Clinical Profile of Dengue Fever in a Tertiary Hospital of Rural South India – A Retrospective Study

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Authors' contributions

This work was carried out in collaboration among all authors. Author CM designed the study. Author RR performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors JS and RR managed the analyses of the study. Author RR managed the literature searches. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Introduction: Dengue fever is a globally important arboviral infection transmitted by the Aedes genus of mosquito found in tropical and subtropical regions. Fluid therapy and the identification of the critical phase are the most important aspects of management.
Objectives: To study the clinical profile of patients with Dengue Fever.
Methodology: The patients diagnosed with Dengue Fever would be considered for the study. Data pertaining to the clinic-socio demographic profile of dengue fever would be collected from the patient's records and analyzed.
Results: It was observed that majority of patients had myalgia as the common associated symptoms with fever and bleeding manifestations was present in 7.7% of patients. Dengue NS1 was positive in 79% of patients. Platelet transfusion was given for 20% of patients. Amongst those who received platelet transfusion 52% patients had bleeding manifestations. Antibiotics was given for 65% of patients which had no significant effect on the duration of stay in hospital and platelet values.

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Conclusion: Dengue fever despite its aggressive nature can be effectively managed by maintaining hydration and hemodynamic stability. Platelet transfusion and antibiotic therapy has failed to show any significant improvement in disease outcomes and should be reserved for Severe Dengue Haemorrhagic Shock.

1. INTRODUCTION

Dengue fever (DF) is a globally important arboviral infection transmitted by the *Aedes* genus mosquito (primarily *A. aegyptus*, but also *A. albopictus*), found in tropical and subtropical regions [1]. The infection is endemic in more than 100 countries, particularly the South East Asia region, western Pacific region, and the Americas [2]. The incubation period is 3-14 days (average 7 days) [3]. Clinical features include fever, headache, myalgia or arthralgia and skin flushing/rash, together with leukopenia, thrombo-cytopenia, and increased liver function. Severe thrombocytopenia, hemorrhage and plasma leakage are the key diagnostic features of the more severe forms of infection[4]. Confirmatory tests include detection of viral antigen or nucleic acid and serology. Fluid therapy and the identification of the critical phase are the most important aspects of management [5].

The first evidence of occurrence of DF in the country was reported during 1956 from Vellore district in Tamil Nadu. The first Dengue hemorrhagic fever outbreak occurred in Calcutta (West Bengal) in 1963 out of which 30% of cases showing hemorrhagic manifestations [6]. The incidence has increased manifold in India due to unplanned urbanization and migration of population to urban areas. Although initially reported from urban locality, dengue is now being reported from urban and rural backgrounds alike. Over 3.9 billion people in over 128 countries are at risk of contracting dengue, with 390 million clinical cases estimated per year. In India, the annual incidence is estimated to be 7.5 to 32.5 million [7]. According to the WHO, the case fatality rate for dengue is roughly 5% [5]. Over the past years even with increased incidence, the case fatality in India remains low due to widespread availability of diagnostic kits and awareness among the society [8].

Data suggests that 2017 is one of the worst affected year with dengue. Severe thrombocytopenia and bleeding manifestations pose a dilemma to the clinician regarding platelet transfusion. Several studies have shown platelet transfusion does not alter the course of illness or impact severity of bleeding manifestations [9]. Our study aims to study the Clinico-socio epidemiological pattern of Dengue at our Hospital and the effect of platelet transfusion among cases. Analysis of the results obtained would be an additional aid in management of Dengue.

1.1 Objectives

1. To study the clinical profile of in-patients admitted with Dengue Fever at Sri Manakula Vinayagar Medical College and Hospital (SMVMCH), Puducherry, India.
2. To compare the profile of these cases among platelet transfused and not transfused groups.

2. MATERIALS AND METHODS

2.1 Study Setting and Study Design

A hospital based retrospective analytical study, conducted at tertiary health care hospital Sri Manakula Vinayagar Medical College located at Kalitheerthalkuppam in rural Puducherry, India. Also caters to many adjacent towns of Tamilnadu such as Villupuram, Cuddalore and Thiruvanamalai district.

2.2 Study Participants

All adult patients between 14 to 80 years of age diagnosed with Dengue Fever (by NS1Ag or Dengue IgM or both done by ELISA method) from January 2017 to December 2017. Total of 427 cases were considered for the study.

