

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ





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Profiles of hematological parameters in Plasmodium falciparum and Plasmodium vivax malaria children and Healthy attending Health centers, Yazd Zone, Iran

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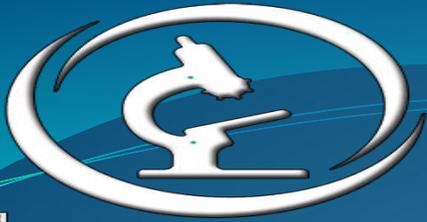
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Background

Malaria is an acute and chronic illness characterized by paroxysms of fever, chills, sweating, fatigue, anemia, and splenomegaly. Most malarial deaths occur in infants and young children. Plasmodium falciparum causes the most severe form of malaria and is associated with more intense Parasitemia. Anemia in malaria has diverse pathophysiologic mechanisms such as direct invasion of Red cells, anemia of chronic disease hypersplenism, Hemophagocytic syndrome and erythrophagocytosis, dyserythropoiesis, immune hemolysis and cytokine dysregulation anemia of chronic disorder is characterized by moderate to mild normocytic normochromic anemia along with microcytic hypochromic cells. In the following, we presented comparison of hematological aspects: children with falciparum & vivax malaria and healthy.

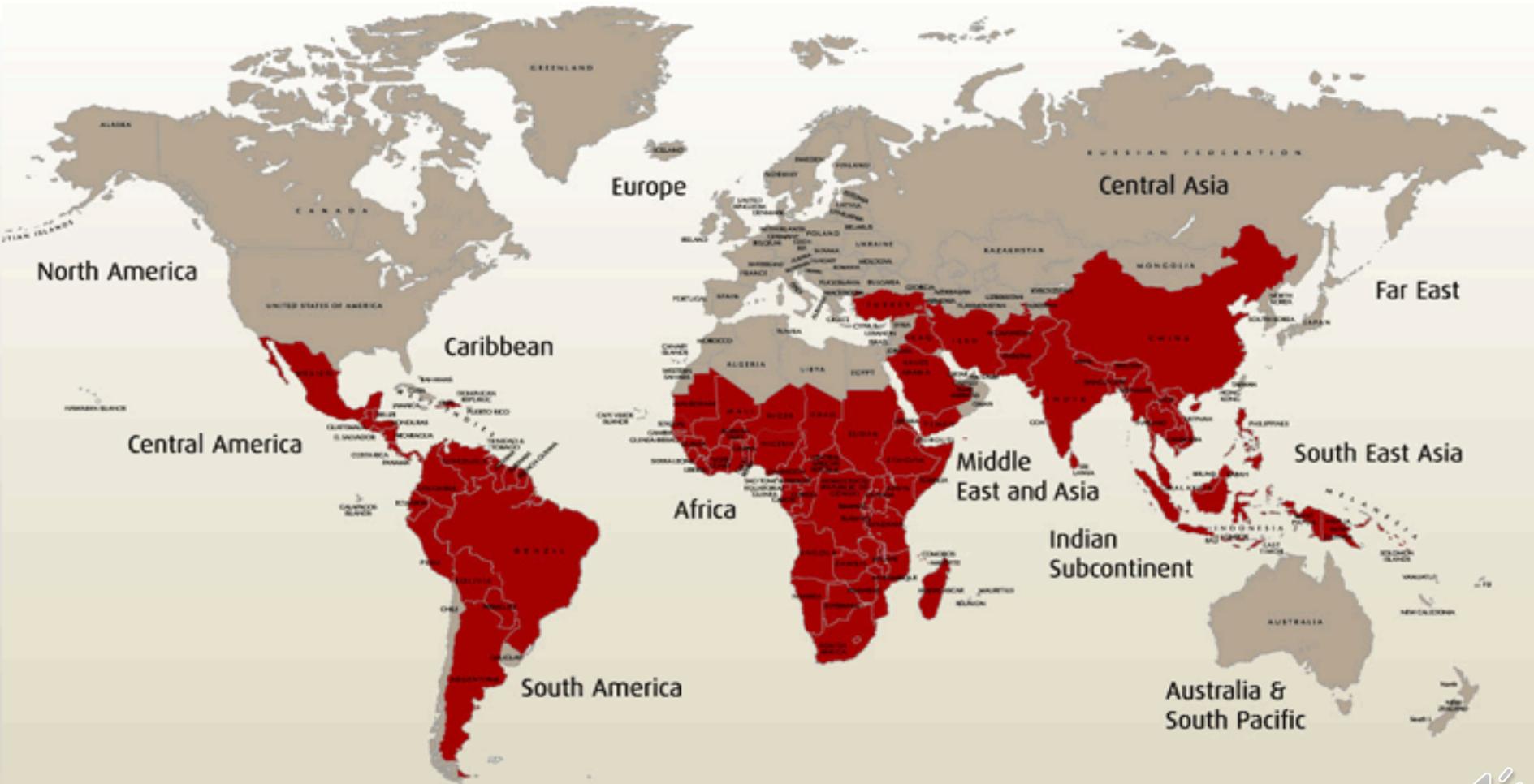


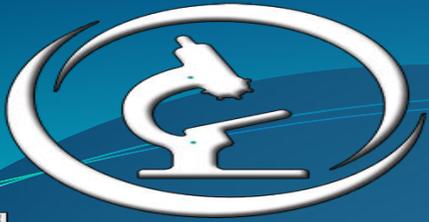


Global Problem



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Geographical Distribution in The World

