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DISTINGUISHING MALARIA AND DENGUE FEVER PATIENTS BY USING FREQUENCY AND HEMATOLOGICAL MANIFESTATION IN HYDERABAD, SINDH, PAKISTAN

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Abstract
Malaria and dengue are the two common mosquito infections that are very important and cause high risk for many patients around the world. Malaria and dengue fever are the leading cause of illness in Pakistan. These both diseases have caused severe loss of life in every city of Pakistan. The objective of this study is to determine the demographic, clinical and haematological aspects of malaria and dengue fever. This study was carried out from 2023-2024 on 120 dengue fever and 120 malaria patients. This study shows that majority of the malarial cases were diagnosed with Plasmodium vivax. Dengue fever cases were diagnosed by NS1 antigen test. In demographic characters of both the cases, males were more effected than the females. Dengue fever patients showed more mean age ratio than the malarial patients. Most of the affected malarial cases were in age 1-10 years while most of the dengue fever cases were in age 21-30 years. Fever and headache were common clinical symptoms in both cases. Significant differences were noticed in blood cell parameters.

INTRODUCTION

Mosquito borne diseases

In recent years, Mosquito borne diseases have emerged as a serious public health problem in countries of Asia region. Some of the mosquito borne diseases known to man includes Malaria and Dengue fever. Mosquito borne diseases mainly arise in those areas where clean drinking water and proper sanitation system is a challenge. These have mainly been treated as diseases of the poor as it is endemic in low socio economic strata and in areas where cycle of illness and poverty exists. All over the world mosquito borne diseases are responsible for a large number of global morbidity and mortality, mainly affecting children and young adults on evaluating the endemic regions of malaria. Mosquito is considered to be an important animal vector that can cause several diseases to human beings. Dengue fever and malaria are the most common arthropod borne diseases in humans and represent major public health problems.

International Journal of Community Medicine and Public Health | November 2017 | Vol 4 | Issue 11 Page 4178

Nanjesh KS et al. Int J Community Med Public Health. 2017 Nov;4(11):4178-4181

Malaria and dengue fever, the two prevalent arthropod-borne diseases, which has emerged as the significant public health problems in tropical areas. Dengue viruses and Plasmodium parasites are common in convergence regions, in which their highly prevalent areas overlap significantly. Even though their pathogeneses varies, but their clinical and biological manifestations are similar,

which makes it difficult to differentiate between the two infections.

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Comparison of Clinical and Biological/ Laboratory Findings of Malaria and Dengue Infection in Karachi. A Cross Sectional Survey

Mosquito is considered to be an important animal vector that can cause several diseases to human beings. Most important in that regard are mosquitoes (Diptera: Culicidae) that act as vectors of a variety of harmful pathogens and parasites. Of these, the genera Anopheles, Aedes, and Culex are the most problematic vectors of most important pathogens, causing diseases such as malaria, Dengue, yellow fever, filariasis, Japanese encephalitis, and Zika. Important vectors of the pathogens causing these diseases are mosquitoes belonging to the genera Aedes, Culex, and Anopheles, widely distributed in Africa, Asia, South America, and Europe. Approximately seven hundred million people around the world suffer from mosquito-borne illnesses, resulting in over one million deaths

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Malaria:

Malaria causing plasmodia are parasites of blood and hence induce hematological alterations. The hematological changes that have been reported to accompany malaria include anemia, thrombocytopenia and leucocytosis, leucopenia, mild to moderate atypical lymphocytosis, monocytosis, eosinophilia and neutrophilia.3-8 Platelet abnormalities are both qualitative as well as quantitative. Thrombocytopenia is common occurrence in acute malaria and it is observed in vivax and falciparum malaria to varying degrees

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Surve KM et al. Int J Res Med Sci. 2017 Jun;5(6):2552-2557

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Malaria is among the five leading causes of death worldwide. Even though Pakistan is categorized as a country with malaria prevalence around 177 million individuals are still at risk of contracting the disease. The clinical spectrum of malaria is broad with manifestations such as severe anemia and thrombocytopenia. Most of these reports of severe and fatal vivax malaria have come from endemic regions, where the people have limited access to healthcare.

