



## CLINICAL PROFILE OF MALARIA CASES IN CHILDREN AT A TERTIARY HEALTH CENTER

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### ABSTRACT

**Introduction:** Malaria is the world's most important parasitic infection, with the major health challenges for the poor countries. Children under five years of age are most vulnerable group affected. There were an estimated 660000 malaria deaths around the world in 2010, of which 86 p.c were in children <5 years of age. Present study was undertaken to study clinical profile of malaria in children at Alluri Sitarama Raju Academy of Medical Sciences, Eluru. **Methodology:** A prospective observational study was conducted in the Department of Pediatrics of Alluri Sitarama Raju Academy of Medical sciences, Eluru, over a period of 2 years from August 2011 to July 2013. **Results:** Out of 350 fever cases, 30 p.c had malaria and remaining were non malaria cases. Most common presenting clinical feature in the present study was fever accounting for 105 (100 p.c) cases, followed by splenomegaly 91.4 p.c, hepatomegaly 76.2 p.c, pallor 73.3 p.c, headache 35.5 p.c, vomiting 31.4 p.c, icterus 21 p.c, dark urine 11.4 p.c and melena in 3.8 p.c cases. **Conclusion:** Malaria is the most common serious parasitic disease affecting human beings. Major breeding season for vector is rainy season, which coincides with peak incidence of malaria transmission. Vector control measures should be strengthened during this period to decrease malarial incidence.

**KEYWORDS :** Encephalopathy, Malaria, Meningitis, Plasmodium and Rapid antigen test

### INTRODUCTION:

Malaria is the most important parasitic disease of the human in the terms of mortality and morbidity.

Malaria is of overwhelming importance in the developing countries today, with an estimated 300 to 500 million cases and more than 1 million deaths each year<sup>1</sup>. Presently, about two million cases and a thousand deaths due to malaria are reported annually in India<sup>2</sup>. 6 p.c of the total malaria cases occur in South East Asia, mostly India and Myanmar and 65 p.c of total deaths due to malaria in South East Asia are from these two countries only<sup>3</sup>. Children under five years of age are most vulnerable group affected. There were an estimated 660000 malaria deaths around the world in 2010, of which 86 p.c were in children <5 years of age<sup>4</sup>.

Malaria is the world's most important parasitic infection, ranking among the major health challenges for the poor countries. Five parasitic species of the genus Plasmodium infect human beings, but only Plasmodium vivax and Plasmodium falciparum cause majority of the infections in India. Nearly all deaths and major proportion of morbidity is caused by Plasmodium falciparum. During the "eradication era"; half a century ago, malaria is eliminated or suppressed, particularly in sub-tropical regions. Malaria is now on the rise due to drug resistance of the parasite and insecticide resistance of the vector.<sup>5,6</sup>

Present study was undertaken to study clinical profile of malaria in children at Alluri Sitarama Raju Academy of Medical Sciences, Eluru.

### METHODOLOGY:

A prospective observational study was conducted in the Department of Pediatrics of Alluri Sitarama Raju Academy of Medical sciences, Eluru, over a period of 2 years from August 2011 to July 2013. The study group comprised of 350 patients presenting with pyrexia attending Pediatric department ASRAM. Malaria was diagnosed by the clinical presentation of high grade fever with features like anaemia, jaundice, oliguria, bleeding manifestations, convulsions, coma etc. and confirmed by either of positive QBC or rapid malarial antigen test (HRP-II/pLDH) or smear for MP.

Children of age group less than 14 years or with presence of clinical features suggestive of malaria or with fever positive for either QBC or Rapid malarial antigen test or peripheral blood smear for MP were included in the study. Children in age group > 14 years or with all three tests QBC, Rapid malarial antigen test, and peripheral blood smear for MP were negative or with other causes of fever, anaemia, jaundice and encephalopathy like meningitis, encephalitis were excluded from the study.

Out of 350 patients, 105 patients showed at least one of the 3 tests positive. These 105 cases diagnosed as malaria were studied clinically by detailed history along with physical examination according to the structured.

Statistical analysis: Data was collected and compiled in MS. Excel 2013 and analyzed in SPSS Vr. 11 (Trial). Results shown in proportions, percentages and Graphs.

