

Prevalence of Commonest Plasmodium Malaria in Children below 10 of Age in North Karnataka

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Abstract:

Background: Malaria is one of the oldest recorded diseases in the world. It has infected humans for the last 50,000 years. The paediatric population is especially vulnerable to this preventable illness if it is diagnosed and treated at the earliest possible time.

Method: 70 paediatric patients under 10 years old were studied. The peripheral smear test was studied by Rapid Kit test positive. The *P. falciform*/*P. vivax* was detected.

Results: 31 females and 39 male children were studied. The highest numbers of children were >5 years old: 14 females, 18 males. 52.8% *P. falciform* +ve 24.2% *p. vivax* were +ve, and 22.8 children had mixed (PF/PV +ve) positives. The effect of Hb% was 24 (34.2%) had Hb% <5mg, 26 (37.1%) Hb% 5-7 gm/dl, 12 (17.1%) had Hb% 7-10 gm/dl, and 8 (11.4%) had Hb% > 10 mg/dl. The mortality was 8 (11.4%) children.

Conclusion: The present study will help the paediatrician treat malaria patients efficiently and avoid mortality.

Keywords: Rapid Card Test, Plasmodium, Peripheral Smear, Haemoglobin Level, North Karnataka.

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Introduction

Malaria is a protozoal disease caused by infection with parasites of the genus plasmodium. There are five species that cause disease in humans: plasmodium falciparum, plasmodium vivax, plasmodium malaria, plasmodium ovale, and Knowles. The female Anophele mosquito, a common species, causes infection. Malaria is a global health problem, and the burden of malaria is high in tropical and subtropical countries like India [1]. Most of the cases of malaria occur in children, especially those under the age of 10.

Three climatic indicators, such as temperature, rain, and relative humidity, have been considered most important in influencing the malaria epidemic and its pattern. Plasmodium falciform infections are the most serious form of malaria. The parasitic presentation varies from one place to another depending on factors like socio-economic status, drug resistance, and the type of treatment done [2]. There is a wide distribution of nine anopheline vectors transmitting three plasmodia species, *p. falciform*, *p. vivax*, and *p. malaria*, in India [3]. Anopheles culicifaces is widely distributed and is the principal vector of rural malaria. Malaria is one of the oldest recorded diseases in the world. It has infected humans for the last 50,000 years. The paediatric population is more vulnerable to this preventable

illness. The common symptoms include anaemia and fever [4]. Hence, an attempt is made to rule out different age groups of paediatricians to evaluate morbidity and mortality.

Material and Results

70 children aged below 10 years admitted to the paediatric ward of ESIC Medical College Hospital Kalaburgi (585102, Karnataka) were studied.

Inclusive Method: Children below 10 years of age peripheral smear or Rapid Card test positive for malaria parasite. The patient's parents or guardian, who gave their written consent, were selected for study.

Exclusion Criteria: Peripheral smear negative for malaria parasite. Patients over 10 years of age were exclusion from study.

Method: The blood samples from suspected malaria cases were obtained in a vacuotainer, and serum was prepared using a centrifuge. The serum was then used for the malaria PF/PV test (Rapid Card Test). It is a rapid qualitative and differential test for the detection of antibodies to Plasmodium falciform and Plasmodium human serum by the SD BOLINE rapid card test by Alera Medical Private Limited. For the positive card test cases, a drop of

finger-picked blood was obtained for blood smear preparation. Thick and thin smears were prepared on standard glass slides. The blood smears were stained with Jaswant Singh and Bhattacharyaji stain and examined under oil immersion at 1000 magnification. The malaria-type plasmodium falciform or plasmodium vivax was identified and recorded. The treatment done as p. falciform malaria patients was done with body weight-dependent doses of intravenous Artesunate, followed by oral Artesunate sulfadoxine and pyrimethamine tablets as per the guidelines of the National Vector. Borne disease control program, Ministry of Health and Family Welfare [5] and the outcome of the treatment and complications were analyzed.

The duration of the study was from October 2022 to November 2023.

Statistical analysis: Different age groups and types of malaria in both sexes clinical manifestations effective of Hb% levels were classified by percentage. The statistical analysis was performed in SPSS software. The ratio of males and females is 2:1.

