unresponsive to standard treatment.

CONCLUSION:

Although febrile illness may have different aetiology, coinfections are challenging to the treating physician because treatment options are varied for the different febrile illness and concurrent infections may go unnoticed and patients may not receive appropriate treatment.

ETHICAL APPROVAL:

Ref.No.IEC/OMC/2023/M.No.(02)/Acad - 5

LIST OF ABBREVIATIONS:

AUF: Acute undifferentiated fever

AFI: Acute febrile illness

AUFI: Acute undifferentiated febrile illness

NTDs: Neglected Tropical Diseases

DHF: Dengue haemorrhagic fever

DENV: Dengue Virus

DV: Dengue Virus

ELISA: Enzyme linked immunosorbent assay

IgM: Immunoglobulin M

pLDH antigen: Parasite lactate dehydrogenase antigen

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CONFLICTS OF INTEREST:

Authors declare that they have no conflict of Interest.

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Nil

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