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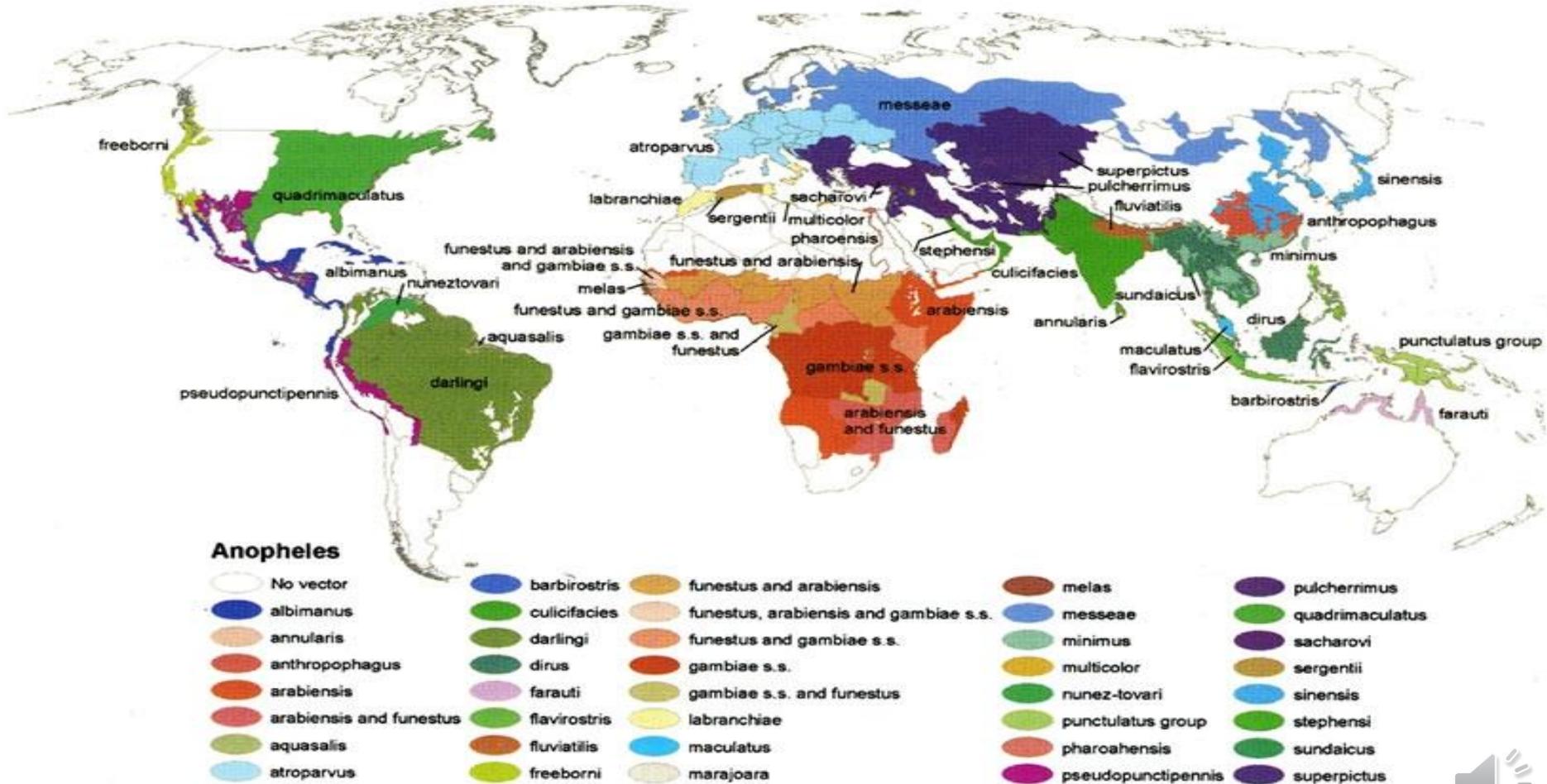


FIGURE 1. Global distribution (Robinson projection) of dominant or potentially important malaria vectors.





Geographical Distribution in Iran

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Low to no risk
antimalarials not usually advised

High risk
antimalarials usually advised

Surrounding countries with malaria risk

This map is only intended as a guide and is not exact. The map must always be used in conjunction with the malaria advice text. Bite avoidance measures should be taken in all areas.

