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ORIGINAL RESEARCH

ASSESSMENT OF CONCURRENT MALARIA AND DENGUE INFECTIONS AMONG FEBRILE PATIENTS

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ABSTRACT

Background: To assess concurrent malaria and dengue infections among febrile patients.

Methods: Seventy patients, aged 18 to 60 years clinically suspected of having dengue and malaria of either gender were selected. Using venipuncture, 4 mL of blood was drawn from suspected samples in an EDTA bulb to aid in the identification of the species. Using a quick malaria antigen test kit and peripheral blood smear microscopy to identify Plasmodium species, the samples were diagnosed with malaria. To rule out dengue infection, the dengue NS-1 antigen, (Immunoglobulin) IgM and IgG antibodies fast kit was used.

Results: Age group 18-28 years had 11 patients, 28-38 years had 26, 38-48 years had 28 and 48-60 years had 5 patients. The difference was significant (P< 0.05). Out of 70 patients, malaria was seen in 8, dengue in 20 and malaria+ dengue in 22. Among 20 dengue positive cases, NS1 antigen was identified in 4, IgM antibody in 5, IgG antibody in 2, NS1 Ag +IgM Ab in 5 and IgM Ab +IgG Ab in 4 cases. Among 8 malaria positive cases, PV antigen was seen in 2, PF antigen in 4 and both PV and PF antigen in 2 cases. Clinical features were jaundice and liver enlargement in 34, muscle pain in 51, joint pain in 24, headache in 18 and kidney failure in 7 cases. The difference was non- significant (P>0.05).

Conclusion: Malaria and dengue must be ruled out in every patient with a fever. Furthermore, additional difficulties may arise in a patient who has both co-infections. Clinicians should give patients with fever or those who have just returned from an endemic area careful care and order examinations to rule out dengue and malaria epidemics.

Keywords: Dengue, Malaria, jaundice, liver

INTRODUCTION

Malaria and dengue fever are two significant mosquito-borne diseases that affect millions of people worldwide, particularly in tropical and subtropical regions.[1] Despite sharing common transmission vectors (mosquitoes), they are caused by different pathogens and have distinct clinical presentations and treatment approaches. Malaria is caused by Plasmodium parasites transmitted through the bite of infected Anopheles mosquitoes.[2] There are several species of Plasmodium that can infect humans, with Plasmodium falciparum and Plasmodium vivax being the most common.[3,4] Dengue fever is caused by the dengue virus (DENV), which is transmitted primarily by Aedes mosquitoes, especially Aedes aegypti. Dengue Virus (DENV) is the name of the virus that causes dengue. Four serotypes are known to exist: DENV-1, DENV-2, DENV-3, and DENV-4.[5] Consequently, a person may contract the infection four times. Due to their favorable

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conditions, tropical and subtropical regions are home to dengue. Urban and semi-urban environments are the most common. In India, dengue has been endemic for more than 200 years.[6] Unspecific symptoms and improper antimalarial medication use make it difficult to make a clinical diagnosis and result in subpar patient monitoring.[7] It therefore necessitates precise laboratory research and reliable species identification.[8] Malaria and dengue infections share similar clinical characteristics, making it difficult to distinguish between the two illnesses. Laboratory diagnosis is used to make the distinction; otherwise, the results are poor.[9,10] We performed this study to assess concurrent malaria and dengue infections among febrile patients.

MATERIALS & METHOD

After considering the utility of the study and obtaining approval from the ethical review committee, we selected seventy patients, aged 18 to 60 years clinically suspected of having dengue and malaria of either gender.

Data such as name, age, etc. was recorded. Using venipuncture, 4 mL of blood was drawn from suspected samples in an EDTA bulb to aid in the identification of the species. Using a quick malaria antigen test kit and peripheral blood smear microscopy to identify Plasmodium species, the samples were diagnosed with malaria. To rule out dengue infection, the dengue NS-1 antigen, (Immunoglobulin) IgM and IgG antibodies fast kit was used. The results were compiled and subjected to statistical analysis using the Mann- Whitney U test. P value less than 0.05 was regarded as significant.

RESULTS

Table I Patients distribution

Age group (years)	Number	P value
18-28	11	0.82
28-38	26	
38-48	28	
48-60	5	

Age group 18-28 years had 11 patients, 28-38 years had 26, 38-48 years had 28 and 48-60 years had 5 patients. The difference was significant (P< 0.05) (Table I).

Table II Assessment of parameters

Parameters	Variables	Number	P value
Disease prevalence	Malaria	8	0.95
	Dengue	20	
	Malaria+ Dengue	22	
Dengue positive (20)	NS1 antigen	4	0.81
	IgM antibody	5	
	IgG antibody	2	
	NS1 Ag +IgM Ab	5	
	IgM Ab +IgG Ab	4	
Malaria positive (8)	PV Antigen	2	0.05
	PF Antigen	4	
	Both PV and PF Antigen	2	

