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Original Research Article

A study of clinical profile and outcome of malaria in adults at government general hospital, Nizamabad

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ABSTRACT

Introduction: What has to be stressed is the need to be cautious with such individuals and to broaden our differentials to include P. vivax as a possible cause of severe malaria. Patients who are aggressively handled and treated can have a better outcome.
Aims: To study the clinical profile and outcome of malaria in adults at Government General Hospital in our local area.
Materials and Methods: A Cross-sectional, observational study done in Department of general medicine in Fifty smear positive malaria patients admitted to the medical wards and intensive care units are included in the study. Study done for a period of 1 Year . Patients of either gender, above 18 years of age and below 60 years of age, diagnosed with malaria on peripheral smear were included in study.
Results: A total number of 50 smear positive malaria patients were included in the study. Majority of the patients belongs to the age group of 18-30 years [36%] CNS findings: Altered Sensorium was seen in 20% patients and convulsions were seen in 20% patients. Complicated malaria was present in 76% patients and uncomplicated malaria was present in 24% patients. Complicated falciparum malaria was present in 30% patients and Complicated Vivax malaria was present in 46% patients. Uncomplicated falciparum malaria was present in 4% patients and Uncomplicated Vivax malaria was present in 20% patients. Mortality was seen in 6% patients. Mortality was seen in the age group of 41- 50 years [66.7%] and 31-40 years [33.3%].
Conclusion: Malaria complications can be reduced by studying the clinical profile of the disease and using proper antimalarial medication treatment. This aids in the reduction of malaria morbidity and death, as well as the country's long-term economic prosperity.

1. Introduction

Malaria is a parasitic disease of humans and is caused by protozoa of the genus Plasmodium. According to WHO, in 2018, an estimated 228 million cases of malaria occurred worldwide. Nineteen countries in sub-Saharan Africa1 and India carried almost 85% of the global malaria burden. An estimated 405,000 deaths occurred from malaria globally and Nearly 85% of deaths were concentrated in 20 countries in the WHO African Region and India. There were an estimated 6,737,000 malaria cases and 9,620 deaths in India in 2018. Malaria infections may cause vital organ damage and death. Severe malaria is defined by clinical or laboratory evidence of vital organ damage. The manifestations of severe malaria include: Cerebral malaria, Unarousable coma, Jaundice, Renal failure, Acidosis, Severe anaemia, Pulmonary oedema/adult respiratory distress syndrome, Hypoglycaemia, Hypotension/shock, Bleeding/disseminated intravascular coagulation, Convulsions, Haemoglobinuria, Hyperparasitaemia.[1]

Delay in Diagnosis and treatment leads to increase in the presentation of severe malaria cases which in turn

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leads to increase in morbidity and mortality. The current study was conducted to study clinical profile, complications and outcome of malaria. Exact clinical and laboratory profile is important for the early diagnosis and successful management, which is crucial for saving lives and malaria being endemic in India lack of data from this geographic area on the clinical profile, complications of malaria has prompted us to undertake this study.

2. Materials and Methods

A Cross-sectional, observational study done in Department of general medicine, Government General Hospital, Nizamabad in Fifty smear positive malaria patients admitted to the medical wards and intensive care units are included in the study. Study done for a period of 1 Year (1st December 2019 to 30th November 2020)

2.1. Sample size

Formula: $n = z\alpha^2 * pq / d^2$

Where, n is the required sample size.

Z α is the standard normal deviate, which is equal to 1.96 at 95% confidence interval. p is the prevalence in that study = 68.53 (Nadkar MY et al.)[2]

q = 100-p

d = allowable error

p = 68.53 (Nadkar MY et al.)[2]

q = 31.47

d = Allowable error taken as 20%

n = number of samples is to be studied

$n = z\alpha^2 * pq / d^2$

$= (1.96)^2 * 68.53 * 31.47 / (13.706)^2$

= 8284.94/187.85

=44.10= 44.10 + 4.41

= 48.51 = Rounded to 50

2.2. Inclusion criteria

Patients of either gender, above 18 years of age and below 60 years of age, diagnosed with malaria on peripheral smear.

2.3. Exclusion criteria

Patients below the age of 18 years and above the age of 60 years, Patients diagnosed with chronic liver, kidney/CNS disease.

2.4. Methodology

After obtaining written informed consent, a detailed history and clinical examination was done to note complications and outcome.

The following laboratory investigations for hematological parameters were done: Hemoglobin estimation, Total and Differential Leucocyte count, Total Platelet count. In severe cases coagulation parameters like Bleeding time, whole blood Clotting time, Prothrombin time were done. Thick and Thin Blood smear with Giemsa staining were done for confirmation of Malaria.