Click on an icon below for additional country information

Regional Information

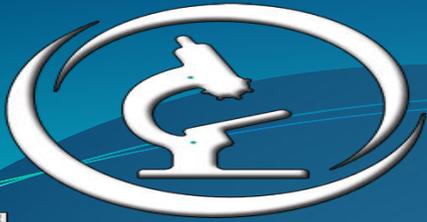


Major Airports

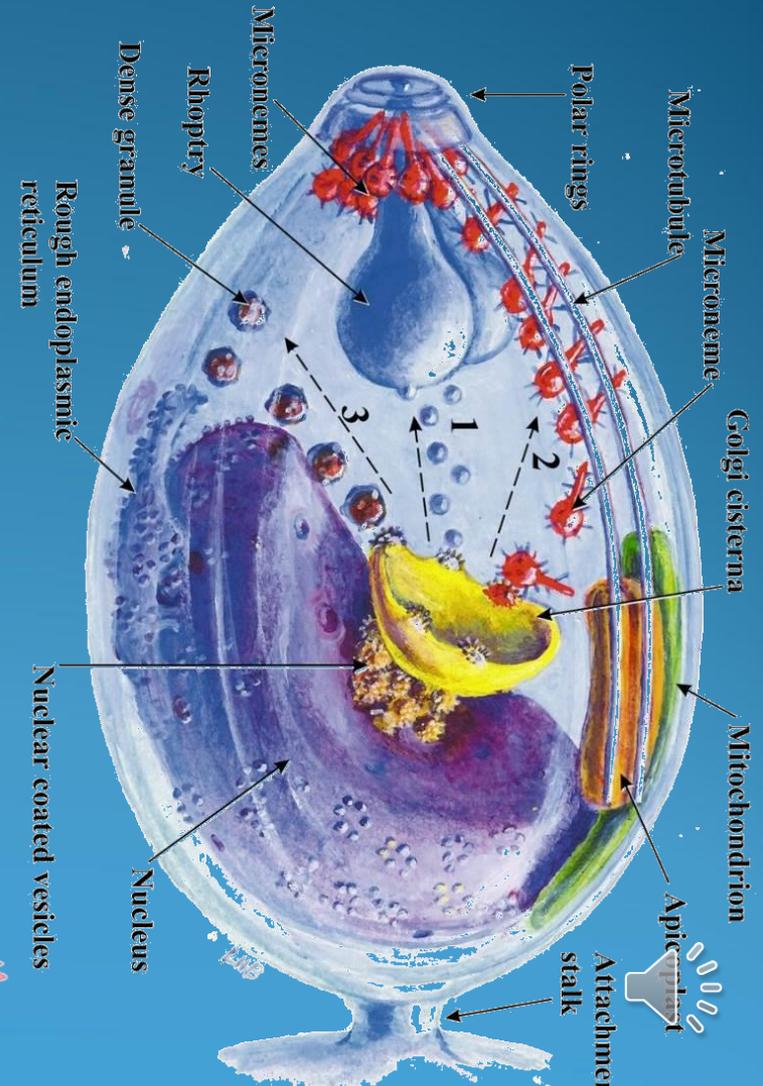
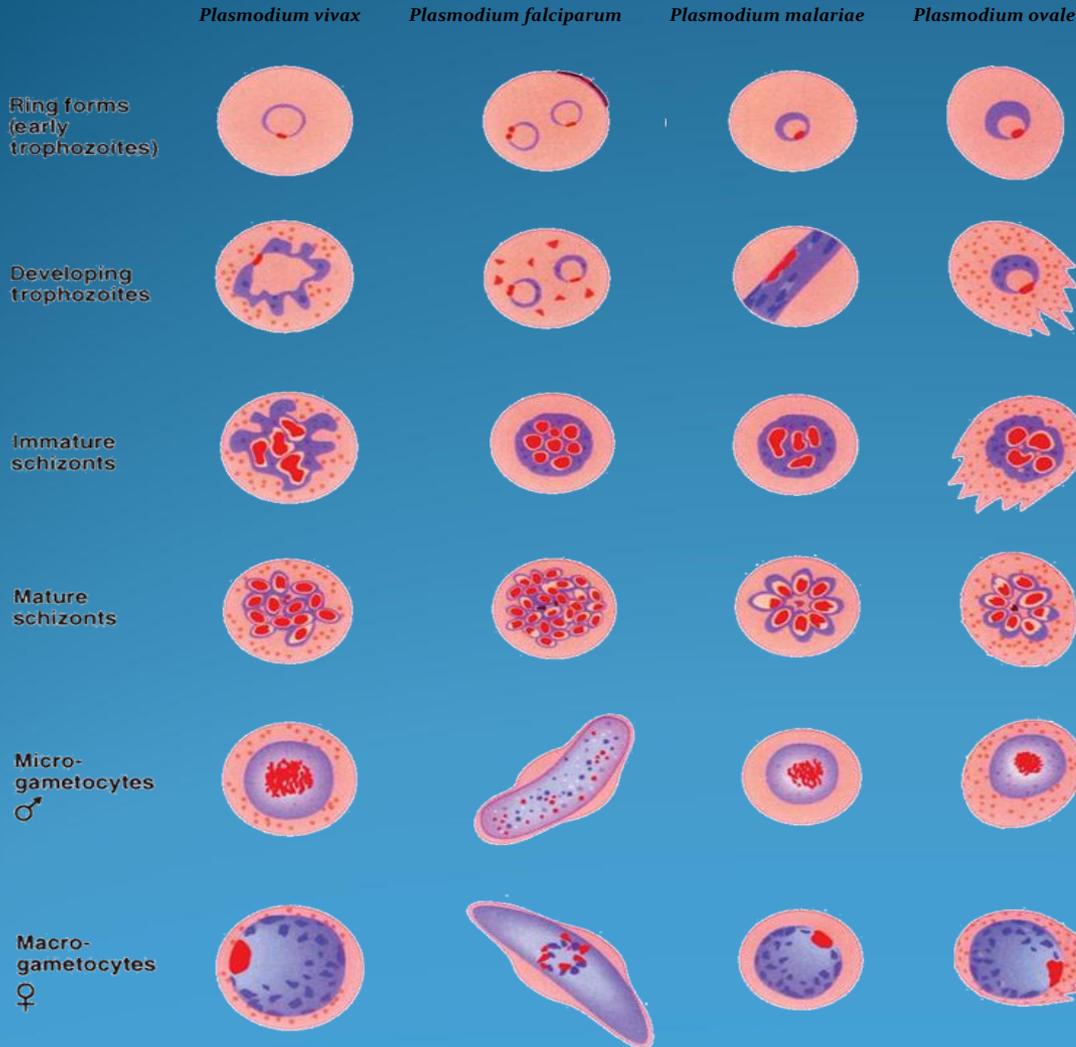