2.3 Methods

After identifying patients admitted with Dengue fever were identified from the medical records, appropriate pre structured and pre tested standardized questionnaire was used to collect details regarding patients. Dengue was suspected based on the clinical features such as fever, nausea, vomiting, rash, aches and pain with laboratory evidence of leucopenia and

thrombocytopeniac [3]. Dengue hemorrhagic fever was identified based on bleeding manifestations and dengue shock syndrome was identified based on presence of hypotension despite fluid resuscitation. Diagnosis of dengue confirmed using NS1 Antigen testing and Ig-M and Ig-G ELISA testing done at admission. Patient demographic details, symptomatology, clinical findings, laboratory investigations were recorded. Trend of complete blood count was compared in all. Cases from admission to day of lowest platelet count to discharge. Among those cases with platelet trasfusion; pre and post transfusion platelet count were compared.

Scheme 1. Map of the study area
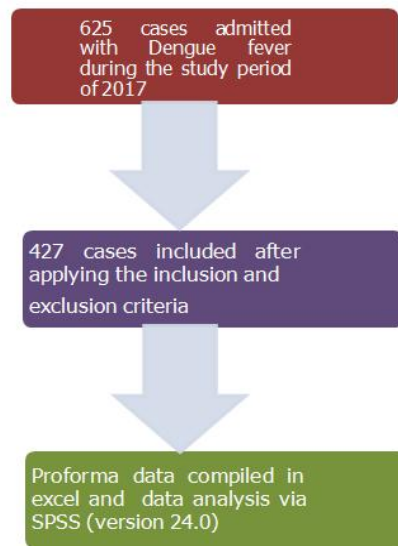
Scheme 2. Study flowchart

2.4 Statistical Analysis

Data was entered into Microsoft excel sheet and was analyzed by SPSS (version 24.0) software. Categorical variables was analyzed by using chi square test and continuous variables by using unpaired t test which was used as a test of significance. P value <0.05 was considered statistical significant. Descriptive data was analysed with a frequency distribution graph for categorical variables and mean standard deviation graph for continuous variables.

3. RESULTS

From Fig. 1 it is evident that majority of patients admitted with dengue fever in our study was between 20-29 years (33%) followed 24% belonging to 30-39 years.

From Fig. 2, male gender was most affected in our study.

From Fig. 3, the most common presenting symptom apart from fever was myalgia (24%) followed by nausea/vomiting (21%) and headache (20.6%). Retro-orbital pain (3%) was the least associated symptom with fever.

From Fig. 4 it is evident that bleeding manifestations among the patients affected with dengue fever in our study was observed in only 12.2%. Of them malena (4.7%) was the most common presentation followed by gum bleeding (4.2%) and the least common was subconjuctival haemorrhage.

Table 1. Co-morbidities associated with patients

Co-morbidities	Present
Diabetes	32(7.5%)
Hypertension	20(4.7%)
Pregnancy	6(3.9%)
Other	14(3.3%)
Smoking	18(4.2%)
Alcohol	14(3.3%)

From Table 1 it is eviden that diabetes was the commonest co-morbidity seen in patients presented with dengue fever in our study, which was 7.5%, followed by hypertension. 6% of patients were pregnant. Smoking and alcohol intake was present in 4.2% and 3.3% of individuals.

Fig. 5 shows the positivity of the serological test used in diagnosis of dengue fever. Dengue NS1 antigen is positive in most of the cases i.e. 80% followed by Dengue IgM in 50% of patients. IgG is least positive in just 6.2% of patients.

