## **Original Research Article**

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# A study on length of stay and its predictors among dengue patients in a tertiary care institute in Lucknow

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#### **ABSTRACT**

**Background:** Dengue virus infection is a growing health problem and is prevalent throughout India. Research focusing on length of hospital stay and its predictors is scarce from India. This is important considering the burden of the disease during epidemics and impact on hospital admissions. Hence the study was conducted with the objectives to find out the factors influencing the length of stay in hospital of dengue patients.

**Methods:** A cross sectional retrospective observational study conducted at a tertiary care hospital from August 2016 to October 2016. Data was retrieved from case sheets at Medical Record Department of 350 lab confirmed adult dengue patients admitted in the hospital.

**Results:** The majority of patients admitted were of economically productive age group of 18-45 years and males indicating the occupational exposure to the vector of dengue. The study found that majority had length of stay of less than a week and as age increases the length of stay also increases (statistically significant). The nil case fatality and lesser number of mean days of symptoms before admission possibly indicate that early arrival of patients to hospital can lead to very low fatality rates. Further research required to find out the other predictors of length of stay.

**Conclusions:** The study concludes that the dengue affects the economically productive age group and more males thereby indicating occupational exposure to the vector. The age of the patient can be used as an indicator to the length of stay in the hospital.

Keywords: Length of stay, Dengue, Platelet count, Hospitalization

#### INTRODUCTION

Dengue virus infection (DVI) is mosquito borne disease and is a growing health problem in the world. Due to the advent increase in trade activities and tourism, the virus has been inadvertently transferred from endemic regions to other parts of the world.<sup>1,2</sup> The number of countries reporting DVI has increased from nine to over 100 countries over the past few decades. As a result, over 50 million people are infected by DVI and around 2.5 billion people are at risk.<sup>3</sup> Disease is prevalent throughout India in most of the metropolitan cities and towns.<sup>4</sup> India is one

of the seven identified Southeast Asian countries reporting frequent outbreaks of the disease, with case fatality rates as high as 3-5%. Research focusing on length of hospital stay and its predictors is scarce from India and none from northern part of the country. This research is important considering the burden of the disease during epidemics, its impact on hospital admissions and the requirement of platelet transfusion. Identification of these factors or predictors can be incorporated into patient assessment and management protocol to provide better care. Inconclusive evidence from available literature about the association of platelet count with duration of hospitalization also corroborates

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further research into the area. Hence the study was conducted with the aim and objectives to find out the factors influencing the length of stay in hospital of dengue patients, to analyze the association between demographic, clinical and laboratory factors and length of stay and to assess the proportion of patients requiring platelet transfusion.

#### **METHODS**

This is a cross sectional retrospective observational study conducted at Integral Institute of Medical Sciences and Research (IIMSR), a tertiary care private sector hospital in Lucknow. The study unit was lab confirmed admitted adult dengue patients and the type of sampling was purposive convenience sampling. The data was retrieved from case sheets at Medical Record Department (MRD) of all the lab confirmed adult dengue patients admitted in the hospital during the study period from 1st August 2016 to 31st October 2016. Confidentiality of the data retrieved was maintained. A total of 350 eligible lab confirmed dengue patients were admitted in the IIMSR hospital during the study period and all were included in the study. The case sheets of all these patients were retrieved and data collected as per a pre-designed format. The inclusion criteria was all lab confirmed adult dengue patients admitted during the 1st August 2016 to 31st October 2016 in IIMSR while the pediatric patients; cases admitted before or after the study period and dengue patients not requiring hospitalization were excluded. The demographic, clinical, and laboratory parameters or variables was recorded in a pre-designed format. The variables included socio-demographics factors such as age, sex, length of stay, platelet count and hemoglobin on day of admission while the outcome was length of stay, association between length of stay and other sociodemographic factors. The research approval and ethical approval was taken from the institutional research and ethical committee of IIMSR and the confidentiality of the data retrieved were thoroughly maintained.

### Data analysis

The data was compiled on a MS Excel sheet and was analyzed using IBM SPSS Version 20. Frequencies were used to describe the socio-demographic and other characteristics. Chi-square test was used to test the association between socio-demographic characteristics and length of stay. The p-value of <0.05 was taken to be statistically significant. Same methodology was used in some other studies which makes our study comparable. <sup>6,7</sup>

#### **RESULTS**

Table 1 shows that the majority (87%) of patients admitted for treatment of dengue was of economically productive age group of 18-45 years and 70% of total were males. Approximately 70% of patients had duration of hospitalization (length of stay) of less than a week. 80% of the subjects had hemoglobin level at the time of

admission more than 12 mg/dl and only 37% of the subjects had thrombocytopenia at the time of admission. Only approximately 10% of the admitted patients required platelet transfusion. Very low rates of comorbidity, complications and bleeding tendency were observed and none died.