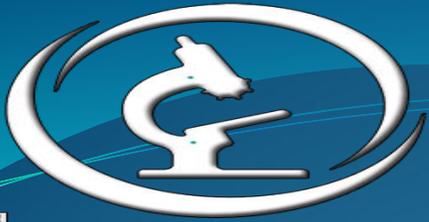
Major Railways



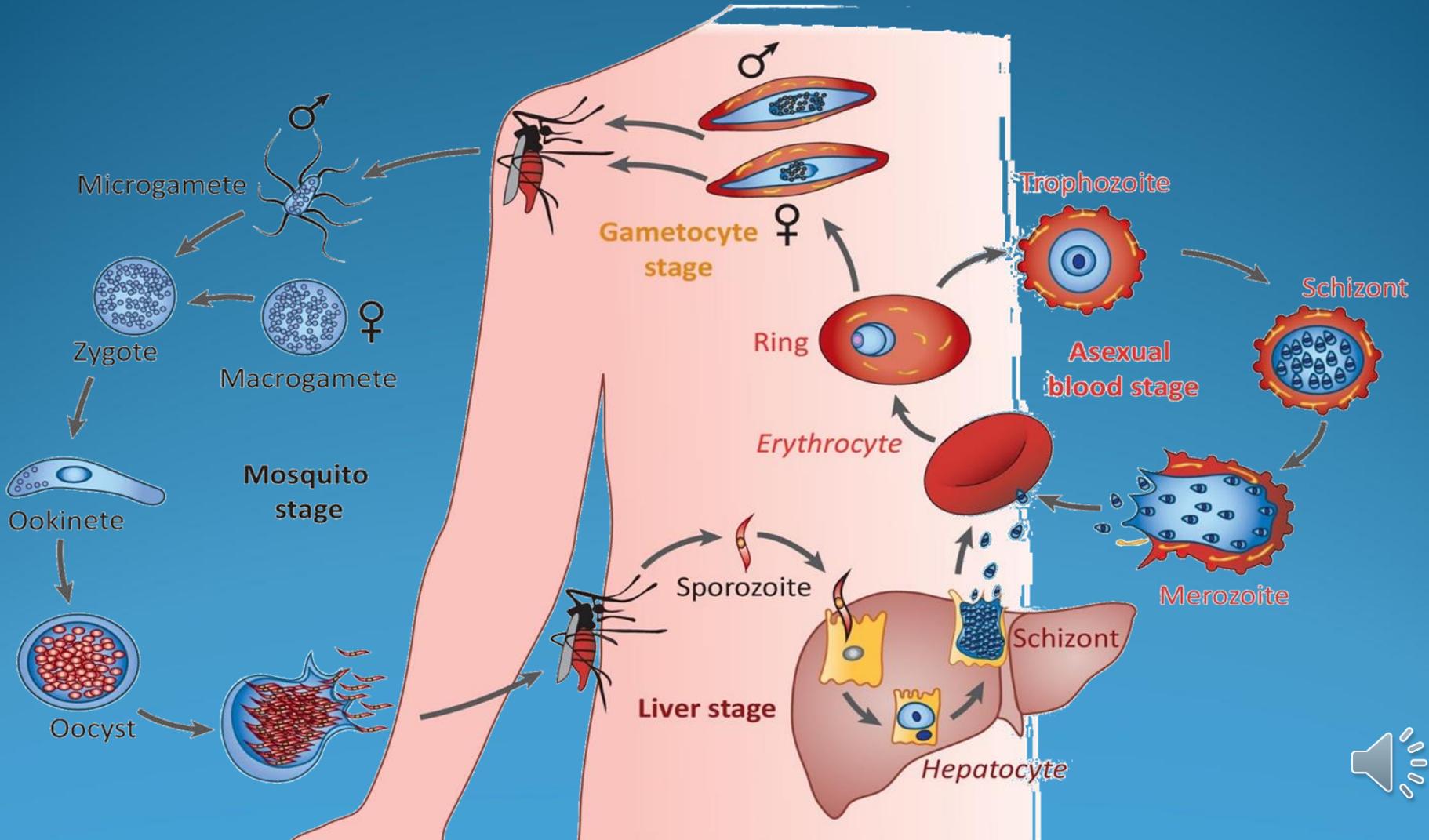


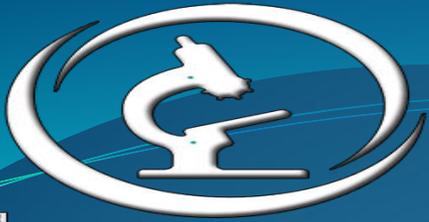
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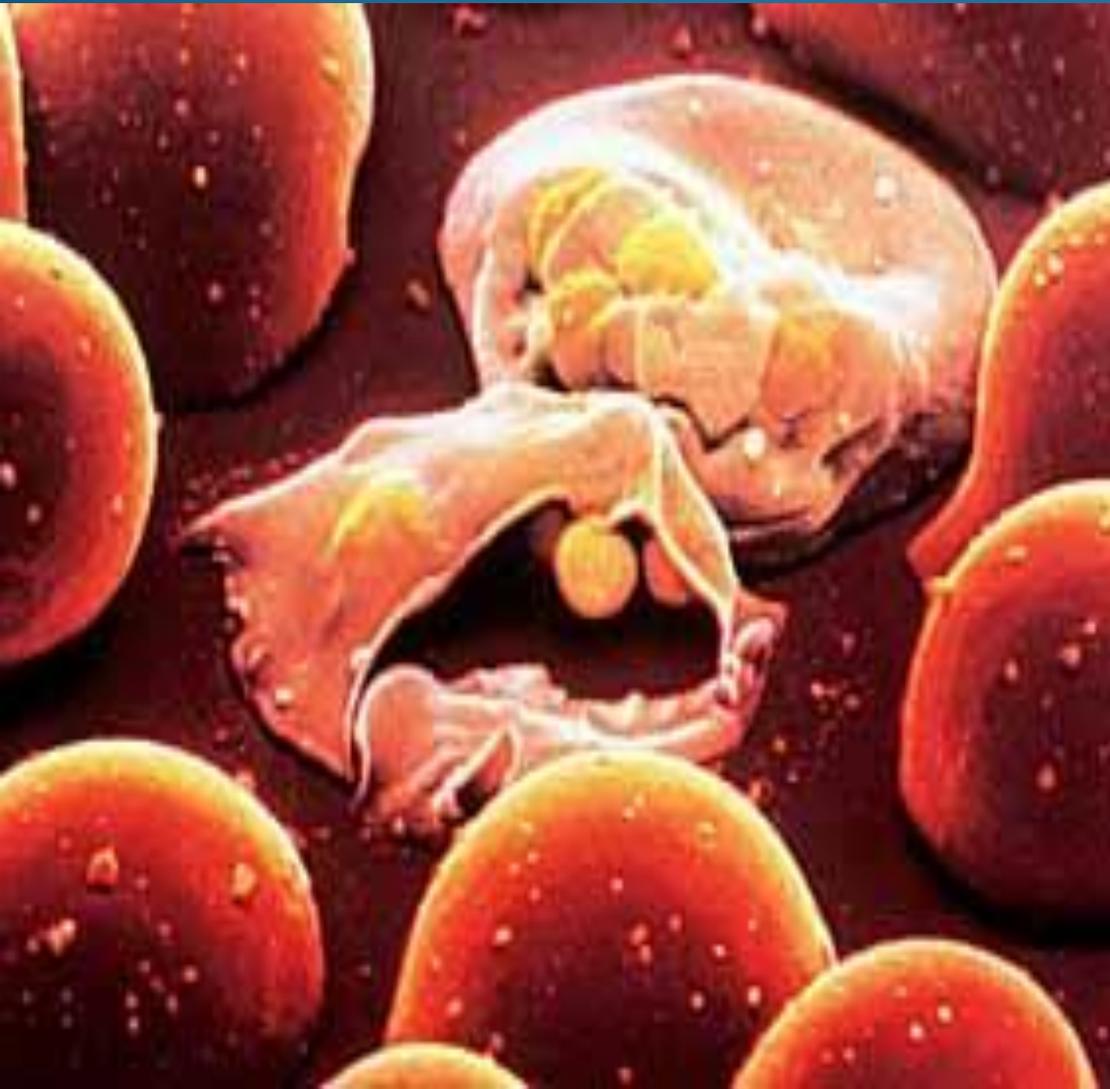
Life cycle