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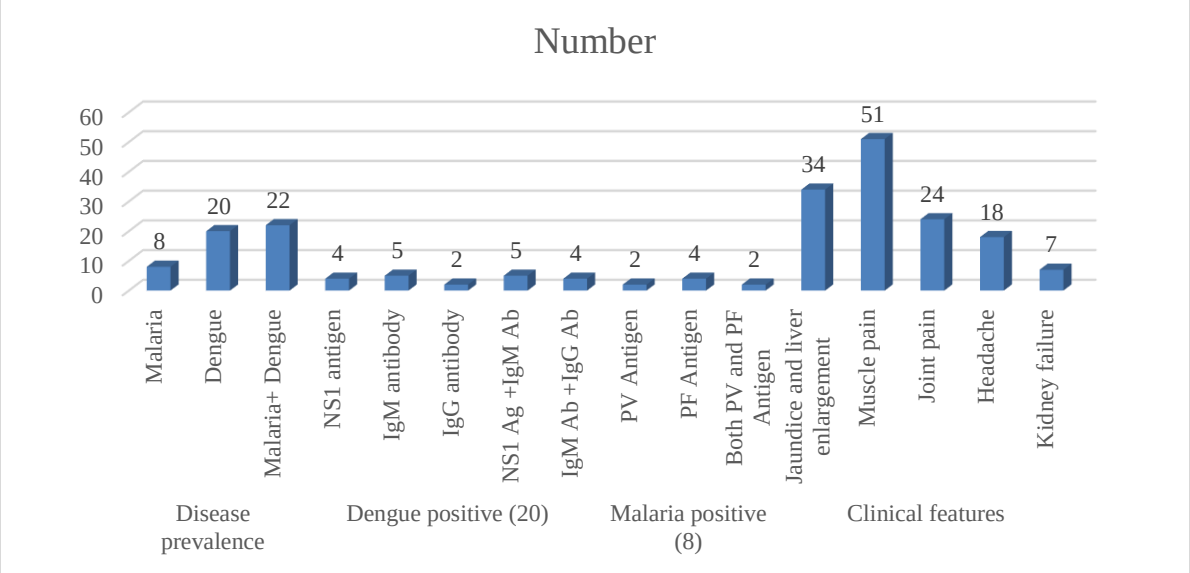
Clinical features	Jaundice and liver enlargement	34	0.93
	Muscle pain	51	
	Joint pain	24	
	Headache	18	
	Kidney failure	7	

Out of 70 patients, malaria was seen in 8, dengue in 20 and malaria+ dengue in 22. Among 20 dengue positive cases, NS1 antigen was identified in 4, IgM antibody in 5, IgG antibody in 2, NS1 Ag +IgM Ab in 5 and IgM Ab +IgG Ab in 4 cases. Among 8 malaria positive cases, PV antigen was seen in 2, PF antigen in 4 and both PV and PF antigen in 2 cases. Clinical features were jaundice and liver enlargement in 34, muscle pain in 51, joint pain in 24, headache in 18 and kidney failure in 7 cases. The difference was non- significant (P>0.05) (Table I, Graph I).



Graph I

DISCUSSION

The most recent World Health Organization (WHO) malaria information sheet and world malaria report, which was published on November 30, 2020, states that there were 229 million cases of malaria in 2019 and 409 000 malaria-related fatalities.[11] Two endemic kinds of malaria parasites, Plasmodium falciparum and Plasmodium vivax, are found in 108 countries, including India. Aedes aegypti mosquitoes are the carrier of dengue, one of the most common viruses carried by arthropods.[12,13] We performed this study to assess concurrent malaria and dengue infections among febrile patients.

We observed that age group 18-28 years had 11 patients, 28-38 years had 26, 38-48 years had 28 and 48-60 years had 5 patients. Vasava et al[14] determined the co-infection prevalence rate for both dengue and malaria, as well as the correlation between the severity of these co-infections and symptoms and haematological markers. Of the 604 patients, 58 (9.6%) tested positive for malaria, 80 (13.24%) tested positive for dengue, and 21 (3.47%) tested positive for both dengue and malaria concurrently. The age group most afflicted, at 45.53%, was 31 to 60 years old. According to the study, there was a preponderance of men (61.59%), 52.38% of patients had hepatomegaly and

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jaundice, 23.80% had hemorrhagic symptoms, 4.76% had kidney failure, and 95.23% of patients had thrombocytopenia (platelet count <150,000/cubic millimeter (cmm)).

In our study, out of 70 patients, malaria was seen in 8, dengue in 20 and malaria+ dengue in 22. Among 20 dengue positive cases, NS1 antigen was identified in 4, IgM antibody in 5, IgG antibody in 2, NS1 Ag +IgM Ab in 5 and IgM Ab +IgG Ab in 4 cases. Among 8 malaria positive cases, PV antigen was seen in 2, PF antigen in 4 and both PV and PF antigen in 2 cases. Clinical features were jaundice and liver enlargement in 34, muscle pain in 51, joint pain in 24, headache in 18 and kidney failure in 7 cases. Mohapatra et al[15] examined the clinical characteristics and results of dengue and malaria mono-infection with concurrent infection. Every patient who had a fever for seven days or less had their fever reasons looked at, including dengue, malaria, and other conditions. Individuals with dengue mono-infection (Group B) and malaria mono-infection (Group C) were compared with patients with concurrent dengue and malaria (Group A). Comparative studies between haematological and biochemical methods were conducted. In the course of the trial, 367 dengue patients were admitted. Of the patients, 27 (7.4%) had both malaria and dengue concurrently. Groups A, B, and C comprised of 27, (5.8), 340 (72.5), and 102 (21.7%) patients, in that order. The concomitant infection's clinical characteristics resembled dengue fever more than malaria. Concurrent infection has a positive consequence, in contrast to malaria. It is not unusual for dengue and malaria to coexist. Regular investigations should be conducted for both infections in order to get a diagnosis.

Santana et al[16] examined 111 clinical serum samples from patients for the presence of arboviruses. After extracting the viral RNA, RT-PCR and Multiplex-Nested-PCR were carried out utilizing primers unique to the orthobunyavirus, flavivirus, and alphavirus.
Two patients from Novo Repartimento (Pará) who also had an active Plasmodium vivax infection had dengue virus serotype 2.

CONCLUSION

Malaria and dengue must be ruled out in every patient with a fever. Furthermore, additional difficulties may arise in a patient who has both co-infections. Clinicians should give patients with fever or those who have just returned from an endemic area careful care and order examinations to rule out dengue and malaria epidemics.

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