Biochemical investigations like blood Sugar, serum Bilirubin, Aspartate and Alanine aminotransferase, blood Urea, serum Creatinine and Electrolytes were carried out. In patients with respiratory distress and renal failure, X-ray Chest and Arterial Blood Gas Analysis were done. HBsAg, Widal test, Dengue serology and Leptospiral antibodies test were done.

All patients were treated with intravenous/oral Artemisinin-based combination therapy. Other supportive measures in the form of antibiotics, anticonvulsants, antiemetics, blood transfusion inotropic support and fluids, dialysis and ventilator support as and when required.

2.5. Statistical analysis

Data entry was done using M.S. Excel and statistically analyzed using Statistical package for social sciences (SPSS Version 21) for M.S Windows. Descriptive statistical analysis was carried out to explore the distribution of several categorical and quantitative variables. Categorical variables were summarized with n (%). All results are presented in tabular form and are also shown graphically using bar diagram or pie diagram as appropriate.

2.6. Inferential statistics

The difference in the two groups was tested for Statistical Significance and categorical variables tested by chi square test. P-value less than 0.05 considered to be statistically significant.

3. Results

Table 1: Distribution of patients based on the age group

Age Group (Years)	Frequency	Percent
18-30	18	36.0%
31-40	16	32.0%
41-50	16	32.0%
Total	50	100.0%
Gender		
Male	31	62.0%
Female	19	38.0%
Total	50	100.0%

In this study, majority of the patients belongs to the age group of 31-40 years [36%] followed by 41-50 years [32%] and 18-30 years [32%], Males constitute 62% and females constitute 38%.Table 1

In this study, Fever was present in all[100%] the patients, Chills & Rigor was present in 90% patients, Headache was present in 72% patients, Nausea &vomiting was present

Table 2: Distribution of patients based on the clinical presentation

Clinical Presentation	Frequency	Percent
Fever	50	100%
Chills & Rigor	45	90%
Headache	36	72%
Nausea &vomiting	23	46%
Myalgia	19	38%
Jaundice	13	26%
Altered sensorium	10	20%
Convulsions	10	20%
Decreased Urine	8	16%
Abdominal Pain	7	14%
Breathlessness	5	10%
Diarrhea	4	8%
Cough	4	8%
Bleeding	3	6%

in 46% patients, Myalgia was present in 38% patients, Jaundice was present in 26% patients, Altered sensorium was present in 20% patients, Convulsions was present in 20% patients, Decreased urinary output was present in 16% patients, Abdominal Pain was present in 14% patients, Breathlessness was present in 10% patients, Diarrhea was present in 8% patients, Cough was present in 8% patients and Bleeding was present in 6% patients.Table 2

Table 3: Distribution of patients based on general physical examination

Physical Examination	Frequency	Percent
Pallor	18	36%
Icterus	13	26%
Respiratory System Examination		
Crepitations	5	10%
Per Abdomen		
Hepatomegaly	9	18%
Splenomegaly	36	72%
CNS Examination		
Altered Sensorium	10	20%
Convulsion	10	20%

In this study, Pallor was present in 36% patients; Icterus was present in 26% patients.

Respiratory System examination showed crepitations in 5% patients.

In this Study, Hepatomegaly was present in 18% patients; Splenomegaly was present in 72% patients.

CNS findings: Altered Sensorium was seen in 20% patients and convulsions were seen in 20% patients.Table 3

The Hemoglobin level was ranging from 3.2 to 13.4gm/dl. Mean hemoglobin was 9.284gm/dl. The association between the groups was found to be statistically not significant.

The Platelet count was ranging from 0.36 to 2.6 lakh/cumm. Mean Platelet count was 1.368lakh/cumm. The association between the groups was found to be statistically significant.

The Total Bilirubin level was ranging from 0.8 to 6.6mg/dl. Mean Total Bilirubin was 2.174mg/dl. The association between the groups was found to be statistically not significant.

The Serum Creatinine level was ranging from 0.8 to 5.6mg/dl. Mean Serum Creatinine was 2.16mg/dl. The association between the groups was found to be statistically not significant.Table 4

In this Study, Thrombocytopenia was present in 60% patients, Anemia was present in 36% patients, ARF was present in 30% patients, Jaundice was present in 26% patients, Cerebral Malaria was present in 20% patients, ARDS was present in 10% patients, Hypotension/Shock was present in 10% patients, Hypoglycemia was present in 6% patients, Bleeding was present in 6% patients.Table 5

In this study, P Falciparum was present in 34% patients, P Vivax was present in 66% patients. Among the P falciparum patients, 88.2% are complicated Malaria patients. Among the P vivax patients, 69.7% are complicated Malaria patients.