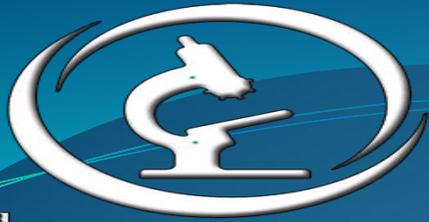




Pathogenicity

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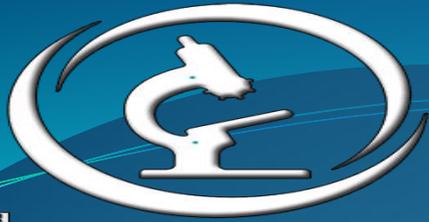
Clinical symptoms

The cold stage



The cold stage





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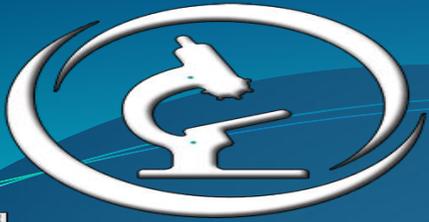
Clinical symptoms

The hot stage



The hot stage





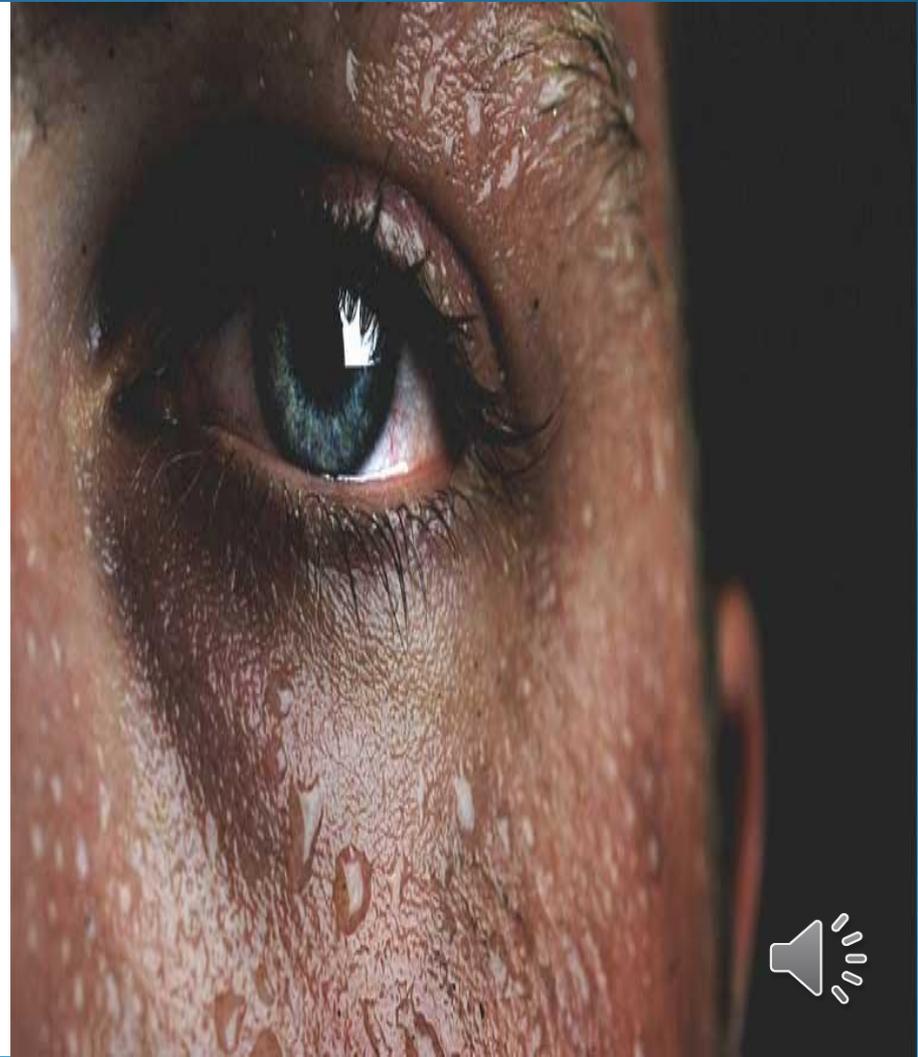
Clinical symptoms

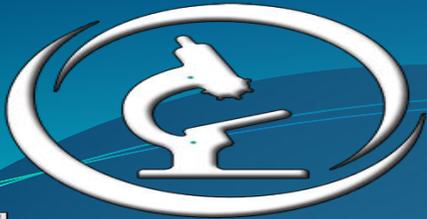
The sweating stage

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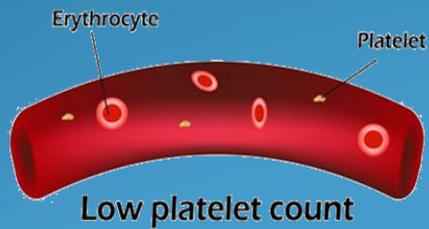
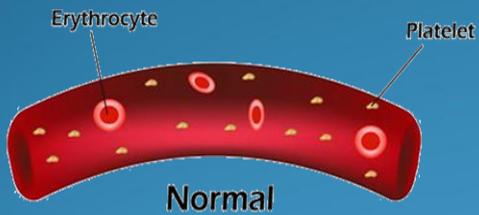
The sweating stage