From Fig. 6 we can see that 61% of patients were having elevated aspartate aminotransferase (AST/SGOT) and alanine aminotransferase levels (ALT/SGPT) with AST more than ALT (1.5 times).
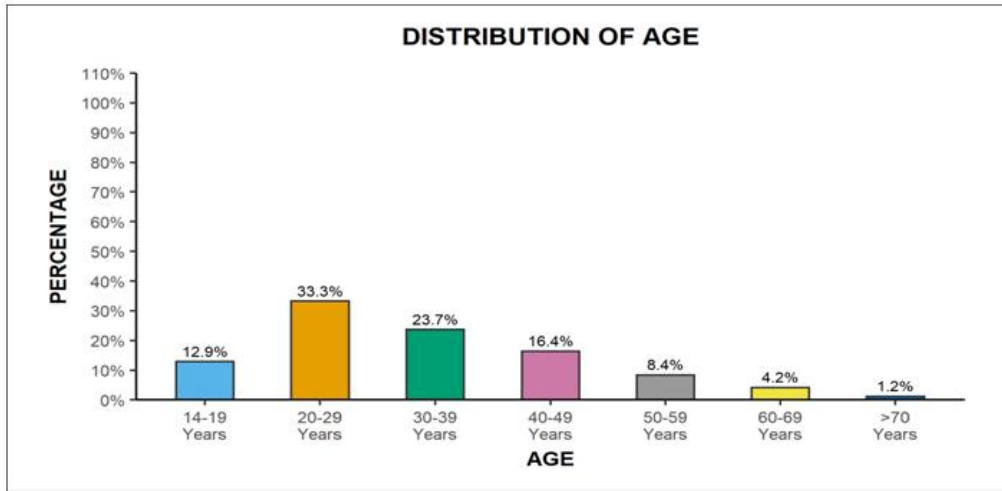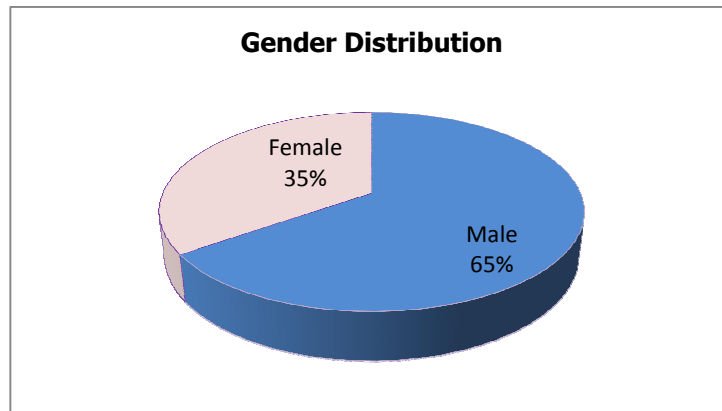
Fig. 1. Distribution of age in this study

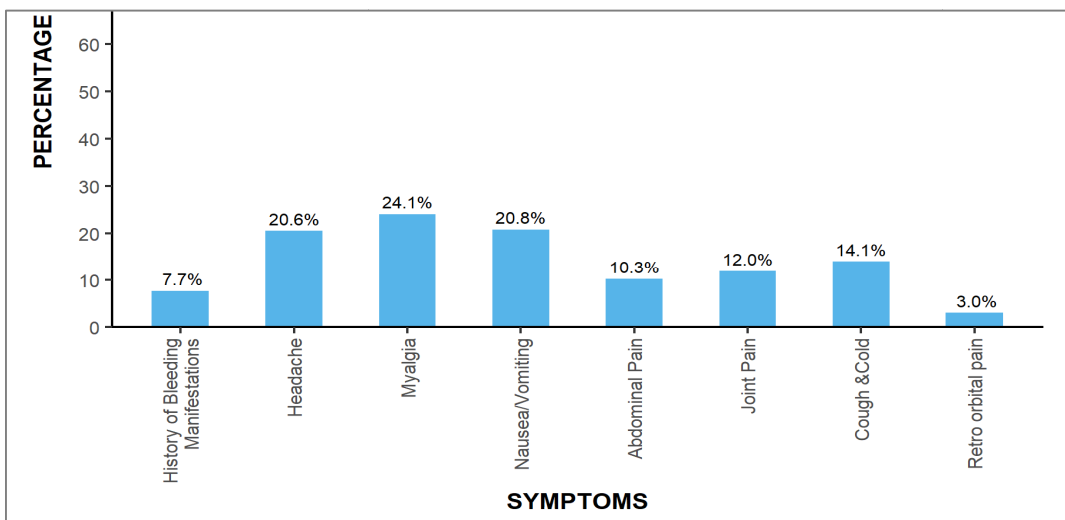**Fig. 2. Gender distribution in this study**

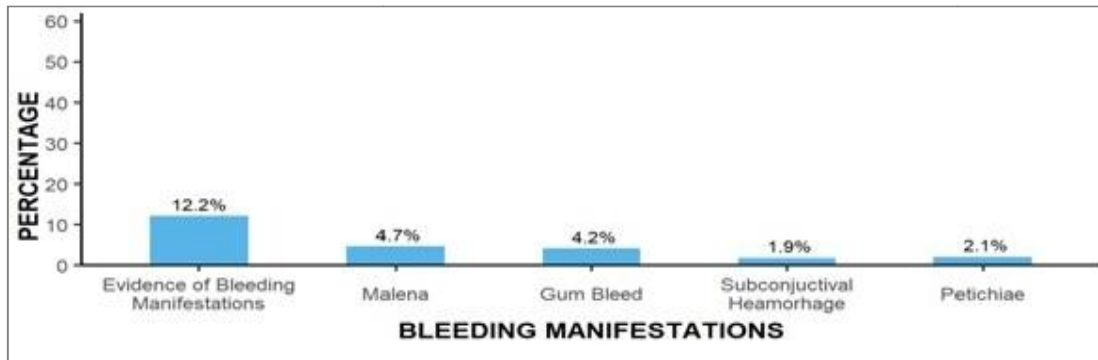**Fig. 3. Presenting symptoms of the patients**