Table 1: Demographic characteristics and clinical variables of the study subjects.

Demographic characteristics	No.	%						
Age group (in years)								
18-25	135	38.6						
26-45	170	48.6						
46-65	41	11.7						
> 65	4	1.1						
Sex								
Male	246	70.3						
Female	104	29.7						
Length of stay								
3 or less than three	89	25.4						
4-6 days	155	44.3						
7 or more than 7 days	106	30.3						
Hemoglobin on the day of admission (mg/dl)								
Less than 12	72	20						
More than 12	278	80						
Platelet count on the day of admi	ssion							
Less than equal to 20000	29	8						
21000 to 50000	55	16						
51000 to 1 lac	47	13						
1 to 1.5 lac	137	39						
More than 1.5 lac	82	24						
Bleeding tendency								
Yes	33	9.4						
No	317	90.6						
Required platelet transfusion								
Yes	34	9.7						
No	316	90.3						
Co-morbidity	No.	<b>%</b>						
Yes	2	0.6						
No	348	99.4						
Complications								
Yes	1	0.3						
No	349	99.7						
Outcome								
Discharged	350	100						
Died	0	0						

Table 2: Statistical averages of various demographic and clinical variables of the study subjects.

	Mean	SD
Age (in years)	32.4	12.24
Length of stay (days)	5.44	2.77
No. of days of symptoms before presenting for admission (days)	5.15	3.75
No. of platelet units required (units)	3.12	1.5

Table 3: Distribution of clinical features/ symptoms among the study subjects.

Presenting complaints	No.	%
Fever	298	85
GI symptoms	165	47
Head ache	140	40
Body ache	123	35
Skin rash	88	25

Table 4: Association between various socio-demographic and clinical variables with the length of stay and other variables.

	Length of stay			Bleeding tendency				Days onset of symptoms before admission				
		3 or less than three	4-6 days	7 or more than 7 days	Chi- Square	Yes	No	Chi- square	3 or less than three	4-6 days	7 or more than 7 days	Chi- square
		N (%)	N (%)	N (%)		N (%)	N (%)		N (%)	N (%)	N (%)	
	18-25	37 (28)	65 (48)	33 (24)		11 (8)	124 (92)		52 (39)	53 (39)	30 (22)	5.538, p=0.47
Age (in years)	26-45	37 (21)	80 (47)	53 (32)	17.513,	17 (10)	153 (90)	8.312,	51 (30)	63 (37)	56 (33)	
	46-65	13 (31)	8 (19)	20 (50)	p=0.008	2 (5)	39 (95)	p=0.04	15 (37)	16 (39)	10 (24)	
	Above 65	2 (50)	2 (50)	0 (0)		2 (50)	2 (50)		1 (25)	2 (50)	1 (25)	
Sex	Male	67 (27)	110 (45)	69 (28)	2.804,	20 (8)	226 (92)	1.561,	8 (35)	99 (40)	61 (25)	3.461, p=0.177
	Female	22 (21)	44 (43)	38 (36)	p=0.246	12 (12)	92 (88)	p=0.211	34 (33)	34 (33)	36 (34)	
Hb level on the	Less than 12	22 (30)	27 (38)	23 (32)		6 (8)	66 (92)		27 (38)	24 (33)	21 (29)	0.8442, p=0.655
day of admission (mg/dl)	More than 12	66 (23)	127 (46)	85 (31)	1.9614, p=0.375	27 (9)	251 (91)	0.1273, p=0.721	94 (34)	109 (39)	75 (27)	
Platelet count on day of admission	Less than equal to 20,000	14 (48)	7 (24)	8 (28)	15.90, p=0.044	1 (3)	28 (97)	3.840, p=0.428	13 (45)	11 (38)	5 (17)	12.33, p=0.137
	21000 to 50000	9 (16)	28 (51)	18 (33)		7 (13)	48 (87)		13(24)	24 (44)	18 (32)	
	51000 to 1 lac	11 (23)	24 (51)	12 (26)		4 (9)	43 (91)		20 (42)	19 (40)	8 (18)	
	1 to 1.5 lac	29 (21)	66 (48)	42 (31)		16 (12)	121 (88)		39 (28)	54 (40)	44 (32)	
	More than 1.5 lac	26 (32)	30 (37)	26 (32)		5 (6)	77 (94)		34 (41)	26 (32)	22 (27)	

Table 2 shows the mean age of study subjects to be 32.44 years $\pm 12.24$ , mean length of stay  $5.44\pm 2.77$  days, mean no. of days of symptoms before presenting for admission were  $5.15\pm 3.75$  days.