Complicated malaria was present in 76% patients and uncomplicated malaria was present in 24% patients. Complicated falciparum malaria was present in 30% patients and Complicated Vivax malaria was present in 46% patients. Uncomplicated falciparum malaria was present in 4% patients and Uncomplicated Vivax malaria was present in 20% patients.

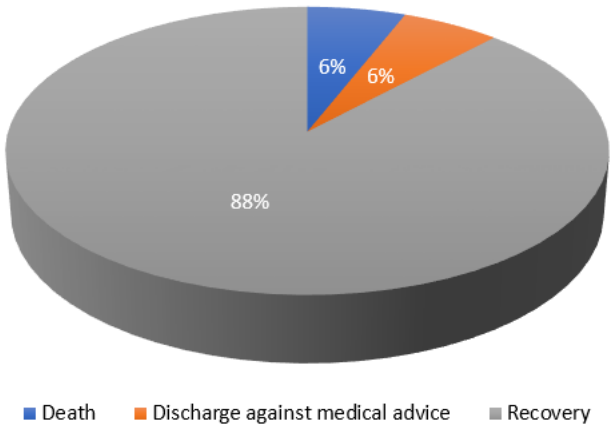

Fig. 1: Distribution of patients based on the outcome

In this study, Mortality was seen in 6% patients.

In this study, Mortality was seen in the age group of 41-50 years [66.7%] and 31-40 years [33.3%]. The association between the groups was found to be statistically not significant.Table 7

Discussion

This study was conducted in the Department of General Medicine, Government General Hospital, Nizamabad. A

Table 4: Distribution of patients based on diagnosis and hemoglobin levels

Hemoglobin (gm /dl)	Diagnosis				Total	
	Falciparum Malaria		Vivax Malaria			
	N	%	N	%	N	%
<8.0	15	88.2%	3	9.1%	18	36.0%
>8.0	2	11.8%	30	90.9%	32	64.0%
Platelet Count (lakhs/cumm)						
<1.5	15	88.2%	15	45.5%	30	60.0%
>1.5	2	11.8%	18	54.5%	20	40.0%
Total Bilirubin (mg/dl)						
<3.0	5	29.4%	32	96.9%	37	74%
>3.0	12	70.6%	1	3.1%	13	26%
Serum Creatinine (mg/dl						
<3.0	4	23.5%	31	93.9%	35	70.0%
>3.0	13	76.5%	02	6.1%	15	30.0%

Table 5: Distribution of patients based on the complications

Complications	Frequency	Percent
Thrombocytopenia	30	60%
Anemia	18	36%
ARF	15	30%
Jaundice	13	26%
Cerebral Malaria	10	20%
ARDS	5	10%
Hypotension	5	10%
Hypoglycemia	3	6%
Bleeding	3	6%

Table 6: Distribution of patients based on the diagnosis of malaria

Diagnosis		Frequency	Percent
Falciparum Malaria	Complicated Malaria	15	30%
	Uncomplicated Malaria	2	4%
Vivax Malaria	Complicated Malaria	23	46%
	Uncomplicated Malaria	10	20%
Total		50	100%

Table 7: Distribution of patients based on the age group and outcome

Age Group (Years)	Outcome						Total	
	Death		Discharge against medical advice		Recovery			
	N	%	N	%	N	%	N	%
18-30	0	0.0%	0	0.0%	18	40.9%	18	36.0%
31-40	1	33.3%	1	33.3%	14	31.8%	16	32.0%
41-50	2	66.7%	2	66.7%	12	27.3%	16	32.0%
Total	3	100.0%	3	100.0%	44	100.0%	50	100.0%

total number of 50 smear positive malaria patients were included in the study. The study was done over a period of 12 months from 1st December 2019 to 30th November 2020.

In this study, Majority of the patients belongs to the age group of 18-30 years [36%] followed by 41-50 years [32%] and 31-40 years [32%]. It is coinciding with other authros with age groups as Aundhakar S et al.[9] 38% (18-30 years), Chouhan AS et al.,[10] 48% (21-30 years), Shah SJ et al.,[4] 51% (15-30 years), Jelia S et al.,[11] 38% (21-30 years), Dabadghao VS et al.,[3] 33% (21-30 years), Devineni SB et al.,[12] 30% 21-30 years) and Madhu M et al.,[7] 70% (21-30 years). our study was comparable to all studies except Suryawanshi A et al.,[13] and it can be observed that majority of subjects were in age group ranging between 21-30 years. In this study, Males constitute 62% and females constitute 38%.