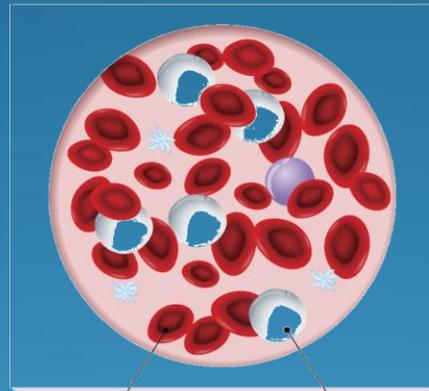


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Thrombocytopenia

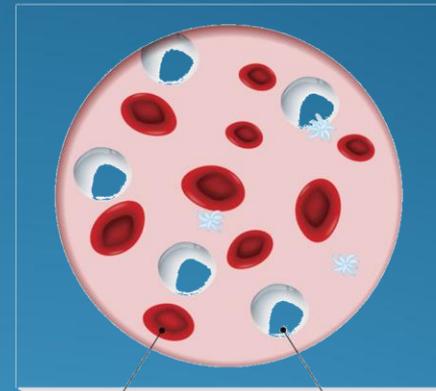


Normal

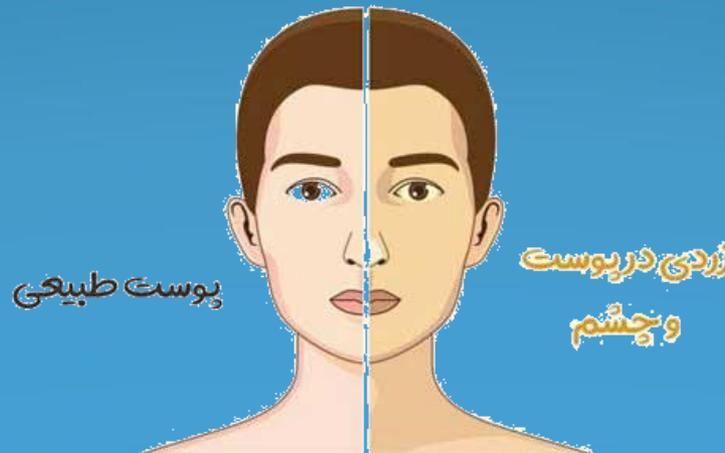


Red blood cell White blood cell

Anemia

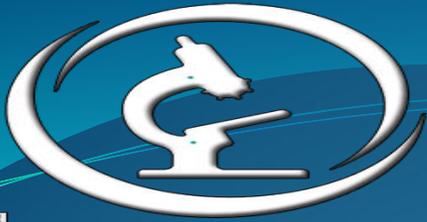


Red blood cell White blood cell



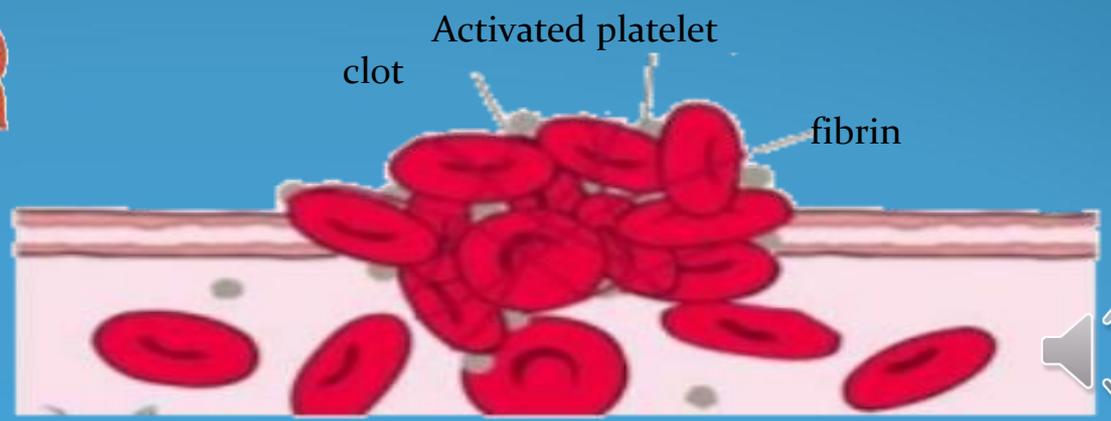
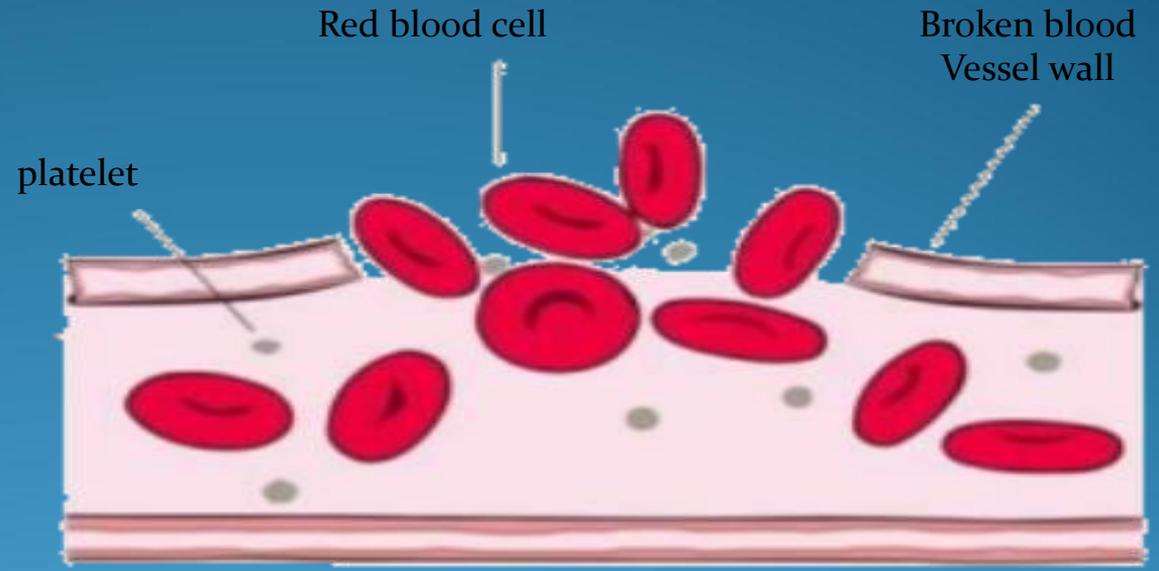
High
Liver
Enzymes

