TO FIND OUT THE FREQUENCY OF MALARIA (FALCIPARUM AND VIVAX MALARIA) IN FEBRILE CHILDREN REPORTING TO PEDIATRIC UNIT AT A TERTIARY CARE HOSPITAL & TO EVALUATE THE SEVERITY IN CHILDREN SUFFERING FROM MALARIA (FALCIPARUM AND VIVAX)

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Abstract

Objectives:
1. The frequency of malaria (falciparum and vivax malaria) in febrile children reporting to pediatric unit at tertiary care hospital.
2. To evaluate the severity in children suffering from malaria

Subject & Methods: Study was conducted in Pediatric Medicine Department of Liaquat University Hospital Hyderabad, total duration was 6 months from May to November 2011. Study was descriptive case series. 205 febrile patients were selected for the study after taken consent. Data were collected on a structured proforma. Detailed history, examination and investigations were done.

Results: Within 205 patients a total of 112 (54.63%) were males and 93 (45.37%) were females. Malarial parasites were present in 19 (9.3%) out of 205 patients. Plasmodium falciparum was seen in 12 (63.1%) of cases, whereas P. vivax was noted to be present in 7 (36.8%) patients. Severe malaria was present in 8 (42.1%) patients. Fits were seen in 6 (31.57%), jaundice in 2 (10.5%), respiratory distress were in 3 (15.7%), 5 patients (26.3%) were brought in an unconscious state to the hospital, hemoglobin <5 g/dl was seen in 19 (100%) patients and hypoglycemia (RBS <40 mg/dl) was seen in 3 (15.7%) patients out of 19 respectively. Chi square (or Fischer’s exact Test) were applied to see the relationship of severe malaria (the main outcome variable) with other variables of study such as age, gender, fits, jaundice, respiratory distress, unconsciousness, low hemoglobin and hypoglycemia respectively. P value of <0.005 was considered to be statistically significant. The presence of severe malaria correlated with the severe Anemia (p 0.000), fits and unconsciousness were significant findings.

Conclusion: In this study it was noted that malaria presents with various varied clinical presentations, but severe anemia, fits and unconsciousness have statistically significant associations with severe malaria.

Introduction

Malaria is an acute and chronic illness characterized by paroxysms of fever, chills, sweats, fatigue, anemia, and splenomegaly1. It has played a major role in human history, having arguably caused harm to more people than any
other infectious disease. Malaria is of overwhelming importance in the developing world today, with an estimated 300-500 million cases of clinical disease and more than 1 million deaths each year. Most malarial deaths occur in infants and young children. Malaria is present in more than 107 countries, with a combined population of over 1.6 billion. The principal areas of transmission are Africa, Asia, and South America. P. vivax is the more common as compare to P. falciparum on worldwide basis. P. ovale and P. malariae are the less common species, especially in Asia. Pakistan has been classified as a country with moderate malaria prevalence by WHO. Annual Parasite Incidence (API) reported 0.8/1000 population, P. vivax & P. falciparum both dominant according to areas. Sindh and Baluchistan are most affected provinces, P. falciparum is dominant there. Malaria remain major public health problem in Pakistan. The geographical location coupled with extensive irrigation has considerably added to the malarigenic potential of the area. Today in spite of gigantic development in research, we are still unable to eradicate malaria, or to reduce it to a level compatible with socio-economic development, death toll from killers such as pneumonia, diarrheal disease and measles has fallen, but deaths from malaria have increased. Government should take adequate steps to combat this disease.

Material & Methods
This study was conducted at Pediatric Department of Liaquat University Hospital Hyderabad this was a descriptive case series study of six months duration (from May to November 2011). The frequency of malaria in febrile children is 18.9%. and severity is 37%3 with 95% confidence interval and 5% margin of error, a total of 205 patients with fever were selected. Sample technique was non probability purposive sampling

Inclusion Criteria: All patients aged between >6 to 12 years with presence of fever (temperature >101°F) at the time of presentation or history of fever (>101°F) for three days duration.

Exclusion Criteria: Prior history of tuberculosis, enteric fever, diabetes mellitus, connective tissue diseases and neoplasms and other chronic illnesses.