Observation and Results

Table 1: Distribution of age and sex in Malaria children -

- Male – 7 were <1 year, 14 were aged between 1-5 years, 18 were > 5 years
- Females – 5 were < 1 year, 12 were aged between 1-5 years, 14 were > 5 years

Table 2: Types of positive malaria deselected in children – 25 males and 12 females children had P. Falciform malaria was positive 6 males and 11 female positive, 8 males and 8 females had both P. falciform / P. vivax were positive

Table 3: The clinical manifestation were 69 (98.5%) had fever, 32 (45.7%) had vomiting, 16 (22.8%) had loose motion, 10 (14.2%) oliguria, 6 (8.5%) had haemoglobinuria, 15 (21.4%) had headache, 35 (50%) had altered sensorium

Table 4: Effect of Haemoglobin level on mortality – 24 (34.2%) had Hb<5 mg/dl and had 5 mortality, 26 (37.7%) had Hb 5-7 mg/dl and 2 mortality, 12 (17.1%) had Hb 7-10 mg/dl and mortality was 1, 8 (11.4%) had Hb >10 mg/dl and mortality was 2, Total mortality were 8 (11.4%).

Table 1: Distribution of age and sex in Malaria children

Age/Sex	< 1 year	1-5 years	> 5 years	Total
Male	7	14	18	39
Female	5	12	14	31
Total	12	26	32	70

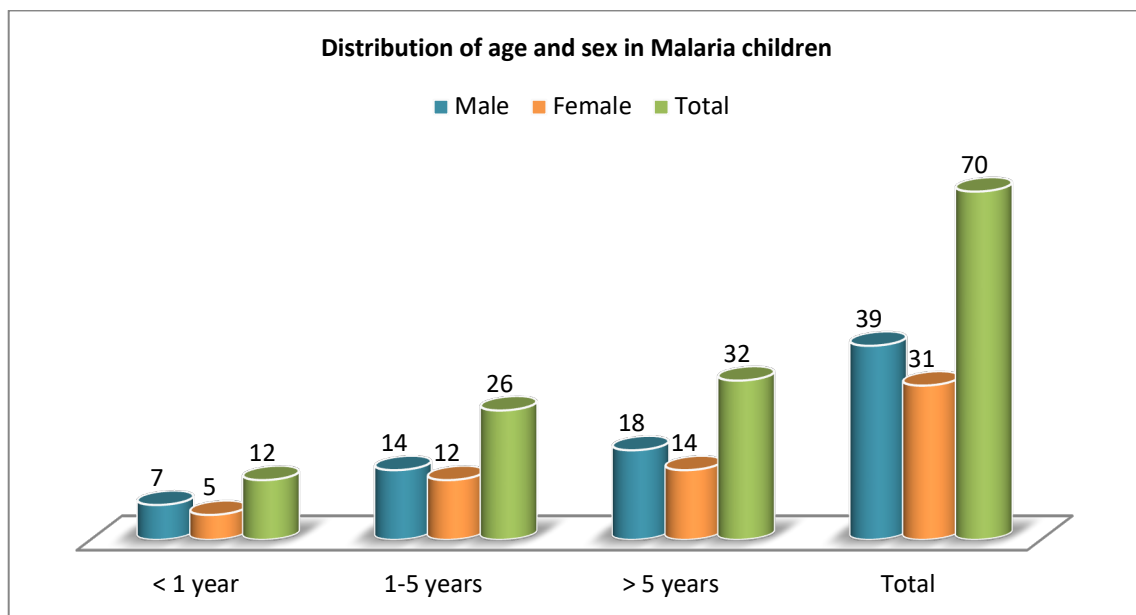


Figure 1: Distribution of age and sex in Malaria children

Table 2: Types of positive malaria cases detected children

Malaria	Male	Female	Total	Percentage
P. Falciform +ve	25	12	37	52.8
P. Vivax +ve	6	11	17	24.2
PF/PV +ve	8	8	16	22.8
Total	39	31	70	100

