

Treatment outcome of inpatient malaria cases: A study in a tertiary care hospital of Odisha, India

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Malaria is the foremost public health problem of Odisha, India. It contributes to 20% of total malaria cases and 17% of total deaths of India¹. The proportion of *Plasmodium vivax* cases is comparatively low in Odisha (15%) as compared to the National figure (60%). Annual parasite incidence (API) rate decreased from 12.38 in 2001 to 8.84 in 2010 but the *Plasmodium falciparum* positive cases increased from 83.1 to 88.5%². There are few studies on hospital situation depicting the severity and mortality due to malaria on our state which encouraged to conduct the study among the cases of malaria, admitted to S.C.B. Medical College and Hospital, Cuttack, situated in the central zone of Odisha and catering to the needs of 10 densely populated districts.

This was a retrospective study, carried out at S.C.B. Medical College and Hospital, Cuttack, Odisha from 1 April 2010 to 31 March 2011. During the study period of one year total indoor admission in medicine ward was 24,072 of which fever cases (suspected malaria) were 2552. The bed head tickets of laboratory confirmed malaria cases, detected by any of the following test like microscopy/rapid diagnostic test (RDT)/malaria parasite quantitative buffy coat (MP-QBC) test were considered for the present study. Hence, the study subjects included all the laboratory confirmed cases found positive during their stay. The suspected malaria cases found negative on above mentioned laboratory test were excluded from the study. Centre for Disease Control and Prevention guidelines were adopted for classifying malaria into uncomplicated and complicated (severe) form³. The schedule was designed to collect necessary information from the bed head tickets of malaria patients as per the study objectives. The data thus collected were fed into SPSS version 16 and analysed with suitable statistical procedures.

Total 557 laboratory confirmed malaria cases were admitted to the indoor ward of the medicine department. The most common presenting symptoms on admission were fever followed by chill and rigor in 55% and vomiting in 36% cases. Other symptoms like convulsion, loss of consciousness, jaundice, decreased urination, black coloured urine and diarrhoea were reported in 5, 0.4, 20,

16, 2 and 3% cases, respectively. In all, 9% cases were infected by *P. vivax* (*Pv*), 42% by *P. falciparum* (*Pf*) and 49% by both (*Pv* + *Pf*). Regarding investigation conducted for confirmation of the diagnosis, 89.1% cases were confirmed by RDT followed by MP-QBC in 5.3% cases. Only 3.2% were diagnosed by microscopy. Both microscopy and RDT were used for diagnosis in 2.4% cases. Table 1 shows that 65% cases were complicated (severe) and 35% were uncomplicated malaria. Among the 360 complicated malaria cases, the most common complication was cerebral malaria in 38% cases, followed by acute renal failure (ARF) in 24% cases, hepatopathy in 23% cases, both ARF and hepatopathy in 11% cases, shock in 4% and algid malaria in 1% cases. In complicated cases, majority 346 (96%) were infected by either *P. falciparum* or by both (*P. falciparum* + *P. vivax*) and 14 (4%) by *P. vivax* infection alone. In 197 uncomplicated malaria cases, 35 (18%) were infected by *P. vivax* and the rest 162 (82%) were infected by either *P. falciparum* or *P. vivax* + *P. falciparum*. Regarding the treatment of malaria cases artesunate injection was given to 86% cases followed by artesunate and quinine combination to 11% cases.

Artesunate, sulphadoxine and pyrimethamine combination was administered in 2% cases, artesunate and mefloquine to 0.2% cases and only quinine to 1% cases.

Table 1. Distribution of malaria cases according to complications (n = 557)

S.No.	Malaria cases	No.	%
1.	Uncomplicated malaria	197	35.4
2.	Complicated malaria	360	64.6
Total		557	100
Complicated malaria (n = 360)			
1.	Cerebral malaria	136	37.8
2.	Complicated malaria with ARF	85	23.6
3.	Complicated malaria with hepatopathy	81	22.5
4.	Complicated malaria with ARF and hepatopathy	39	10.8
5.	Complicated malaria with shock	15	4.1
6.	Algid malaria	4	1.2
Total		360	100

Table 2. Treatment outcome of malaria according to complication

Type of malaria	Cured and discharged		LAMA		Deaths		Discharged on request		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Uncomplicated malaria	168	85.3	17	8.6	3	1.5	9	4.6	197	100
Complicated malaria	236	65.5	56	15.6	56	15.6	12	3.4	360	100
Total	404	72.5	73	13.1	59	10.6	21	3.8	557	100

$\chi^2 = 35.675; p < 0.001$.

Altogether 88% of uncomplicated cases and 84% of complicated cases had received artesunate. The route of administration of Artesunate in majority of cases was parenteral. Since this is a retrospective record-based study, the duration of treatment with different antimalarial drug for each patient was not possible for 557 cases. The treatment outcome showed that 72.5% were cured and discharged, 13.1% had left the hospital against medical advice (LAMA), 10.6% died due to malaria or its complication and 3.8% were discharged on request. Table 2 shows the treatment outcome among the complicated and uncomplicated malaria cases. The proportion of deaths in complicated malaria was 15.6% while it was only 1.5% in uncomplicated malaria ($\chi^2 = 35.675; p < 0.001$). So the proportion of deaths was significantly higher among the complicated cases than the uncomplicated cases of malaria. Analysis of deaths showed that 25.4% (15/59) died due to cerebral malaria, 28.8% (17/59) died due to ARF, 8.4% (5/59) died due to hepatopathy, 6.7% (4/59) died due to shock, 27.1% (16/59) died due to multi-organ failure and 5% (3/59) died due to uncomplicated malaria.

The present study shows that fever was present in all the cases followed by chill, rigor and vomiting. Also jaundice, acute renal failure and convulsion were observed in 20, 16 and 5% cases, respectively. Similar presenting symptoms were observed in other studies⁴⁻⁵. Though microscopy is considered as the gold standard for the diagnosis of malaria⁶, the present study shows that its use in this tertiary health centre is only 3.2%. MP- ICT was used for confirmation in 89% cases and only 5% were diagnosed by QBC test. The present study showed that the overall case fatality rate among the admitted cases of malaria was 10.6% while it was 15.6% in complicated cases of malaria and very high (41%) among the complicated malaria cases having multiorgan failure. Murthy *et al*⁷ in the study of clinical profile of falciparum malaria in a tertiary care hospital, mentioned the case fatality rate to be 20%. Mishra

*et al*⁴ in a study of cerebral malaria cases admitted to a regional hospital in western Odisha had observed similar case fatality rate of 23% and it was particularly high (59%) among those with multiorgan failure.

The current study reveals that the majority of the malaria cases admitted to this tertiary care hospital were infected either by *P. falciparum* or by *P. vivax* + *P. falciparum*. In spite of adequate treatment the case fatality rate was high in complicated malaria as compared to uncomplicated cases. Considering the high case fatality, steps should be taken for early diagnosis and timely treatment of the complicated cases which may be helpful to reduce the fatality.

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