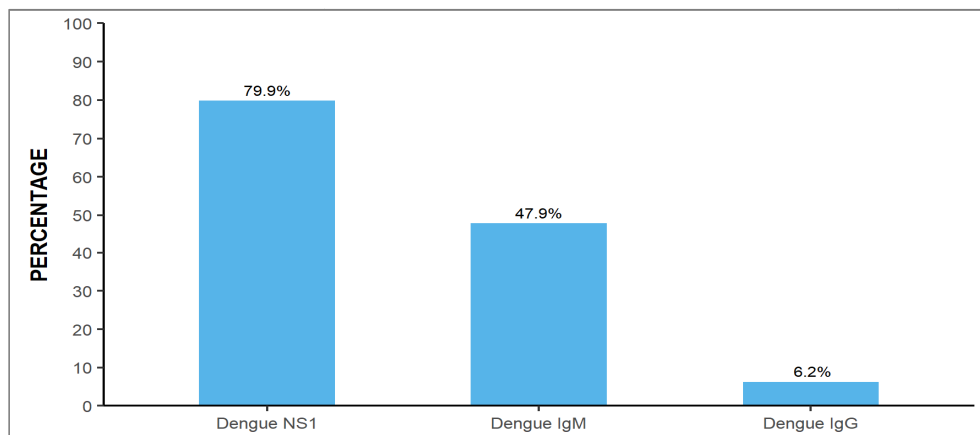**Fig. 4. Distribution of bleeding manifestations among patients**

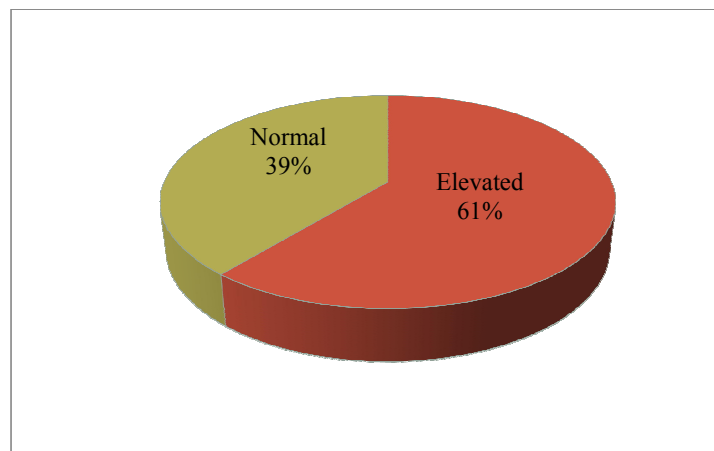**Fig. 5. Dengue serology tests of the patients**

Fig. 6. Percentage of patients having transaminitis

From Fig. 7 it is evident that among patients affected with dengue fever, only 20% required platelet transfusion.

From Fig. 8 it is evident that nearly 65% of patients received antibiotics for dengue fever

which can be avoided. It was found that doxycycline was the commonest antibiotic prescribed (39%) followed by ceftriaxone (15%).

From Fig. 9 it is evident that antibiotic administration did not significantly change the

course of fever compared to those who did not receive antibiotics.

From Table 2 it is evident that platelet transfusion was done for 79 out of the 427 cases. Among those cases with platelet transfusion evidence of bleeding manifestation was present in only 52%