Data Collection
All the patients were fulfilling the inclusion criteria included, informed consent was taken. Laboratory evaluation included preparation of thick and thin blood films at bedside. Using a standard 23g needle skin was punctured at fingertip of ring finger and a drop of blood was used to prepare thick and thin blood film. These slides were stained examined and checked by a technician who had experience of making such slides. The diagnostic criteria of cases were the presence of fever (>101°F) plus positive malarial parasite (falciparum and vivax) identification in the thick and thin blood films were labeled as malaria positive.

Data Analysis
Statistical package for social sciences (SPSS™) version 20 was used for data processing purpose. Mean and SD were computed for age. Frequencies and percentages presented for malarial parasite positive (falciparum and vivax), gender, temperature, level of unconsciousness (GCS), convulsions, anemia, hypoglycemia, respiratory distress, jaundice. Chi square test was applied to find any significant relationship between variables like type of parasite and severity. Confounding factors like age (6 months – 12 years) controlled by breaking the variables in various age categories.

Results
Total number of 205 patients were selected for this study. Out of these 112 (54.63%) were males and 93 (45.37%) were females, as shown in [Chart No: 1]. The mean age was 4.1 years ±2.4 (SD). These patients were sub-divided into three age categories. These categories included ages of six months to one year (group 1), one year to five years (group 2) and five to 12 years (group 3) respectively. Group 1 had a total of 32 (15.6%) patients, Group 2 had 81 (39.5%) patients and Group 3 had 92 (44.9%) patients respectively. The largest number of patients was present in group 3, followed by group 2 and one. The mean age of patients was 4.3 (±2.9 SD) years. Malarial parasites were present in 19 (9.3%) out of 205 patients. Plasmodium falciparum were seen in 12 (63.1%) of cases, whereas P. vivax were noted to be present in 7 (36.8%) patients. From age group 1 (six months to one year) 2 case of P. vivax were seen, whereas from age Group 2 (one year to five years) 7 cases of P. falciparum cases and 2 case of P. vivax...
was seen. In the third age Group (age five years to 12 years) 5 cases of P. falciparum and 3 cases of P.vivax was present. P.falciparum malaria was seen in three males and three females, whereas P.vivax malaria was only seen in two male patients suffering from severe malaria. Severe malaria was present in 8 (42.1%) patients. Fits were seen in 6 (31.57%), jaundice in 2 (10.5%), increased respiratory rate/respiratory distress (>50 breaths/min) were present in 3 (15.7%), 5 (26.3%) were brought in an unconscious state to the hospital, a hemoglobin of <5 g/dl was seen in 19 (100%) patients and hypoglycemia (RBS <40 mg/dl) was seen in 3 (15.7%) patients respectively. Chi square (or Fischer’s exact Test) were applied to see the relationship of severe malaria (the main outcome variable) with other variables of study such as age, gender, fits, jaundice, respiratory distress, unconsciousness, low hemoglobin and hypoglycemia respectively. P value of <0.005 was considered to be statistically significant. The presence of severe malaria correlated with the presence of low hemoglobin (p 0.000), fits and unconsciousness.

Chart No: 1

**Gender Distribution vs. Blood Malarial Parasite**

![Gender Distribution Chart](chart.png)
Chart no. 2

Blood malarial parasite

Table no. 1

<table>
<thead>
<tr>
<th>S.No</th>
<th>Variable</th>
<th>p Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td>0.947</td>
<td>NS</td>
</tr>
<tr>
<td>2</td>
<td>Gender</td>
<td>0.467</td>
<td>NS</td>
</tr>
<tr>
<td>3</td>
<td>Blood malarial parasite</td>
<td>0.0001</td>
<td>*Significant</td>
</tr>
<tr>
<td>4</td>
<td>Fits</td>
<td>0.001</td>
<td>*Significant</td>
</tr>
<tr>
<td>5</td>
<td>Jaundice</td>
<td>0.012</td>
<td>NS</td>
</tr>
<tr>
<td>6</td>
<td>Respiratory distress</td>
<td>0.015</td>
<td>NS</td>
</tr>
<tr>
<td>7</td>
<td>Unconsciousness</td>
<td>0.0005</td>
<td>*Significant</td>
</tr>
<tr>
<td>8</td>
<td>Low Hemoglobin (&lt;5 g/dl)</td>
<td>0.000</td>
<td>*Significant</td>
</tr>
<tr>
<td>9</td>
<td>Hypoglycemia (RBS &lt;40 mg/dl)</td>
<td>0.015</td>
<td>NS</td>
</tr>
</tbody>
</table>