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In Pakistan malaria is quite common. From different regions of Pakistan epidemiological data is insufficient to exactly assess the prevalence of malaria (Khan et al., 2006). Plasmodium falciparum is an important public health problem, which annually causing at least ½ million cases of malaria (Ghanchi et al., 2010). In Pakistan, each year an estimated ¼ million episodes of malaria infection occur (Yasinzai and Kakarsulemankhel, 2009). The malaria incidence has strikingly increased during the last ten years

Pakistan J. Zool., vol. 44 (2), pp. 321-326, 2012.

As per the Pakistan Malaria Annual Report of 2019, out of 374,513 malarial cases, P. vivax accounted for 84.0%, followed by P. falciparum 14.9%, and 1.1% cases were of mixed infection

Among its species, P. vivax is more prevalent in the Pakistani population than P. falciparum. However, thrombocytopenia is an early manifestation, and more than 80% of the P. vivax and P. falciparum present with thrombocytopenia

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Dengue Fever

Dengue virus (Genus Flavivirus) and Plasmodium parasites are widespread in American and Asian tropical regions and their endemic areas overlap extensively. Urban demographic expansion, deforestation and agricultural settlements in peri-urban areas, are known causes of the increase in the probability of concurrent infection of these two diseases.

Dhanya PR et al. Int J Res Med Sci. 2018 Jun;6(6):2111-2115

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There has been considerable health, social and economic consequences of dengue infection particularly in hot climate in developing countries, like Pakistan. There have been possible emergence and re-emergence of the mosquito-borne arbo viruses globally. Some studies have shown dengue infections in children more common 13.45% in India from a tertiary care hospital which is alarming as there has been substandard health care infrastructure in tropical low resource countries like Pakistan. In Pakistan dengue outbreaks have been observed as endemic disease in low resource communities

Epidemiological Surveillance of Dengue Infections: A Community Based Study in Rural, Karachi (2010 - 2012

Annals Abbasi Shaheed Hospital & Karachi Medical & Dental College

Dengue fever is caused by the dengue virus in one amongst the four serotypes DENV-1, DENV-2, DENV-3, and DENV4. According to the WHO, about 50 million patients are infected with Dengue Fever annually worldwide and a couple of 2.5 billion people live in risk areas. Dengue infection may be a nonspecific febrile illness, as in Dengue Fever, to a more severe bleeding tendency, thrombocytopenia, and plasma leakage dengue viral infection, DHF. Clinically, DF and other febrile illnesses share similar clinical presentation, including headache, myalgia, and rash. However, clinical presentation of DHF, bleeding and plasma leakage, are seen at a later stage, after the third or fourth day of fever

Haematological parameters in Malaria & Dengue fever

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Dengue fever is very common infection caused by mosquitoes and major global health concerns. The increasing number of cases is a cause for worry. Pakistan faces a dengue outbreak every year or every second year and despite the government's efforts the severity and death count are still on the rise. It is important to mention that if not, for these efforts the epidemic would have been more devastating.

Fatima et al. International Journal of Surgery: Global Health (2023) 6:e0385
doi.org/10.1097/GH9.0000000000000385

Dengue infection is caused by any of the four distinct serotypes of single-stranded RNA flavivirus, and is mainly transmitted by Aedes aegypti mosquitoes. Dengue is considered the most important arbovirus, almost half of the population at risk of infection in the world. Fever and other symptoms rarely last more than seven days, but convalescence can be prolonged and debilitating. Although people can obtain immunity to one of the dengue serotypes, they are still susceptible to the others. The disease is now endemic in more than 100 countries worldwide. The incidence of this disease has increased dramatically, especially the incidence of the more severe dengue hemorrhagic fever (DHF

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After 4–10 days bite from an infected mosquito symptoms generally appeared and last for 2–7 days. However Dengue hemorrhagic fever DHF and dengue shock syndrome DSS are more severe and possibly lethal forms with symptoms like plasma leaking, respiratory distress, severe abdominal pain, fluid accumulation, severe bleeding, or organ injury.