### RESULTS:

Out of 350 fever cases, 30 p.c had malaria and remaining were non malaria cases. Out of 105 malaria cases, most common presenting age group was 6 years – 10 years accounting for 55.3 p.c cases followed by 24.7 p.c cases in 10-14 years, 16.2 p.c cases in 1 – 5 years and 3.8 p.c cases in < 1 year age group. Males accounted for 55.2 p.c and females were 44.8 p.c.

Topographical distribution of present study group showed that tribal areas contributed 45.7 p.c, rural area 37.1 p.c and urban areas 16.2 p.c of malaria cases. Peak incidence of cases was found in the months between July – October, maximum in august corresponding to rainy season, which is a favorable breeding season for vector (fig. 1). Regarding complications due to malaria severe malaria constitutes 62.9 p.c, and uncomplicated malaria constitutes 37.1 p.c.

Most common presenting clinical feature in the present study was fever accounting for 105 (100 p.c) cases, followed by splenomegaly 91.4 p.c, hepatomegaly 76.2 p.c, pallor 73.3 p.c, headache 35.5 p.c, vomiting 31.4 p.c, icterus 21 p.c, dark urine 11.4 p.c and melena in 3.8 p.c cases (table 1).

Among the 66 cases of severe malaria defined by WHO guidelines 2010, the most common complication of severe malaria cases in present study was impaired consciousness which account for 4.5 p.c, remaining in the order of frequency are multiple convulsions 30.3 p.c, shock 25.7 p.c, respiratory distress in 18 p.c and abnormal spontaneous bleeding in 9 p.c cases (table 2 and 3). Most common laboratory finding in severe cases was severe normocytic anaemia (Hb < 5 g/dl, packed cell volume < 15%) accounted 37.8 p.c cases followed by hemoglobinuria in 13.6 p.c, metabolic acidosis in 12.1 p.c, renal impairment in 9 p.c and hypoglycemia in 7.5 p.c cases (table 4).

Outcome pattern of malaria cases were mortality 8.6 p.c, morbidity in 3.8 p.c cases and complete recovery without sequele in 87.6 p.c cases (table 5).

#### DISCUSSION:

Malaria is one of the major parasitic diseases affecting 300-500 million people annually worldwide and accounts for over 1 million Deaths<sup>7</sup>. Approximately, 40 p.c of the world's population, mostly those living in the world's poorest countries, are at risk of malaria. Children have an increased susceptibility to malaria with mortality predominant in children<sup>7</sup>. In the present study, we have tried to study the clinical profile and outcome of malaria from 350 fever cases attending tertiary hospital during the study period. A total 350 patients aged <14 years presented with fever to pediatric department ASRAM Hospital during study period were included in the study. Out of these, 105 patients 30 p.c were diagnosed as malaria (at least one of the 3 tests was positive) and remaining 245 patients 70 p.c were non-malaria cases (all three tests were negative).

In present study most common age group affected with malaria was 6-10 years accounting for 58 (55.3 p.c) cases. 4 cases (3.8 p.c) were reported in infants but none in neonates. Similar prevalence was noted by R.K.Padhi et al<sup>8</sup>; 2013 where 5-10 years was the most common group (62 p.c) followed by 10 – 14 years (27 p.c) and in study by Satpathy SK<sup>9</sup> et al; in 2004.

Sex prevalence of the present study showed, males (55.2%) were commonly affected than females (45.5 p.c). Similar sex prevalence was noted in study by Arnaud D Ella<sup>10</sup> et al; in 2005.

Sex ratio in the present study was male: female = 1.23:1. Similar sex ratios were seen in studies by R.K.Padhi<sup>8</sup> et al; 2013 which was 1.25:1 and 1.2:1 by DPMawili-Mboumba<sup>11</sup> et al, 2013.

Topographical distribution of present study showed tribal areas contributed 48 (45.7 p.c), rural area 39 (37.1 p.c) and urban areas 17 (16.2 p.c) of malaria cases. This was due to ASRAM hospital in Eluru, is a tertiary hospital and most number of tribal cases in West Godavari district are referred here.

In our study the peak incidence of cases was found in the months between July – October, maximum in August corresponding to rainy season, which is a favorable breeding season for vector. Similar peak rainy seasonal distribution of cases was present in study by Alain Nahum<sup>12</sup> et al, 2010

In present study, children <14 years, diagnosed as malaria were recruited and characterized using the WHO definition for severe and uncomplicated malaria. Severe malaria constituted 62.9 p.c cases and uncomplicated malaria seen in 37.1 p.c cases. This is due to majority of cases are referrals to our hospital. Similar observation of more than 50 p.c cases of severe malaria are seen in study by Achidi E.A.<sup>13</sup> et al, 2012.

