

# Incidence of Malaria among the Pediatric Age Group Attending to MGM Hospital Warangal

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## ABSTRACT

**Background:** In India, malaria persist throughout the year and usually the incidence is more during rainy season. This necessitates the use of other laboratory methods to clinch the diagnosis, which is important in view of frequent relapses reported in vivax malaria and hence there is need for radical treatment. Considering all the above factors, a need is felt to evaluate the available lab diagnostic procedures for malaria, and also to know the trend of malaria epidemic at Warangal.

**Methods:** It was a prospective study, conducted in the department of Microbiology, KMC Warangal. Paediatric age group with fever with chills and rigors followed by sweating were included in this research. Blood sample was collected thick and thin blood smears were prepared, stained by JSB or Leishmans or Giemsa. Parasight 'F' test and OptiMAL tests were used to detect the antigen. Chi square test was used to find the correlation between the parameters.

**Results:** Total 300 blood samples were collected, malaria positivity was 24%, male female ratio was 1.05, statistically there was no significant difference. In area wise malaria positivity also statistically there was no significant difference. Age wise, maximum cases were diagnosed in 6 – 10 years group. Parasight F test was identified to be highly sensitive in the diagnosis of malaria among the paediatric age group.

**Conclusion:** Falciparum malaria is identified to be the commonest malaria in this area which effect all the paediatric age groups and gender. Parasight F test was found to be the better technique in malaria diagnosis.

**KEYWORDS:** Malaria, plasmodium, age, study

## INTRODUCTION:

Plasmodium species, the causative agent of malaria is the one of the great burdens of the world. [1, 2] This is one of the oldest man kind infections, the global burden is 2020 million which is equal to 36% of the world population. [3] India is the

great contributor of malaria cases, which is 70% of the total Southeast Asian region. [4]

In India, malaria is persisted throughout the year and usually the incidence is more during rainy season, climatic factor had negative impact on human health. There are four distinct human species of the malaria parasite. Plasmodium vivax, Plasmodium falciparum, Plasmodium malariae and P. ovale. About 70% of infections are reported to be due to P.vivax, 25 – 30% due to P.falciparum and 4 – 8% are the mixed infection. [4] Infants, young children and pregnant women are at high risk. Limited health infrastructure and lack of drug availability at village level are the important factors not only for high infectivity, but also responsible for high morbidity and mortality of malaria.

Many diagnostic tests for malaria in the laboratory are available. In spite of these, peripheral blood smear examination still remains the gold standard in the diagnosis of malaria. However, the smear negative malaria also had been reported. This could be due to wrong timing of blood collection otherwise, the patients already started treatment.

This necessitates the use of other laboratory methods to clinch the diagnosis, which is important in view of frequent relapses reported in vivax malaria and hence there is need for radical treatment. Considering all the above factors, a need is felt to evaluate the available lab diagnostic procedures for malaria, and also to know the trend of malaria epidemic at Warangal.

## MATERIALS AND METHODS:

It was a prospective study, conducted in the department of Microbiology, KMC Warangal. Study was conducted from January 2005 to February 2006. Study protocol was approved by the institutional ethics committee. Informed written consent was taken from the parents of all the participants. The study was explained to the participants in the local language.

Paediatric age group with consisted of fever with chills and rigors followed by sweating were included in this research. Those who were non cooperative, parents who refuse to submit the consent, those with anti malaria drugs were excluded from this research.

Initially, thorough clinical history was taken from the parents of the study participant. These include the symptoms, duration of the symptoms, travel history, blood transfusion history. All these findings were noted in the study proforma. After obtaining brief clinical history about the duration the symptoms, age, gender, occupation, socioeconomic status and history of past medication were collected and these were also recorded in the study proforma.

After clarifying all the doubts, beyond the knowledge, blood sample was collected using sterile, new syringe. First the blood collection area was disinfected thoroughly and 1 ml intravenous blood sample was collected. Immediately, the sample was transferred in to sterile bottle containing EDTA, an anticoagulant. [5, 6] Thick and thin blood smears were prepared. The smears were stained by JSB or Leishmans or Giemsa stain. Smear preparation, staining were carried as per standard guidelines. Simultaneously the blood samples were subjected to serological tests to detect plasmodial antigen; Parasight 'F' test optimal tests from Orchid Biomedical services were used to detect the antigen of the pathogen. [7]

**Statistical analysis:** Data were analyzed manually. Chi square test was used to find the correlation between the parameters;  $P < 0.05$  was considered to be statistically significant.

## RESULT

Total 300 (100%) blood samples were collected and malaria positivity was 72 (24%). Gender wise, 158 (53%) were boys and 142 (47%) were girls; the male female ratio was 1.11. In malaria positive cases, the gender ratio was 1.05. Statistically there was no significant difference ( $P > 0.05$ ; Table 1).

Area wise, 243 (81%) samples were from rural area and 57 (19%) from urban. Out of 72 (100%) positive cases, area wise the malaria positivity was 65 (90%) and 7 (10%), respectively; statistically there was no significant difference (Chi square test: 3.508;  $P = 0.061$ ).