There are some important factors which are responsible for endemic threat of dengue which includes deforestation, increasing population growth, accidental urbanization, traveling by air, inadequate public health care facilities, insufficient people knowledge, poor disease surveillance, difficult to vector control and global warming.

About 104 species of mosquitoes had reported in Pakistan and Bangladesh, while both of dengue causing mosquito species Aedes aegypti and Aedes albopictus was present in Pakistan

International Journal of Mosquito Research 2017; 4(6): 25-32

Methodology:

The study carried out on 240 patients, which includes 120 malaria cases and 120 dengue fever cases. This study was conducted at Civil Hospital

Hyderabad, from January 2023 - December 2025. Verbal consent was obtained from every patient. A specialized questionnaire was created to analyze the cases of malaria and dengue fever. Dengue fever cases were identified by NS1 antigen test and malarial cases were identified by malarial parasite test. All the confirmed cases were analyzed for blood test. The clinical history was examined. The questionnaire included three sections, the first section included the demographics such as age and gender. The second section included the clinical symptoms of malaria and dengue fever cases. The third section included haematological findings by laboratory test. All the data of demographic, clinical and laboratory were received by patients on paper, moreover data was entered in excel sheets. Finally, the statistical analysis of the data were done by using SPSS-27.

Results:

Demographic variables in a study population:

Out of total cases, 120 patients diagnosed with malaria and 120 patients diagnosed with dengue fever. The majority of the malarial cases were caused by Plasmodium vivax 98 cases (81.7%) however Plasmodium falciparum were diagnosed within 22 cases (18.3%). This study shows that Plasmodium vivax is the leading malarial species in the population of Hyderabad. In demographic characteristics shows that males were more affected in both groups, 72 male cases were observed with Dengue fever while 75 male cases were observed with malaria. Table 1 shows that dengue fever patients (30.5) have higher mean age ratio than the malarial patients (15.97).

Table 1: Comparison of demographic variables in Dengue Fever and malaria

Demographic variables		Dengue	Malaria
Total Patient		120	120
Mean Age		30.5	15.97
Sex	Male	72	75
	Female	48	45