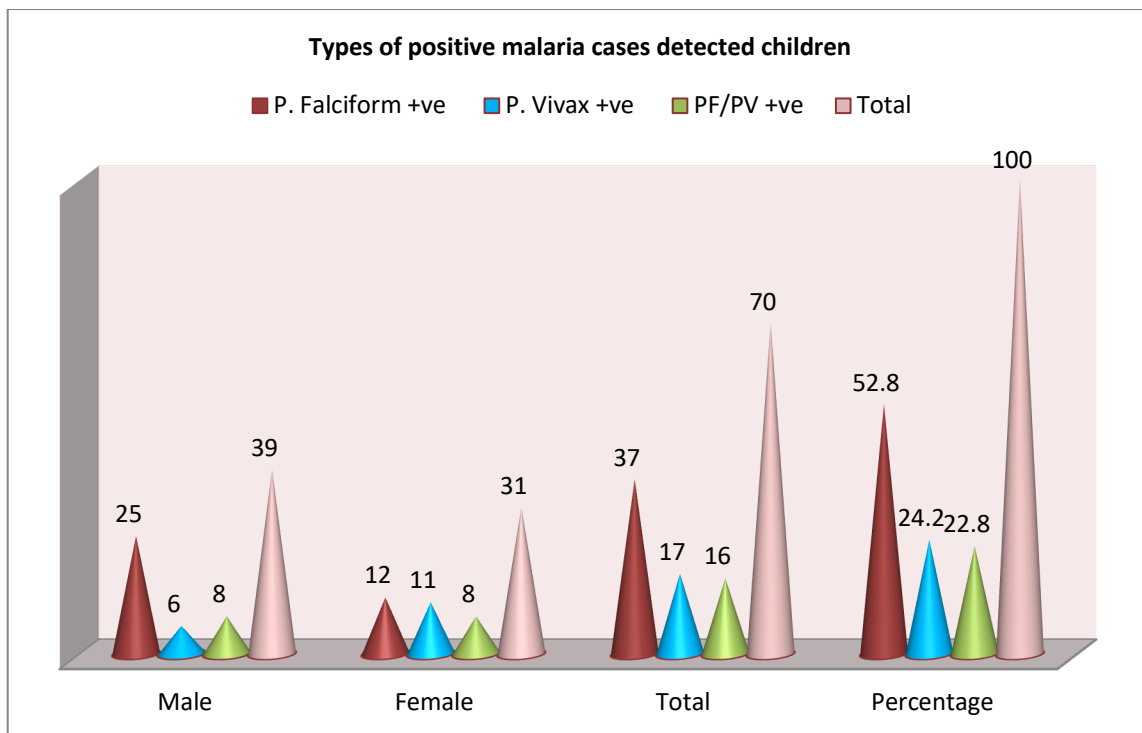


Figure 2: Types of positive malaria cases detected children

Table 3: Clinical Manifestation of Malaria in children

Manifestation	No. of patients (70)	Percentage (%)
Fever	69	98.5
Vomiting	32	45.7
Loose motion	16	22.8
Oliguria	10	14.2
Haemoglobinuria	6	8.5
Headache	15	21.4
Altered sensorium	35	50