Age wise, in 1 – 5 years group, malaria was diagnosed in 27 (9%) members. In 6 – 10 years group, 34 (11%) and in 11 – 14 years group, 11 (4%) malaria cases were diagnosed; statistically there was no significant difference (Table 2).

Technique wise, 100% (72) were positive by Parasight F test, the smear positivity was 70 (97.2%) and 68 (94%) were positive by OptiMAL test. The Parasight F test was identified to be highly sensitive in the diagnosis of malaria among the paediatric age group.

Gender	Positive	Negative	Total
Boys	37 (12.3)	121 (40.3)	158 (52.6)
Girls	35 (11.6)	107 (35.7)	142 (47.3)
Total	72 (24)	228 (76)	300 (100)

Statistical analysis : Chi square test

**Table 1: Gender wise malaria positivity among study participants**

Age in yrs	Positive	Negative	Total
1 – 5	27 (9)	92 (31)	119 (40)
6 – 10	34 (11)	87 (29)	121 (40)
11 – 14	11 (4)	49 (16)	60 (20)
Total	72 (24)	228 (76)	300 (100)

Statistical test used : Chi square test

**Table 2: Age wise malaria positivity among study participants**

## DISCUSSION:

Malaria, a world pandemic parasitic infection. It was documented by Crutcher and Hoffman in 1993 that 90 – 100% of the African children have malaria parasites circulating in the blood. [6]

In this report, among the 300 (100%) febrile pediatric participants, 24% (72) were malaria positive. In the positive cases all were diagnosed to be *P.falciparum*. With this finding, it is very clear that *P.falciparum* malaria was common. Almost similar findings were reported in another South Indian study reported by N.Chayani et al. the rate of positivity was 21%. [8] In another south Indian study *P.falciparum* malaria positivity was reported to be 53%. [9] As per the available reports, *P.falciparum* malaria positivity was ranged between 22% to 61%. [10] It was mentioned in a research that presence of *P.falciparum* in the blood may suppress the parasitaemia of other malaria parasites. [11]

Gender wise, malaria positivity was 12.3% (37) and 11.6% (35) respectively in boys and girls; statistically there was no significant difference between the malaria positivity and gender Table 1 . There was 0.7% low positivity of malaria among the girl children in this study. This could be due to strong antibody response as well as stronger cell mediated response. [11]

Age wise, in this study, the malaria positivity was 9%, 11% and 4% respectively in 1 – 5, 6 – 10 and 11 – 14 year groups. With this, in the first 2 groups there was almost similar positivity and statistically there was no significant difference Table 2 . In this study, most of the participants were from tribal region and at this age most of the time they were spending in playing. There was no proper medical as

well as prophylactic care to these group of study members. Moreover, malnutrition was the most important finding in those days.

Poor waste water management, poor housing, poor knowledge on the disease are the predisposing factors for malaria spread. As the study members were from the rural and tribal areas of Waragal, usually these don't have the knowledge either on the preventive measures or predisposing factors of malaria. Hence more malaria positivity was observed in rural population, which was 65 (90%); statistically there was no significant difference (Chi square test: 3.508;  $P = 0.061$ ) between the rural and urban malaria positivity.<sup>[12]</sup> Whereas in a very recent report by Anna Maria van Eijk et al. it was mentioned that there was increased risk of malaria even in the urban population.<sup>[13]</sup> This could be due to urbanization where people from the rural areas migrate to urban places as daily labourer, who may contain the pathogen.<sup>[4]</sup>

Parasight F test, an immunochromatography test. This was designed based on detection of HRP<sub>2</sub> antigen detection of Plasmodium antigen. In this study it was sensitive in the detection of malaria. According to the data published by Mendiratta et al. the sensitivity of this was 92.6% and specificity was 98.6%.<sup>[14]</sup> Whereas, in another report, the rates were mentioned to be 66 — 100% and 98 — 100%, respectively.<sup>[15]</sup> Mendiratta et al. reported that five cases which were falciparum malaria positive by Parasight F were negative by staining.<sup>[14]</sup> In one of the very recent reports from South India also, P.falciparum was reported to be the common malaria among the children.<sup>[16]</sup> This could be because of sequestration which is one of the important mechanisms of falciparum. But we didn't find these issues in this report.

OptiMAL test was another antigen detection test. In this research 94% positivity was reported by this. Similar findings were reported by Chayani et al., out of 122 blood samples, 118 were positive.<sup>[8]</sup> In our report, the positive rate of OptiMAL test is less compared to smear microscopy. Under smear microscopy, we cannot differentiate whether the pathogen is dead or live, which is major drawback. Whereas, the antigens can be by a live pathogen.

#### CONCLUSION:

Falciparum malaria is identified to be the commonest malaria in this area which effect all the paediatric age groups and gender. Parasight F test was found to be the better technique in malaria diagnosis.

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