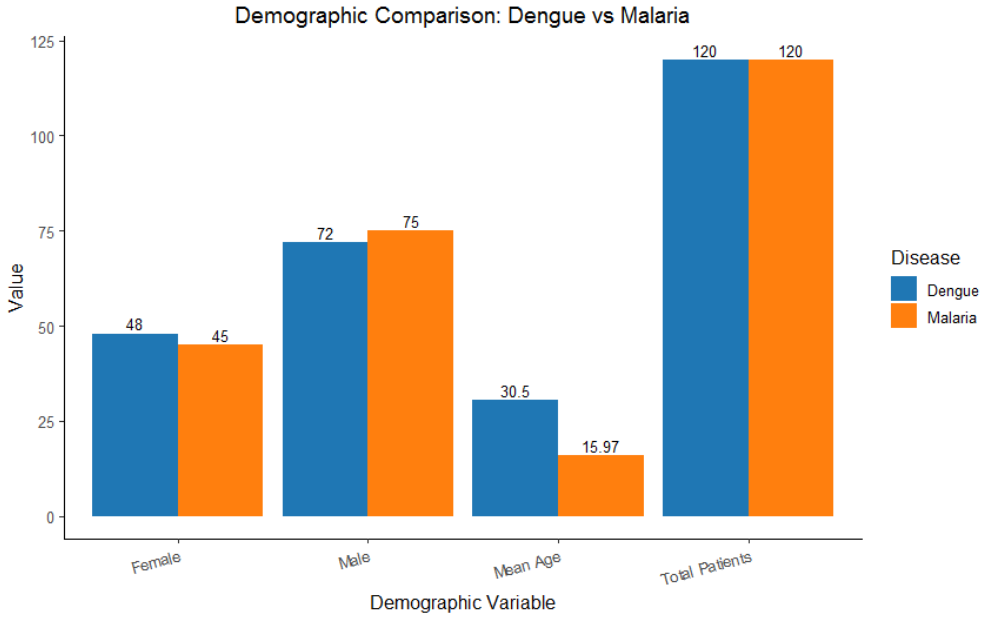
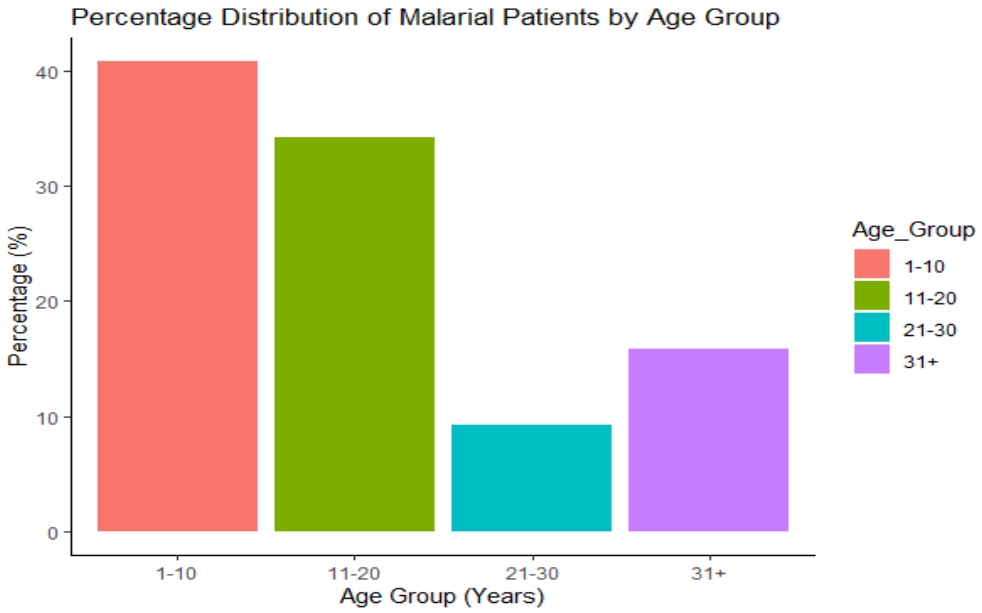


Figure 1: Comparison of demographic variables in dengue fever and malaria.



Graph 2: Distribution of age in malaria patients.