Note: NS; not significant
Discussion
Malaria is one of the main public health problems in the Pakistan, and an important cause of morbidity and mortality, especially in children younger than 5 years old. The probable identified causes of persistent prevalence of malaria in Pakistan seems to be poor economy, tropical agricultural state, most of the population living in the rural areas, inadequate waste material disposals, poor knowledge about sanitations, inappropriate and inadequate steps taken by government for prevention are looking most probable contributors to the malarialogenic potential for Pakistan. In this study Malarial parasite were present in 19 (9.3%) out of 205 patients. Plasmodium falciparum were seen in 12 (63.1%) of 19 malaria positive cases, whereas P. vivax was noted to be present in 7 (36.8%) of total 19 positive Malaria cases. P. falciparum was present in nine males and three females whereas P vivax was seen in four males and three females. These results resembles to study conducted at Baqi Medical University Karachi by Akbar JU et al. who observed high incidence of falciparum as compared to vivax (65% vs. 35%). WHO and local surveillance also reported high P.falciparum ratio in sindh.

In this study 112 (54.63%) patients were males and 93 (45.37%) were females and male female ratio was 1.2:1 which resembles studies conducted by Jalal-ud-din et al. and Idris M et al. In this study most of the children were below 5 years of age (55.12%). Study done on malaria in pediatric age group by Jamal MM et al. reported 62.5% patients below 5 years, and according to WHO malaria is the leading cause of mortality among children <5 years of age. In this study most of the cases presented during September to November. Nizamani MA et al. documented that malaria risk is high in Sindh during September to January months. Regarding clinical presentations, all patients (205) had fever or history of fever. Many authors Akbar JU, Murtaza G, Jamal MM et al. Rahim F et al. they all reported fever as 100% in malaria.

CNS presentations noted in this study; 5 patients were present in unconsciousness (26.3%) and 8 (42.1%) were severe cases of total 19 malaria positive cases Mockenhaupt FP et al. reported unconsciousness in 19.3%.

In this study convulsions were noted in 6 (31.57%) patients these CNS presentations of malaria are many times confusing with the diagnosis of; meningitis, encephalitis, hepatic encephalopathy and misleading the physician, it has been observed that many physicians are used to start antibiotics and antimalarial simultaneously if patient presented with this confusing picture of CNS involvement, till investigations prove the case as cerebral malaria. Hypoglycemia reported in 3 (15.7%) patients while Maitland K et al. reported hypoglycemia in 27.6% of malaria patients. Severe anemia was reported in 19 patients (100%) in this study, Satpathy SK et al. reported severe anemia in 26.3%, while Mockenhaupt FP et al. reported it in 55.2% of malaria patients. Anemia was observed as strong suggestive indicator for malaria infection and suggest that those febrile patients presented from endemic areas and are anemic should be suspected and evaluated for malaria. In this study severe anemia, fits and unconsciousness were associated with the presence of severe malaria (p <0.005).

Severe malaria were noted in 8 patients (42.1%) of total 19 positive cases in this study, this resembles with study done by Manan JA et al. study who reported it in 20.37% of cases. Respiratory distress was observed in 3 (15.7%) Mockenhaupt FP et al. also reported same percentage. As in this study most of the children were presented with fever, associated with rigor or chills, anemia and/or splenomegaly, therefore all these sign and symptoms can be taken as suggestive indicators for suspicion of malaria infection.

On the behalf of these indicators, we can make a high index of suspicion for malaria infection to start its workup, especially in children those are visiting basic health units, outpatients and emergency departments etc, it would be helpful in early diagnosis and treatment of malaria, that in turn, would reduce the morbidity and mortality associated with malaria and to its complications.

Conclusions
In this study it was noted that malaria presents with various varied clinical presentations, but only severe anemia had a statistically significant association with severe malaria. To overcome malaria challenge, there is a need to make strong and collective efforts by all involved departments, personnel related to health and community members, because this is avoidable disease by simple preventive measures, and awareness about malaria sign,
symptoms and its various presentations to health related personnel will prove helpful in early diagnosis and treatment. By all these means we can reduce mortality and morbidity related to malaria.

References