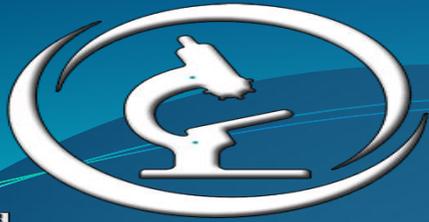




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DISSEMINATED INTRAVASCULAR COAGULATION





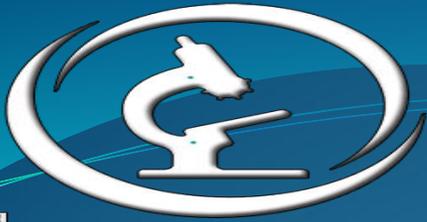
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Materials & Methods

Patients' children were referred and admitted to the pathobiology laboratory along with physical examination. Then they underwent a complete blood count and the results of a complete blood count for a healthy person the same age as compared. A total 30 samples, the study was carried out among 10 patients with falciparum, 10 patients with vivax and 10 healthy individuals. The hematological examination was performed. Finally, the data was analyzed using SPSS version 19 statistical software. Chi-square test was used for data analysis of qualitative variables, and values were compared using independent T- test and Mann- Whitney- exact Test. Differences were considered significant at P-values of less than 0.05.





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Results



The levels of
HGB (P=0.001),
HCT (P=0.001),
MCV (P= 0.001),
MCH (P=0.001),
WBC (P=0.001)
and Plt (P= 0.02)
decreased significantly in children with
falciparum and vivax malaria compared to
healthy controls.

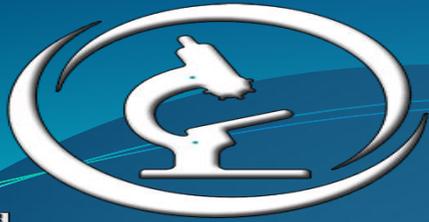




Table I: Comparison of hematological aspects: children with falciparum, vivax malaria and healthy.

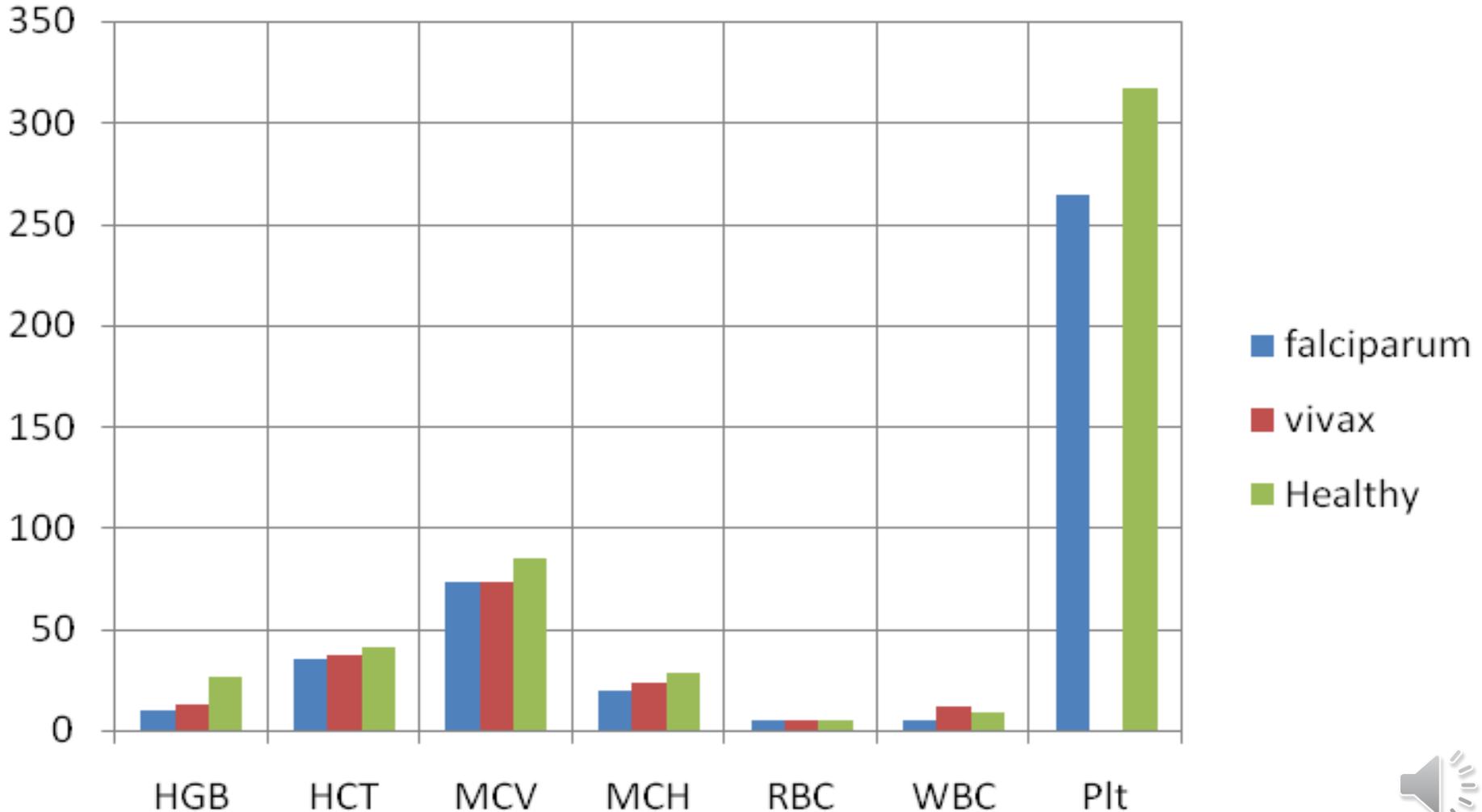
Group	HGB g/dl	HCT %	MCV fl	MCH pg	RBC μ l	WBC μ l	Plt μ l
falciparum Patients	10.21±0.62 MD=10.25	34.92±1.4 MD=35.55	72.73±4.75 MD=71.55	19.9±0.54 MD=19.93	4.84±0.12 MD=4.85	5.09±0.35 MD=5.25	263.8±59.64 MD=280.5
vivax patients	12.2±0.75 MD=12.25	37.5±1.62 MD=37.75	73.48±0.84 MD=73.35	23.61±0.76 MD=23.25	4.8±0.52 MD=4.79	11.5±0.41 MD=11.55	408.2±328.73 MD=328
Healthy	26.44±40.3 MD=13.65	41.31±3.75 MD=40.75	84.66±3.32 MD=85.5	27.88±0.91 MD=27.9	5.02±0.53 MD=4.92	8.81±3.36 MD=8.35	317.1±92.15 MD=302
Test	Kruskal-Wallis Test	ANOVA	ANOVA	ANOVA	ANOVA	ANOVA	Kruskal-Wallis Test
P-value	<0.001	<0.001	<0.001	<0.001	0.49	<0.001	0.002