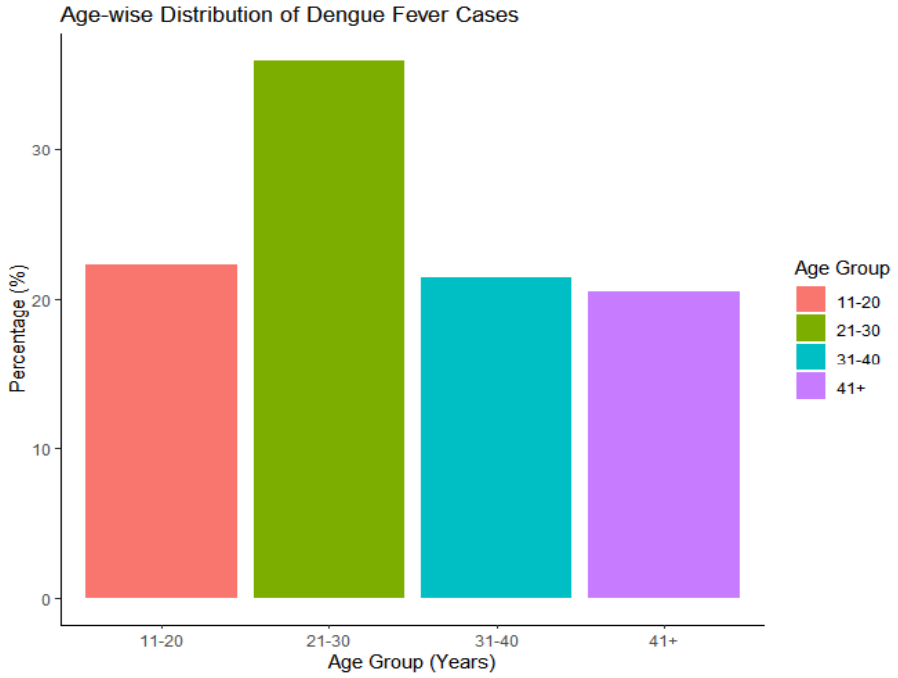


Figure 3: Distribution of age in Dengue fever cases.

Table showing Comparison of clinical symptoms in malaria and dengue fever cases

Variables	Dengue 120 N (%)	Malaria 120 N (%)
Symptom		
Fever	117 (97.5)	120 (100)
Chills	20 (16.67)	58 (48.33)
Headache	62 (51.67)	65 (54.17)
Nausea	20 (16.67)	33 (27.5)
Vomiting	60 (50)	23 (19.17)
Fatigue	57 (47.5)	44 (36.67)
Joint pain	24 (20)	11 (9.17)
Muscle pain	66 (55)	27 (22.5)

Table: Comparison of mean and standard deviation of dengue fever and malaria.

Variables	Dengue		Malaria	
Parameter	Mean	Standard Deviation	Mean	Standard Deviation
Haemoglobin	12.14	1.91	8.20	2.71
Platelets	124.82	70.08	118.34	88.83
RBCs	4.39	0.64	3.40	0.96
WBCs	4.29	1.83	7.64	4.33
Haematocrit	38.40	4.58	23.80	6.91

Table: Trend of Malarial Cases in Hyderabad, (Sindh) in 2025

Month	P. vivax N(%)	P. falciparum N(%)	Mix N(%)	Total Number of positive cases N (%)
Jan-25	475 (6.78%)	108 (1.54%)	10 (0.14%)	593 (8.46%)
Feb-25	574 (8.19%)	67 (0.96%)	4 (0.06%)	645 (9.20%)
Mar-25	498 (7.11%)	58 (0.83%)	0 (0.00%)	556 (7.93%)
Apr-25	383 (5.46%)	30 (0.43%)	1 (0.01%)	414 (5.91%)
May-25	456 (6.51%)	20 (0.29%)	1 (0.01%)	477 (6.81%)
Jun-25	473 (6.75%)	16 (0.23%)	2 (0.03%)	491 (7.01%)
Jul-25	855 (12.20%)	35 (0.50%)	2 (0.03%)	892 (12.73%)
Aug-25	1158 (16.52%)	69 (0.98%)	1 (0.01%)	1223 (17.45%)
Sep-25	777 (11.09%)	72 (1.03%)	1 (0.01%)	850 (12.13%)
Oct-25	247 (3.52%)	54 (0.77%)	0 (0.00%)	301 (4.29%)
Nov-25	244 (3.48%)	46 (0.66%)	0 (0.00%)	290 (4.14%)
Dec-25	233 (3.32%)	44 (0.63%)	0 (0.00%)	277 (3.95%)

Table Trend of dengue fever cases in Hyderabad July-December in 2025

Months	Dengue Test N (%)	Positive Cases N (%)
Jul-25	960 (17.37%)	135 (7.69%)
Aug-25	925 (16.74%)	72 (4.10%)
Sep-25	939 (16.99%)	22 (1.25%)
Oct-25	922 (16.68%)	831 (47.32%)
Nov-25	894 (16.18%)	481 (27.39%)
Dec-25	886 (16.03%)	215 (12.24%)