of cases and the rest had no bleeding feature but yet received platelet transfusion which could have been avoided. Evidence of hypotension was seen in only 12.7% who received platelets which shows that platelet transfusion can be reserved for patients with hypotension with bleeding manifestations.
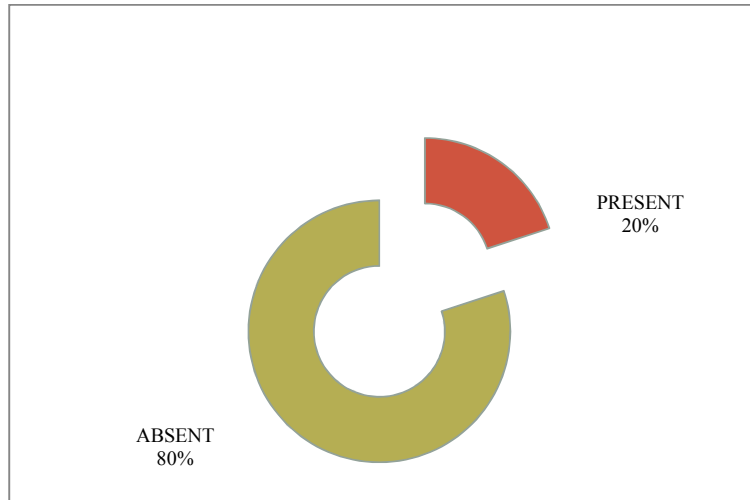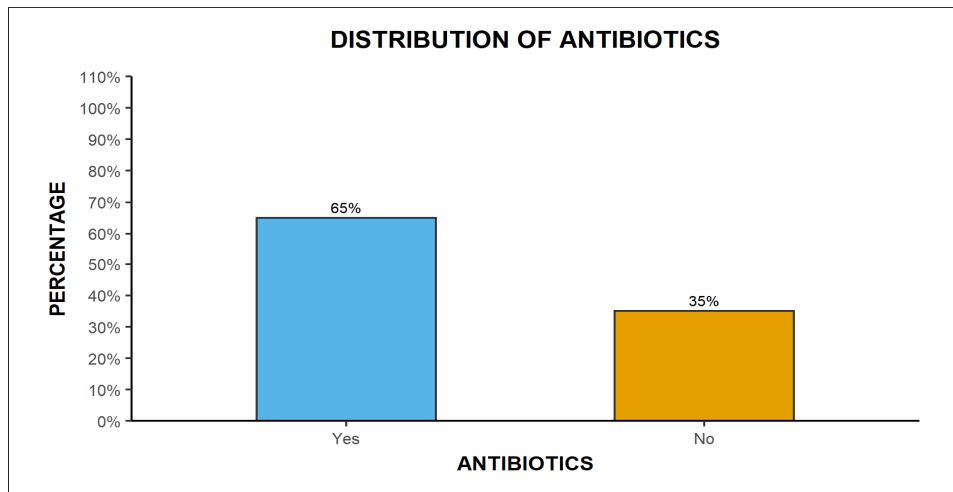

Fig. 7. Percentage of platelet transfusion

Fig. 8. Percentage of patients received antibiotics

Table 2. Association between platelet transfusion and other parameters

Parameters	Platelet transfusion present (N=79)	Platelet transfusion absent (N=348)	p value
Evidence of bleeding manifestations (present)	41 (51.9%)	11 (3.2)	< 0.001[2]
Evidence of hypotension (present)	10 (12.7%)	25 (7.2%)	0.109[2]
Dengue NS1 Positive	72 (91.1%)	269 (77.3)	0.006[2]
Units transfused	5.63 ± 2.96		
Average IVF in used First 3 Days (mL/day)	2000 ± 750	1600 ± 600	< 0.001[1]