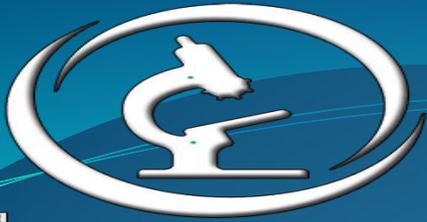




Comparison of hematological aspects: children with falciparum, vivax malaria and healthy.

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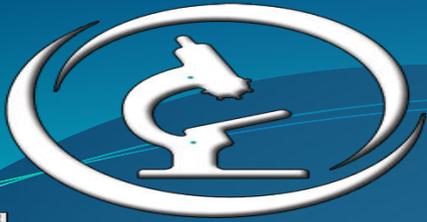




...Results

- The levels of RBC ($P=0.49$) increased significantly in children with falciparum and vivax malaria compared to controls.
- A Blood and urine culture at two times was negative.
- To investigate malaria; blood smears were taken after microscopic study of Plasmodium falciparum ring was observed.

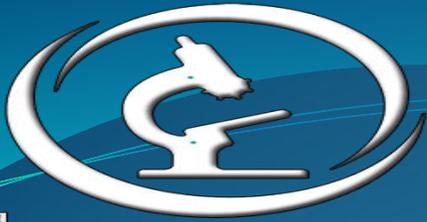




Discussion

Hematological abnormalities are thought-outed a hallmark of malaria, and reported to be most in *P. falciparum* infection, probably as a result of the higher levels of parasitemia found in these patients. Malaria is a multisystem disorder which can mimic many diseases. Physicians, especially those in endemic areas, should be aware of the varied manifestations and maintain a high index of suspicion for the disease so that the diagnosis and treatment are timely and morbidity and mortality minimized. In approach to patients with various clinical presentations such as anemia, direct invasion of red cells, anemia of chronic disease hypersplenism, Hemophagocytic syndrome and erythrophagocytosis, dyserythropoiesis, immune hemolysis and cytokine dysregulation Anemia of chronic disorder is characterized by moderate to mild normocytic normochromic anemia along with microcytic hypochromic cells, evaluation of Malaria infection especially in malaria- borne areas is highly recommended for consideration and further therapy[1 and 2]. Malaria is a common cause of fever in tropical countries and First Symptoms nonspecific and include headache, fatigue, myalgia, abdominal pain, and fever are and sometimes cause arthralgia, diarrhea and chest pain. Nausea vomiting and orthostatic hypotension are also common [3].

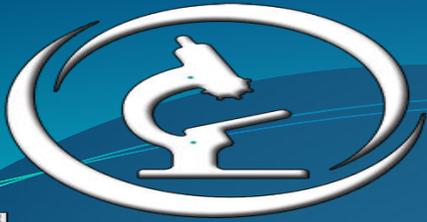




...Discussion

Falciparum malaria can affect other organs. The hematological involvement as medicinal and mild leukocytosis, thrombocytopenia, and sometimes it is. Anemia due to red blood cells and removal rate Erythropoiesis by spleen cells and ineffective, but the causes of pancytopenia and Hemophagocytosis not occur. There is a direct correlation between parasitemia and thrombocytopenia. Diagnosis is based on the existence of malaria parasites in peripheral blood smear is done asexual forms (thin & thick smear Platelet count, CRP and ESR thick). In laboratory studies, anemia was common Normochromic normocytic be disrupted. PTT and PT 100000 reduced. In severe infections / ml, Treatment of non-falciparum malaria, Choroquine is the drug of choice for severe malaria but not to Choroquine trusted, but must quinine or Kynydyn or Fansidar (sulfadoxine + Prymtamyn) can be used[4,5 and 6].

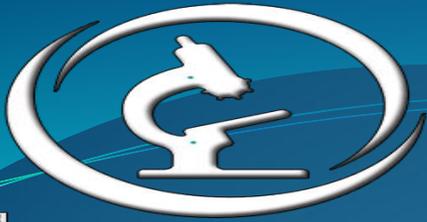




Conclusion

Malaria is a multisystem disorder which can mimic many diseases. Physicians, especially those in endemic areas, should be aware of the varied manifestations and maintain a high index of suspicion for the disease so that the diagnosis and treatment are timely and morbidity and mortality minimized





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