Most common presenting clinical feature in present study was fever seen in cent percent cases and splenomegaly in 91.4 p.c cases. Other features in order of frequency are hepatomegaly 76.2 p.c, pallor 73.3 p.c, headache 35.5 p.c, vomiting 31.4 p.c, icterus 21 p.c, dark urine 11.4 p.c and melena in 3.8 p.c cases.

The most common clinical presentation of severe malaria cases in present study was impaired consciousness which account for 36 cases (54.5 p.c). Remaining in the order of frequency are multiple convulsions 20 (30.3 p.c), shock in 17 (25.7 p.c), respiratory distress in 12 (18 p.c) and abnormal spontaneous bleeding in 6 (9 p.c) cases.

Similar observations were seen in study by JS Kaushik<sup>14</sup> et al, 2012 which showed impaired consciousness 50 p.c, multiple convulsions

33.3 p.c, abnormal spontaneous bleeding (8.3 p.c) and respiratory distress in 8.3 p.c cases and shock in 8.3 p.c cases.

Shock and respiratory distress are more common presentation in our study. 15.8 p.c cases of respiratory distress were seen in study by Tsigie Ketema<sup>15</sup> et al, 2013.

Among the 66 cases of severe malaria defined by WHO guidelines 2010, the most common laboratory finding in present study was severe normocytic anaemia (Hb < 5 g/dl, packed cell volume < 15 p.c) account for 37.8% cases which was similar to Tsigie Ketema<sup>15</sup> et al, 2013 (42 p.c), Hyder Mahgoub<sup>16</sup> et al, 2012 (33.3 p.c) but differed from JS Kaushik<sup>14</sup> et al, 2012 (29 p.c) and Debojyothi sarkar<sup>17</sup> et al, 2013 (11.1 p.c). Remaining laboratory findings in order of frequency were hemoglobinuria account for 13.6 p.c, metabolic acidosis in 12.1 p.c, renal impairment in 9 p.c and hypoglycemia in 7.5 p.c cases.

Out of all cases 9 p.c of the present study showed renal impairment which was similar to studies by JS Kaushik<sup>14</sup> et al, 2012 (8.3 p.c) and Debojyothi sarkar<sup>17</sup> et al, 2013 (7.4 p.c).

Hypoglycemia seen in 7.5 p.c cases where as it was 10.5 p.c in Tsigie Ketema<sup>15</sup> et al, 2013, 5 p.c in Hyder Mahgoub<sup>16</sup> et al, 2012 and 3.7 p.c in Debojyothi sarkar<sup>17</sup> et al, 2013.

Out of total 105 malaria cases, most common complication seen in present study was anaemia accounting for 77 (73.3 p.c) cases.

Cerebral malaria/Impaired consciousness seen in 36 (34.2 p.c), DIC 6 (5.7 p.c), ARF 6 (5.7 p.c) and all them are severe malaria cases as defined by latest WHO classification. According to world health organization (WHO), apart from jaundice, signs of hepatic dysfunction are unusual<sup>18</sup>.

In recent years, there has been increasing number of reports favoring existence of malarial hepatopathy, from Asian countries, especially form India<sup>19</sup>. Malarial hepatitis is also common in children during the course of severe infection and the incidence is reported to vary from 8 p.c<sup>20</sup> to as high as 32 p.c<sup>9</sup>. Malarial hepatopathy seen in 8 (7.6 p.c) cases of present study which was lower compared to Mohanty N et al, 2004<sup>21</sup>.

ARDS was present in 1 (0.9 p.c) case in present study whereas Arnaud D Ella<sup>10</sup> et al; in 2005 showed 31 p.c and Satpathy SK<sup>9</sup> et al; in 2004 it was 2.4 p.c. Algid malaria accounted for 1 (0.9 p.c) cases where as it was 2.4 p.c in Satpathy SK et al; 2004.

