

## Short Communication

### Determinants of Hospital Stay among Malaria Patients at a Tertiary Care Hospital in Goa

With rapid urbanization and migration, malaria is causing a heavy burden on existing health services. A large number of beds get occupied by malaria patients during the peak transmission season. Judicious use of hospital resources is therefore the need of the hour. The length of stay (LOS) of admitted patients is one of the hospital indices used for the day to day management of hospitals as well as future planning of the hospital services<sup>1</sup> so the duration of hospital stay can be used to estimate burden of malaria on hospital services<sup>2</sup>. Hospital beds are to be judiciously utilized for the management of selected cases in view of their limited availability. In this study, an attempt has been made to study the various determinants affecting length of stay of malaria patients admitted at a Tertiary care Hospital in Goa.

In the present study 748 patients admitted with malaria during 1<sup>st</sup> Jan to 31<sup>st</sup> Dec 2004 at a tertiary care hospital under Goa medical college were studied. The data was collected from Medical Records Department. The data included age, gender, place of residence, day of fever, diagnosis, type of treatment, complications, outcome and duration of hospital stay etc. The mean length of stay

among malaria patient was computed as in-patient days for all the malaria admissions in the hospital. The data was analyzed<sup>3</sup> using multiple regression method, t-test and ANOVA.

Out of the 748 patients admitted with malaria in the hospital, 77.4% (579/748) were males and 22.6% (169/748) females. Among all patients 14.2% (106/748) had vivax, 63.4% (474/748) falciparum and 22.4% (168/748) had mixed malaria infection. In this study, 78.3% (586/748) patients improved, 2.5% (19/748) died and 19.1% (143/748) were discharged against medical advice although needed longer stay (moved out).

The mean ( $\pm$ SD) length of stay (LOS) among malaria patients was found to be 4.2 ( $\pm$ 2.0) days. Mean LOS was 3.9 ( $\pm$ 1.8) days for patients suffering from vivax malaria, 4.3 ( $\pm$ 2.1) days for falciparum malaria and 3.8 ( $\pm$  1.8) for mixed malaria infection cases.

The length of stay was (5.1  $\pm$ 3.0) found to be higher in younger patients (<15 years), in females (4.5  $\pm$ 2.1), patients reporting late (4.4  $\pm$ 1.9), in patients with falciparum malaria (4.3  $\pm$ 2.1), patients receiving third line of treatment (5.5  $\pm$ 3.1) and those patients with complication like acute

**Table 1: Characteristics of malaria patients and Length of stay**

Factor		Number (748)	%	Mean LOS ( $\pm$ SD)	F/t value, p-value & df
Age	<15	90	12.0	5.1 ( $\pm$ 3.0)	F=9.4 p<0.001 df=(3,730)
	15-24	252	33.7	3.9 ( $\pm$ 1.7)	
	25-34	173	23.1	4.0 ( $\pm$ 1.8)	
	>35	233	31.1	4.2 ( $\pm$ 2.0)	
Gender :	Male	579	77.4	4.1 ( $\pm$ 2.0)	t = 2.27 p<0.05 df =746
	Female	169	22.6	4.5 ( $\pm$ 2.1)	
Place of residence:	Rural	136	18.2	4.1 ( $\pm$ 2.0)	t=0.52 p>0.05 df = 746
	Urban	612	81.8	4.2 ( $\pm$ 2.3)	
Reporting: (days)	Delay				F =2.74 p<0.1 df = (2,745)
	1-2	197	26.3	4.0 ( $\pm$ 1.7)	
	3-4	303	40.5	4.1 ( $\pm$ 1.9)	
	>4	248	33.2	4.4 ( $\pm$ 1.9)	
Diagnosis :	P. Falciparum	474	63.4	4.3 ( $\pm$ 2.1)	F=3.56 p<0.029 df = (2, 747)
	p. Vivax	106	14.2	3.9 ( $\pm$ 1.8)	
	Mixed	168	22.4	3.9 ( $\pm$ 1.8)	
Treatment :	1 <sup>st</sup> Line	87	11.6	3.7 ( $\pm$ 1.7)	F= 15.2 p<0.001 df = (2,743)
	2 <sup>nd</sup> Line	603	80.6	4.1 ( $\pm$ 1.9)	
	3 <sup>rd</sup> Line	58	7.8	5.5 ( $\pm$ 3.1)	
Complications at 1 <sup>st</sup> visit:	None	607	81.2	NA	t = 5.15 p<0.01 df= 746
	ARF	27	3.6	6.1 ( $\pm$ 3.8)	
	Hepatitis	114	15.2	4.9 ( $\pm$ 1.8)	
Treatment outcome :	Discharged	584	78.1	4.3 ( $\pm$ 1.8)	F= 25.89 P<0.001 df = (2, 744)
	Died	20	2.7	5.9 ( $\pm$ 4.4)	
	Moved out	144	19.2	3.2 ( $\pm$ 1.9)	

**Table 2 Multiple Logistic Regression showing determinants of length of stay**

Variable	$\beta$	pvalue
Acute renal failure (ARF)	1.436	0.001
Treatment (TRT)	0.444	0.016
Hepatitis (HEP)	0.717	0.000
Delay after fever (DAF)	0.046	0.050
<b>Length of stay (LOS)=2.924+ 1.436 ARF+ 0.444TRT+ 0.717HEP + 0.046DAF</b>		

renal failure (ARF) ( $6.1 \pm 3.8$ ). (Table 1)

Multiple regression also showed that patients with complications like acute renal failure (ARF) and hepatitis had longer LOS as compared to those without such complications (Table 2). LOS also depended on the line of treatment. Higher the line of treatment longer was the LOS as the third line of treatment usually was given to those patients with complications. Longer delay after fever to report at the hospital was also higher. The LOS increased significantly due to the increase in number of complications in these patients ( $F=13.7$ ,  $p < 0.01$ ).

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Multiple Regression analysis also showed acute renal failure (ARF), hepatitis, line of treatment, day of fever as some of the significant determinants of length of stay (LOS) among malaria patients. This information may help organize hospital beds availability for malaria patients admitted at the hospital and to serve the community better.

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#### REFERENCES

1. Goel SL and Kumar R. Challenges of the administration of hospital services: Hospital Administration & management 1999; (1): 209.
2. Issac A, Darko D and Sansro A. Malaria: A burden explored. Bull Health Information 2004; 1 (1): 31
3. Marcello P and Kimberly G. Principles of Biostatistics: Duxbury, Learning, USA 2000; p 455-457.

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