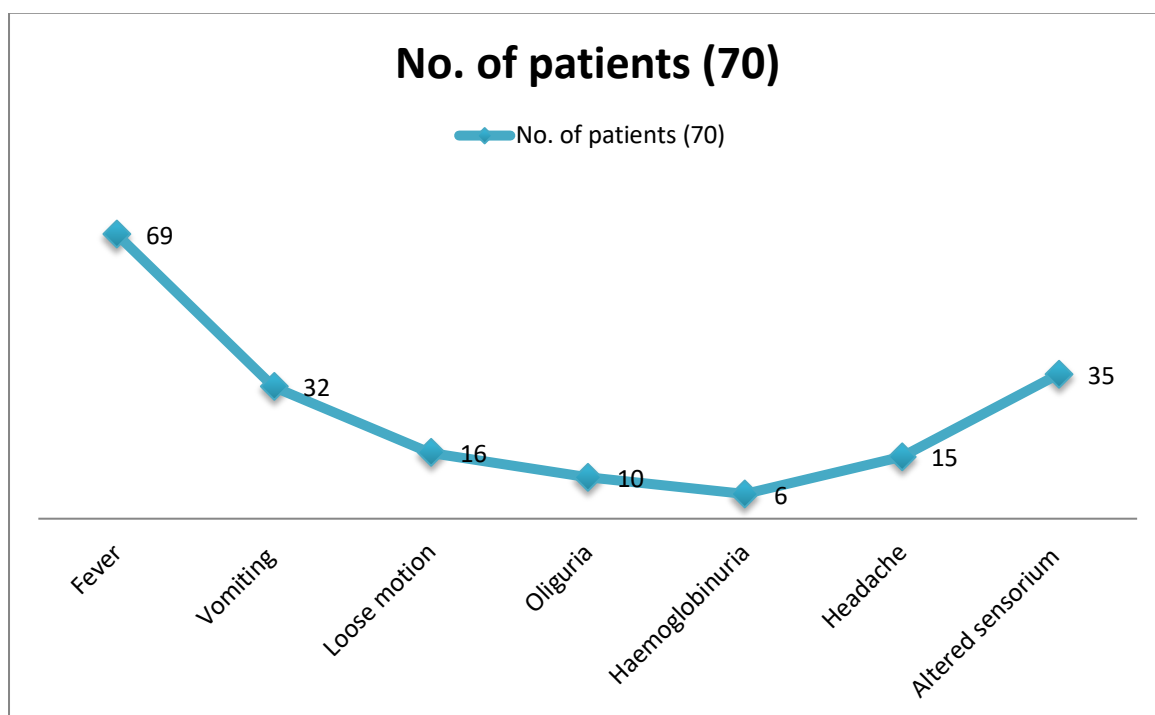
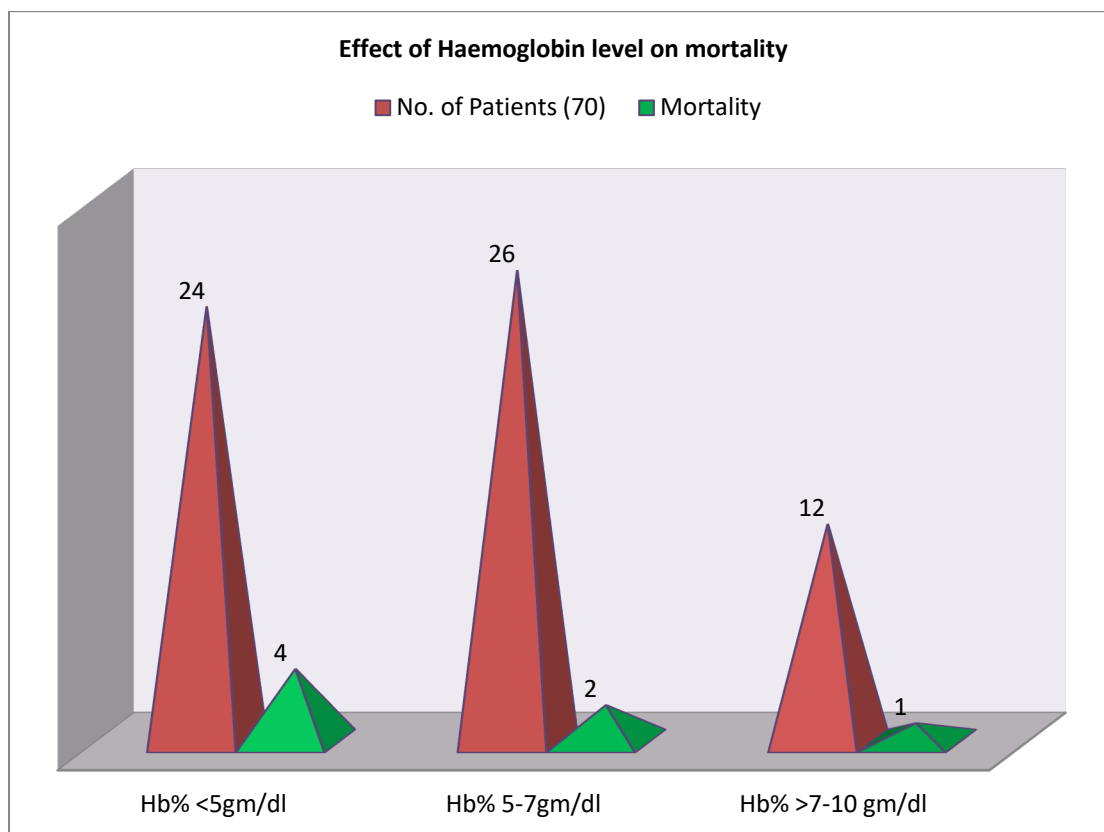