Mortality in the present study was 8.6 p.c. Delay in diagnosis and institution of therapy were associated with high mortality. Similar mortality pattern noted were 9 p.c in Arnaud D Ella et al in 2005, 9.9 p.c in Satpathy SK et al in 2004 and 7 p.c in Idro R<sup>22</sup> et al in 2006 and 12 p.c in Tripathy R<sup>23</sup> et al in 2007 were present.

Morbidity seen in present study was in the form of neurological sequele which accounted for 4 (3.8 p.c) cases. Similar finding of 5 p.c seen in Arnaud D Ella<sup>10</sup> et al in 2005 and 7.9 p.c in N gougou<sup>24</sup> et al, in 2007. But Brewster DR<sup>25</sup> et al, in 1990 and Isaac Oludare Oluwayemi<sup>26</sup> et al, in 2013 showed comparatively high rates of 12 p.c and 13.7 p.c respectively.

Out of 4 cases, hemiplegia, monoparesis, visual impairment and ataxia seen in 1 (0.95 p.c) case each. Similar observations are found in Isaac Oludare Oluwayemi<sup>26</sup> et al, in 2013 which showed visual impairment and monoparesis in 0.8 p.c cases each. Brewster DR<sup>25</sup> et al, in 1990 showed ataxia in 1.9 p.c cases but showed higher percentage of hemiplegia 7.5 p.c cases.

#### CONCLUSION:

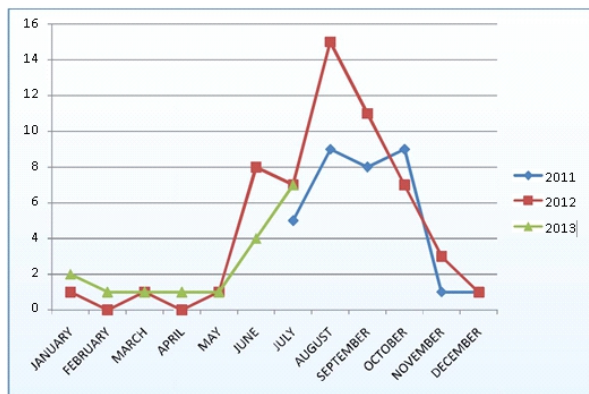
Malaria is the most common serious parasitic disease affecting human beings. Major breeding season for vector is rainy season, which coincides with peak incidence of malaria transmission. Vector control measures should be strengthened during this period to decrease malarial incidence.

Mortality, morbidity, neurological sequele and associated complications were found to be higher in severe malaria. Early and timely institution of appropriate antimalarial therapy will reduce their incidence.

Peripheral smear remains Gold standard for diagnosis, it is time consuming and requires expertise and does not allow quick preliminary diagnosis.

**Fig. 1. SEASONAL DISTRIBUTION MONTH WISE DISTRIBUTION OF CASES**

n: 105



**Table 1. Distribution of cases bases on clinical profile of malaria cases**

n: 105

Clinical Feature	No. of Patients	Percentage
Fever (All cases)	105	100
Vomiting	33	31.4
Headache	37	35.2
Dark urine	12	11.4
Melena	4	3.8
Pallor	77	73.3
Icterus	22	21
Hepatomegaly	80	76.2
Splenomegaly	96	91.4

**Table 2. Distribution of cases bases on associated complications**

n: 105

Complications	No. of Patients	Percentage
Anaemia	77	73.3
Cerebral Malaria /Impaired consciousness	36	34.2
Hepatopathy	08	7.6
Hypoglycemia	05	4.7
ARF	06	5.7
DIC	06	5.7
Algid Malaria	01	0.9
ARDS	01	0.9

**Table 3. Distribution of severe cases bases on complications**

n = 66

Clinical Feature	No. of Patients	Percentage
Impaired consciousness	36	54.5
Multiple convulsions	20	30.3
Shock	17	25.7
Respiratory distress	12	18
Abnormal spontaneous bleeding	6	9

**Table 4. Distribution of severe cases bases on laboratory findings**

n: 66

Clinical Feature	No. of Patients	Percentage
Severe anaemia	25	37.8
Hypoglycemia	5	7.5
Metabolic acidosis	8	12.1
Hemoglobinuria	9	13.6
Renal impairment	6	9

**Table 5. Distribution of severe cases bases on outcome of malaria cases**

n:105

OUTCOME	No. of patients	Percentage
Mortality	9	8.6
Morbidity	4	3.8
Complete recovery without sequale	92	87.6
Total	105	100

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