Table 8: Other complications in present study

Study	Year	Anaemia	ARF	Jaundice	Cerebral Malaria	ARDS
Present Study		36%	30%	26%	20%	10%
Dabadghao VS et al.[3]	2016	10%	48%	32%	-	11%
Shah SJ et al.,[4]	2016	82.75%	-	-	-	-
Kashinkunti MD et al.[5]	2013	-	46%	42%	16%	4%
Nadkar MY et al.[2]	2011	-	31.9%	19.46%	8.19%	1.63%
Chowta MN et al.[6]	2007	37.03%	-	20%	-	-
Madhu M et al.[7]	2006	-	-	14.73%	-	-
Kochar DK et al.[8]	2003	-	-	30%	-	-

Our study was comparable to other studies and it can be observed that majority of subjects were male. Our study is comparable with studies done by Kulkarni VK et al.,[14] (M-65.67% ,females-34.44%) , Shah SJ et al.,[4] (males-57%, females-43%), Jelia S et al.,[11] (males -78%, females-22%) , Dabadghao VS et al.,[3] (males -67%, females-33%), Nadkar MY et al.,[15] (males -71.9%, females-28.1%), Chowta MN et al.,[6] (males-72%, females-28%).

The high infectivity in males might be explained on the basis of the fact that males are more mobile and involved in outdoor activities and they also readily seek medical aid. Further, females in India are usually better clothed than males, and hence they are less exposed.

In this study, Fever was present in all[100%] the patients, Chills & Rigor was present in 90% patients, Headache was present in 72% patients, Nausea &vomiting was present in 46% patients, Myalgia was present in 38% patients, Jaundice was present in 26% patients, Altered sensorium was present in 20% patients, Convulsions was present in 20% patients, Decreased urinary output was present in 16% patients, Abdominal Pain was present in 14% patients, Breathlessness was present in 10% patients, Diarrhea was present in 8% patients, Cough was present in 8% patients and Bleeding was present in 6% patients.

Pallor was present in 36% patients: Icterus was present in 26% patients. Respiratory System examination showed crepitations in 5% patients. Hepatomegaly was present in 18% patients: splenomegaly was present in 72% patients. CNS findings: Altered Sensorium was seen in 20% patients and convulsions were seen in 20% patients.

In This study, the most common symptom was fever (100%), Fever is the most common symptom.Percentage of patients with Fever symptom is similar in other studies as Aundhakar S et al.,[9] Kulkarni VK et al.,[14] Chouhan AS et al.,[10] Dabadghao VS et al.,[3] Jelia S et al.,[11] Shah SJ et al.,[4] Devineni SB et al.,[12] except Patil DR et al.,[16] O'brien AT et al.,[17] Apte S et al.,[18] Kashinkunti MD et al.,[5] Echeverri M et al.,[19] Murthy GL et al.,[20] Gopinathan VP et al.,[21]

In this study, Chills & Rigors was present in 90% Patients. It is similar to studies done by Patil DR et al.,[16] O'brien AT et al.,[17] Apte S et al.,[18] Echeverri M et al.,[19] Murthy GL et al.[20] Headache was present in 72% Patients. It is similar to Gopinathan VP et al.[21] Nausea & Vomiting was present in 46% Patients. It is similar to Gopinathan VP et al.,[21] Aundhakar S et al.,[9] Jelia S et al.[11] Myalgia was present in 38% Patients. It is similar to Chouhan AS et al.,[10] Nand N et al.[2]

In this study, Altered Sensorium was present in 20% Patients. It is similar to Kulkarni VK et al.[14] Jaundice was present in 26% Patients. It is similar to Dabadghao VS et al.,[3] Jelia S et al.,[11] Murthy GL et al.[20] Decreased urine was present in 16% Patients. It is similar to Dabadghao VS et al.[3] Abdominal Pain was present in 20% Patients. It is similar to Aundhakar S et al.[9]

In this study, Convulsions was present in 20% Patients. It is similar to Kulkarni VK et al.[14] Breathlessness was present in 10% Patients. It is similar to Kulkarni VK et al.[14] Diarrhea was present in 8% Patients. It is similar to Shah SJ et al.,[4] Nand N et al.[15] Cough was present in 8% Patients. It is similar to Aundhakar S et al.[2] Bleeding was present in 6% Patients. It is similar to Dabadghao VS et al.[3]

In this study, Pallor was seen in 36% patients. It is similar to Chitharagi VB et al.[22] Icterus was seen in 26% patients. It is similar to Chitharagi VB et al.,[22] Chouhan AS et al.[10]

In this study, Splenomegaly was seen in 72% patients. It is similar to Chouhan AS et al.,[10] Jelia S et al.[11] Hepatomegaly was seen in 18% patients. It is similar to Chitharagi VB et al.[22]

In this study, Thrombocytopenia was present in 60% patients, Anemia was present in 36% patients, ARF was present in 30% patients, Jaundice was present in 26% patients, Cerebral Malaria was present in 20% patients, Hypotension/Shock was present in 10% patients, ARDS was present in 10% patients, Hypoglycemia was present in 6% patients, Bleeding/DIC was present in 6% patients.