Table 3 shows fever to be the most common presenting symptom (85%) followed by GI symptoms and headache.

Table 4 demonstrates that the approximately 50% of subjects in the younger age group of 18-45 years had length of stay of 4-6 days while in the older age group of 46-65 years, 50% of subjects had a length of stay of 7 or more than 7 days. It also shows that as age increases the length of stay also increases and the difference was statistically significant. Majority of the subjects in both sexes have a length of stay of 4-6 days. Approximately half of the patients having platelet count less than 20000 had a 3 or less than 3 day stay while about three fourth of the patients whose platelet count was having more than 20000 at the time of admission had a stay of more than 3 days (p<0.05). Elderly (above 65 years) and females had more bleeding tendency. Subjects having lower platelet count of 20000 or less have lesser bleeding tendency than the other higher platelet count groups. One-third of females and the patients in the age group of 26-45 years have onset of symptoms 7 or more than 7 days before admission while in males and in rest of the age groups only one fourth of the patients have onset of symptoms 7 or more than 7 days before admission. Table 4 also shows that the subjects having hemoglobin less than 12 mg/dl, majority of patients have onset of symptoms before admission of 3 or less than 3 days while subjects having hemoglobin more than 12 mg/dl, majority of subjects (39%) have 4-6 days of onset of symptoms before admission although the difference is not statistically significant.

#### **DISCUSSION**

The epidemics of dengue are becoming increasingly common in northern part of India during the rainy season. Our study found that most of patients were in the economically productive age group of 18-45 years and the mean age of the subjects to be 32 years, similar results were also reported by another study conducted in Southern part of the country. Similar to other studies, our study also found the occurrence of dengue fever in males to be more as compared to the females, as well as it was observed that almost all the patients were between the age of 18-60 years thereby indicating that it may be due to the occupational exposure to the vector of dengue infection.

The current study observed that thrombocytopenia was present in only 37% of the patients while another study has reported a very high percentage of thrombocytopenia in admitted patients. This discrepancy needs further investigation and may indicate other factors like severity of symptoms etc. being taken into account for admission of patients rather than thrombocytopenia. Our study

found that the 10% of the patients required platelet transfusion which is in concordance with other studies done in India. Further 8% of patients have platelet levels less than or equal to 20,0000 at the time of admission which may indicate that the transfusion of platelets was being done in accordance to the national guidelines. It

The case fatality was not observed in our study while studies done in India have shown the case fatality ranging from 0.5 to 3.5 %. <sup>12-14</sup> More over the mean no. of days of symptoms before presenting for admission was approx. 5 days whereas the studies done globally have shown that the higher duration of symptoms before presenting for admission thereby possibly indicating that early arrival of patients to hospital can lead to very low or nil fatality rates. <sup>15,16</sup>

Fever was the most reported symptom in our study subjects followed by GI symptoms and headache and findings were similar to other studies. 8 The current study shows that the mean duration of length of stay was 5.44±2.77 days. Studies conducted globally have observed that the length of stay varies between 2.6 to 6.9 days with most studies reporting between 3-4 days. 10,15-23 Our study observed that the age of the patient and the platelet count at the time of admission were significantly associated with the length of stay. Although the finding was in accordance with the some other studies. 22,24 but several studies have found no such association. 10,15,16,25 The current study observed that the lesser platelet count was associated with lesser duration of hospitalization which is in contrast to some local studies and need further insight into the aspect.<sup>24</sup> Similar to another study, our Study also observed that the association between the platelet count at the time of admission and bleeding tendencies was not significant thereby meaning that the platelet counts at admission were neither an indicator of prognosis nor of bleeding tendencies or progression of the disease.8

#### **CONCLUSION**

Dengue is a growing major health problem and is spreading rapidly throughout the world. The findings of our study conclude that the dengue affects the economically productive age group and more frequently males thereby indicating occupational exposure to the vector. The Case fatality in the dengue can be reduced by early arrival of patients for admission in the hospital. The age of the patient can be used as an indicator to the length of stay in the hospital but other factors like platelet count, hemoglobin level etc., needs further research.

#### Limitation

As this was a retrospective study, we were restricted to secondary data. Moreover due to resource constraints, the study was conducted in a single center.

#### Recommendations

In view of growing endemicity of dengue and its epidemic potential, it is highly recommended that further research regarding the predisposing factors for longer length of stay should be undertaken, various measures to sensitize the population regarding the prompt health care seeking should be undertaken to reduce the case fatality as much as possible, measures should be instituted to decrease the occupational exposure to the vector.

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