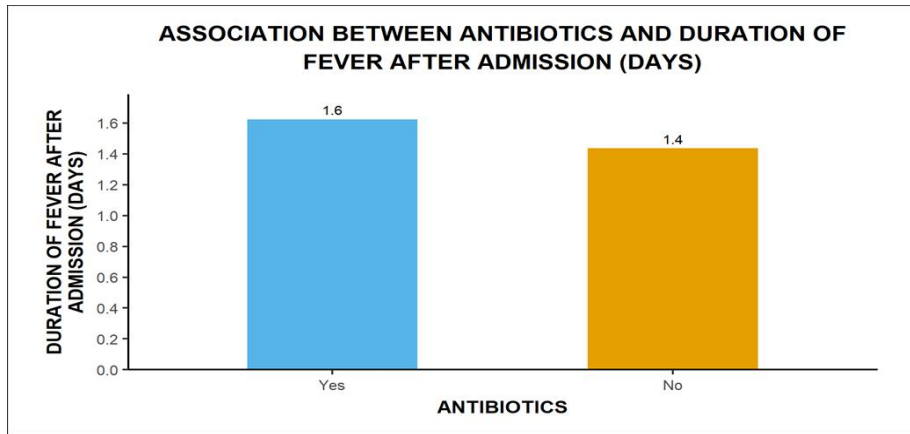**ASSOCIATION BETWEEN ANTIBIOTICS AND DURATION OF FEVER AFTER ADMISSION (DAYS)**

Fig. 9. Association between antibiotics administration and the duration of fever
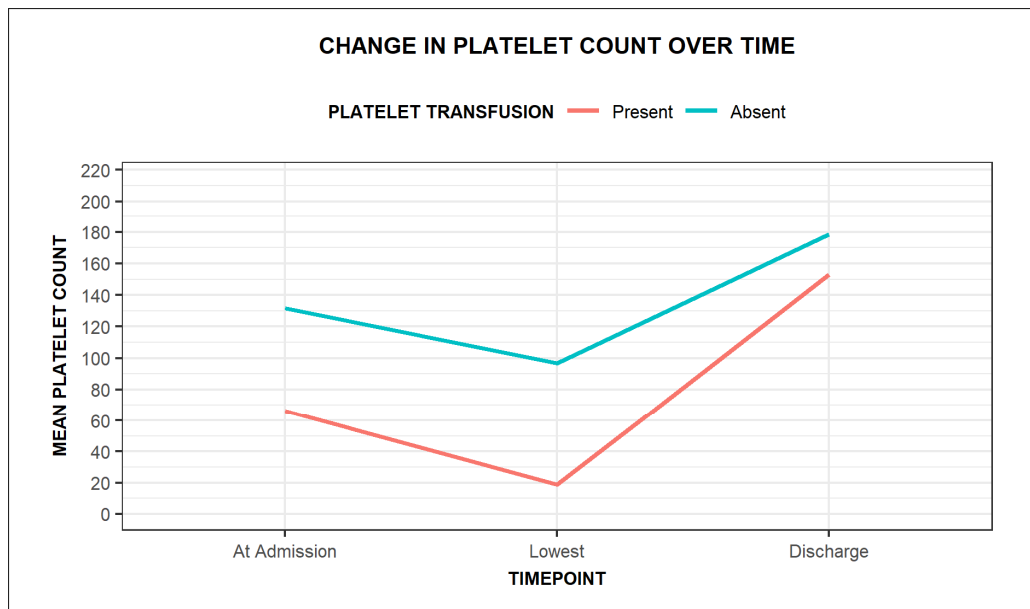
Fig. 10. Platelet count following transfusion
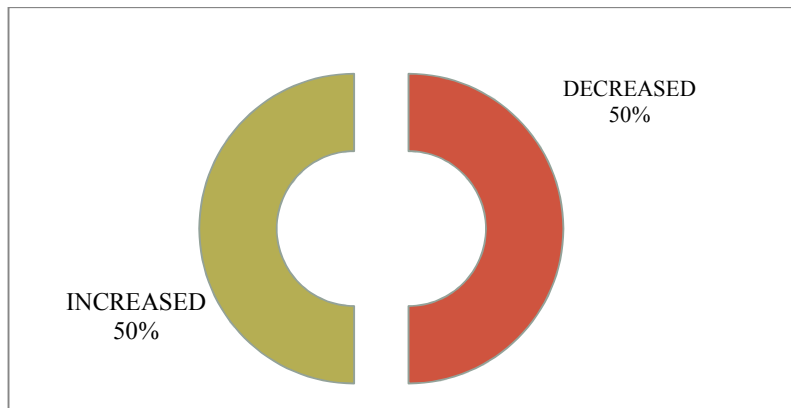
CHANGE IN PLATELET COUNT OVER TIME

Fig. 11. Change in platelet count following transfusion

CHANGE IN PLATELET COUNT OVER TIME

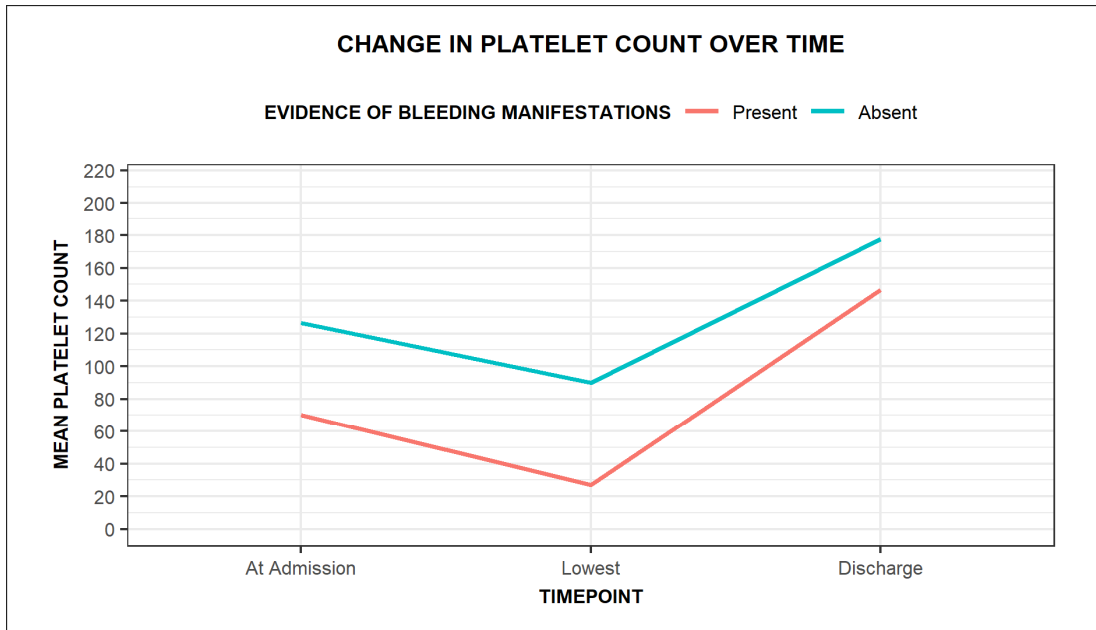EVIDENCE OF BLEEDING MANIFESTATIONS — Present — Absent