Figure 3: No. of patients

Table 4: Effect of Haemoglobin level on mortality

Sl. No	Haemoglobin	No. of Patients (70)	Percentage (%)	Mortality
1	Hb% <5gm/dl	24	34.2	4
2	Hb% 5-7gm/dl	26	37.1	2
3	Hb% >7-10 gm/dl	12	17.1	1

In the present study out 70 children suffering from malaria 8 (11.4%) mortalities were observed

**Figure 4: Effect of Haemoglobin level on mortality**

Discussion

Present study of plasmodium malaria in children below ten years old in North Karnataka. In the distribution of age and sex in malaria children, 5 males and 7 females were <1 year old, 14 males and 12 females were aged between 1 to 5 years of age, 18 males and 14 females were > 5 years old, and 31 females and 39 males were studied (Table 1). 25 males and 12 females had *P. falciform* form positive, 6 males and 11 females had *P. vivax* positive, and 8 males and 8 females had both *P. falciform* and *P. vivax* positive (Table 2).

Clinic manifestations were: 69 (98.5%) had fever, 32 (45.7%) had vomiting, and 16 (22.8%) had loose motion. 10 (14.2%) had oliguria, 6 (8.5%) had haemoglobinuria, 15 (21.4%) had headaches, and 35 (50%) had altered sensorium (Table 3). 24 (34.2%) had Hb<5 mg/dl and had 4 mortality, 26 (37.7%) had Hb 5-7 mg/dl and 2 mortality, 12 (17.1%) had Hb 7-10 mg/dl and one mortality, and 8 (11.4%) had Hb >10 mg/dl and one mortality. Total 8 (eight) mortalities were in the present study

(Table 4). These findings are more or less in agreement with previous studies [6,7,8].

The life cycle of five plasmodium species is similar, apart from the dormant stages of *P. vivax* and *P. ovale*, which are called hypnozoites and may remain quiescent in the liver of the infected human for weeks to years from the initial infection, leading to the onset of clinical symptoms or relapses of infections. Treatment specifically targeting these dormant stages is too clear for infection with *P. vivax* and *P. ovale* [9].

Pro-inflammatory cytokines in turn give rise to [1] the systemic inflammatory response syndrome, [2] oedema and inflammation in perivascular tissue in end organs due to disruption of endothelial basal lamina and extravasations, increased expression of adhesion molecules, and increased sequestration of parasitized erythrocytes [10]. The anaemia caused by plasmodium infection is multifactorial; sequestered erythrocytes can be found in any organ. Sequestration in the brain leads to the clinical syndrome of cerebral malaria; sequestration in the pla-

centa leads to the adverse birth outcomes associated with malaria during pregnancy. In the case of severe malaria, supportive care measures such as fluid resuscitation, cardiac and respiratory monitoring, oxygen, and supportive ventilation should be provided as clinically indicated [11]. In addition to anti-malarial treatment, the management of complications may require anticonvulsants, antibiotics, antipyretics, and blood transfusions. The exchange of transfusions is no longer recommended [12]. Prophylaxis against malaria is recommended for all travelers to malaria-endemic areas by the WHO.

Summary and Conclusion

Malaria infection can rapidly develop into a severe disease that can be fatal. Severe falciform malaria is a major problem affecting the health of children in endemic areas. Severe anaemia, cerebral malaria, and respiratory distress are the commonest complications in children with severe malaria. Children with severe anaemia must approach medical aid at the earliest to avoid further irreversible complications that end in mortality. Apart from this, awareness regarding the fatality of malaria should be created by medical and social workers.

Limitation of Study: Owing to the tertiary location of the research centre, the small number of patients, and the lack of the latest techniques, we have limited findings and results.

This research paper has been approved by the Ethical Committee of ESIC Medical College Hospital Kalaburgi (585102), Karnataka.

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