In This study, Thrombocytopenia is the most common complication. It is similar to Chitharagi VB et al.,[22] Dabadghao VS et al.,[3] Shah SJ et al.,[4] Kashinkunti MD et al.,[5] and Nadkar MY et al.,[2] studies except Shah SJ et al.,[4] Muddaiah M et al.[23]

In a study by Shah SJ et al.[4] Most common complication is Anemia (82.75%). In a study by Muddaiah M et al.,[23] Most common complication is Hepatopathy.

In this study, Thrombocytopenia was present in 60% patients. It is similar to Chitharagi VB et al.,[22] (95.2%), Chouhan AS et al.,[10] (88.7%) Dabadghao VS et al.,[3] (78%), Shah SJ et al.,[4] (62.5%), Patil DR et al.[16] (89.2%) and Kashinkunti MD et al.,[5] (48%) Nadkar MY et al.,[2] (89.13%). The Platelet count was ranging from 0.36 to 2.6 lakh/cumm. Mean Platelet count was 1.368lakh/cumm.

In this study, considering Hb<8gr/dl as Anemia, Anemia was present in 36% patients. It is similar to Chowta MN et al.[6] The Hemoglobin level was ranging from 3.2 to 13.4gm/dl. Mean hemoglobin was 9.284gm/dl. In this study, considering Serum creatinine>3mg/dl as severe Renal failure, ARF was present in 30% patients. It is similar to Nadkar MY et al.[2] The Serum Creatinine level was ranging from 0.8 to 5.6mg/dl. Mean Serum Creatinine was 2.16mg/dl. In this study, considering Total Bilirubin>3mg/dl as jaundice, Jaundice was present in 26% patients. It is similar to Dabadghao VS et al.[3] The Total Bilirubin level was ranging from 0.8 to 6.6mg/dl. Mean Total Bilirubin was 2.174mg/dl. In this study, Cerebral Malaria was present in 20% patients. It is similar to Kashinkunti MD et al.[5] In this study, ARDS was present in 10% patients. It is similar to Dabadghao VS et al.[3]

In this study, P Falciparum was present in 34% patients, P Vivax was present in 66% patients. Among the P falciparum patients, 88.2% are complicated Malaria patients. Among the P vivax patients, 69.7% are complicated Malaria patients. Complicated malaria was present in 76% patients and uncomplicated malaria was present in 24% patients. Complicated falciparum malaria was present in 30% patients and Complicated Vivax malaria was present in 46% patients. Uncomplicated falciparum malaria was present in 4% patients and Uncomplicated Vivax malaria was present in 20% patients.

In this study, P Falciparum was present in 34% patients. It is similar to Dabadghao VS et al.,[3] Jelia S et al.,[11] Chowta MN et al.,[6] Madhu M et al.[7] P Vivax was present in 66% patients. It is similar to Jelia S et al.[11]

In this study, Complicated malaria was present in 76% patients and uncomplicated malaria was present in 24% patients. Our study matches with Dabadghao VS et al.,[3] (Complicated Malaria 53%, Uncomplicated malaria -47% Rao BS et al.,[24] Complicated Malaria 18.89%, Uncomplicated malaria 81.11%.

In this study, Mortality was seen in 6% patients. Our study coincides with study done by Chitharagi VB et al.,[22] (0.8%), Chouhan AS et al.,[10] (4%), Dabadghao VS et al.,[3] (10%), Kashinkunti MD et al.,[5] (12%), Nadkar MY et al.,[2] (11.25%) and Chowta MN et al.,[6] (0%)In this study, Mortality was seen in 6% patients. Mortality was seen in the age group of 41-50 years [66.7%] and 31-40 years [33.3%].

4. Conclusion

Malaria is still at rampant in India with debilitating morbidity and mortality. Studying the clinical profile of malaria with proper antimalarial drug treatment helps to curb down the complications of malaria. Every healthcare facility should follow national and international guidelines and form its in-hospital guidelines regarding proper antibiotic and antimalarial selection. This helps to reduce morbidity and mortality of malaria and helps in the sustained economic growth of the nation. Malaria is a completely curable disease.

5. Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

6. Source of Funding

None.

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