Fig. 12. Comparison of platelet count with bleeding manifestation

From the Table 3 it is evident that platelet transfusion has no effect on the natural course of the illness and the duration of hospitalization.

From Fig. 10 it is evident that platelet count increased in about 50% of patients who received platelet transfusion (n=79), while the rest 50% had further fall following before recovering baseline values.

It was evident from the Fig. 11 that platelet transfusion did not significantly improve the mean platelet count compared to those patients who did not receive platelet transfusion.

It was clear from the Fig. 12 that patients admission date platelet count had no relation to bleeding manifestation, rather; on serial monitoring, those with counts lower than 20,000 had bleeding manifestations.

From the Fig. 13, it is evident that antibiotic usage in patients with dengue fever had no effect on the leucocyte count.

4. DISCUSSION

Increase in the number of dengue cases over the past few years has been attributed to rapid unplanned urbanization with unchecked construction activities and poor sanitation facilities contributing fertile breeding areas for mosquitoes. It is also seen that increase in

alertness among medical personnel following the epidemics and availability of diagnostic tools in the hospitals have contributed to the increased detection of cases. Standardized treatment protocol and effective IV fluid rehydration has kept the mortality low [6].

In our retrospective study which included 427 cases of dengue fever admitted during the year 2017, nearly 50% of cases belonged to third and fourth decade and majority of patients were male sex suggesting a predominance of the mosquito to bite those engaged in outdoor activity during the day[10]. Apart from fever the most common associated symptom was myalgia followed by headache. History of bleeding manifestation was present in 7.7% of patients only. Documented evidence of bleeding manifestation was observed in 12.2% cases only. Of them malena was the common presentation followed by gum bleeding.

Diabetes (7.5%) and hypertension (4.7%) was the common co-morbidity associated with patients presented with dengue fever. Among the diagnostic test NS1 antigen testing was positive in majority of patients (80%) followed by IgM antibody positive in 50% of patients suggesting early presentation of these cases in the critical phase. During Critical phase if patient is well hydrated and maintaining hematocrit, platelet transfusion can be reserved unless in severe hemorrhage or shock, as these cases also had

Table 3. Association between length of hospitalization between platelet transfused and not transfused patients

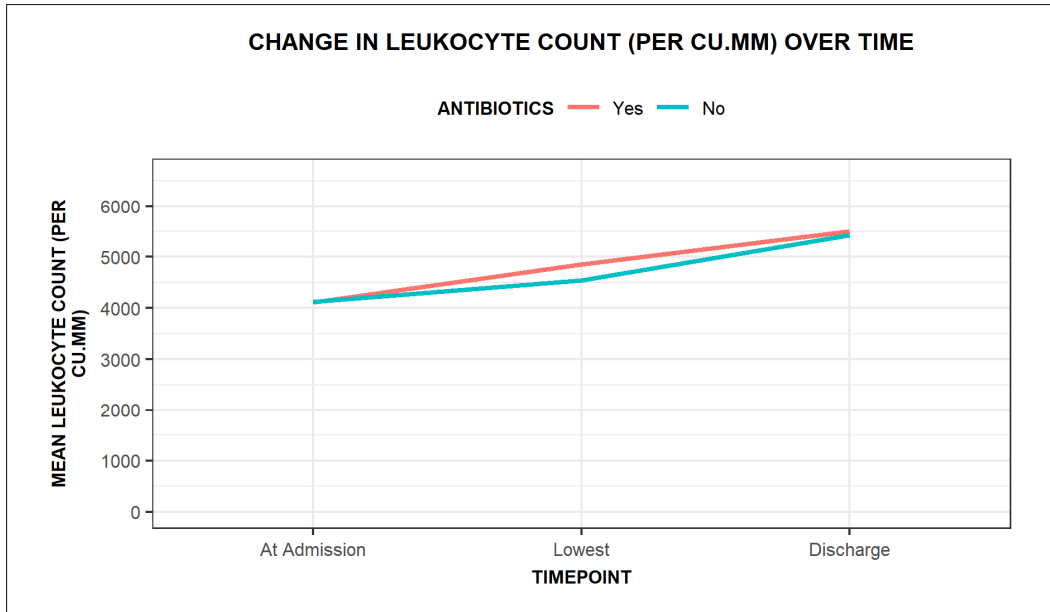| Platelet transfusion	Length of hospitalization (days)	p value
Present	6.59±2.67	<0.001
Absent	5.40±2.28	<0.001

Fig. 13. Relation between antibiotic usage and platelet count

the same mean duration of stay and up to 50% had further fall in platelet count. Among the other blood reports elevation of liver enzymes SGOT/ SGPT was observed in 61% of patients [11]. Though antibiotics are not needed for dengue fever, in our study it was given for 65% of patients and it was found not alter the duration of illness, length of hospitalization and trend of platelet count or leucocyte count. Hence clinicians should withhold antibiotics for an acute undifferentiated fever when suspecting dengue.

Hence platelet transfusion should be reserved only for patients with bleeding manifestations and shock with a platelet count less than 10,000[12]. Otherwise IV fluid rehydration is the mainstay treatment option for patients with dengue fever. Therefore early diagnosis, close monitoring and adequate fluid management goes a long way in reducing the mortality due to dengue hemorrhagic fever and shock syndrome.

5. CONCLUSION

Dengue fever despite its aggressive nature can be effectively managed by maintaining hydration and hemodynamic stability. Platelet transfusion and antibiotic therapy has failed to show any significant improvement in disease out comes, and should be reserved for Severe Dengue Haemorrhagic Shock.

Bleeding manifestations remain limited and not significant enough to cause circulatory collapse or alter prognosis. Hence adopting a more conservative approach towards platelet transfusion and antibiotic usage while laying emphasis on early effective fluid therapy and adequate nutrition can do all the magic required while the virus plays its game.

6. LIMITATIONS

Case records were used; hence the exposure or outcome was decided by the treating physician. Platelet transfusion done at the discretion of physician.

7. FUTURE IMPLICATIONS

The future implications of this study are directed towards managing dengue outbreaks with

adequate hydration and early recognition of dengue shock syndrome. Unnecessary platelet transfusion should be avoided which makes the availability of platelets for those patients who really needed it and also reduces the economic burden of the patient and also on the country.

CONSENT

As it was a retrospective case record based study, consent waiver was obtained.

ETHICAL APPROVAL

Institutional Ethics Committee approval was obtained prior to the study.

ACKNOLEDGEMENTS

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Vector-Borne Disease. World Health Organization.
   Available:https://www.who.int/news-room/fact-sheets/detail/vector-borne-diseases
2. Guzman G, Duane J, Izquerdo A, Martinez E, Halstead S. Dengue infection- natural reviews disease primers; 2016.
3. World Health Organisation. Dengue: Guidelines for diagnosis, treatment, prevention and control. Geneva: WHO; 2009.
4. Mishra VN, Nikhil M. Clinical and laboratory profile of dengue fever. JAPI. 2016;64:16-17.
5. Ministry of Health & Family Welfare-Government of India. Dengue/DHF situation in India. National Vector Borne Disease Control Programme.
   Available:https://nvbdcp.gov.in/index4.php?lang=1&level=0&linkid=431&lid=3715
6. Lee TH, Wong GX, Leo YS, Thein TL, Lye D, Lee K, et al. Potential harm of prophylactic platelet transfusion in adult dengue patients. PLoS Neglected Tropical Diseases. 2016;e0004576.
7. Vulavala S, Reddy Y, Kamarthy P. Study of clinical and laboratory profile of dengue fever patients. 2016;141:90-6.
8. Daniel R, Philip AZ. A study of Clinical Profile of Dengue Fever in Kollam, Kerala, India.
9. Mishra S, Ramanathan R, Agarwalla SK. Clinical profile of dengue fever in children: A study from southern Odisha, India. Scientifica. 2016;1-6.
10. Mishra VN, Motiramani N. Clinical and laboratory profile of dengue fever. Journal of the Association of Physicians of India. JAPI. 2016;64(6):102-03
11. Reghunath L, Rajendren K. Clinical profile of dengue fever in Kanyakumari government medical college. J Evid Based Med Health. 2017;4:43-45.
12. Gupta N, Srivastava S, Jain A. Dengue in India, Indian Journal of Medical Research. 2012;136:373–390.

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