

## ASSESSMENT AND UTILIZATION OF PLATELET IN THROMBOCYTOPENIA CASE: A HOSPITAL BASED RETROSPECTIVE STUDY.

Ms. G. Pravanika Sekhar<sup>1\*</sup> and Mrs. Neelam<sup>2</sup>

<sup>1</sup>Pharm D Intern (Gandhi Hospital, Secunderbad), CMR College of Pharmacy, Kandlakoya (V), Medchal Road, Hyderabad- 501401. Telangana State, India.

<sup>2</sup>M. Pharm. Assistant Professor, Department Of Pharmacy Practice, CMR College Of Pharmacy, Kandlakoya (V), Medchal Road, Hyderabad- 501401. Telangana State, India.

Article Received on  
25 Feb. 2019,

Revised on 15 Mar. 2019,  
Accepted on 05 April 2019

DOI: 10.20959/wjpr20195-14574

### \*Corresponding Author

**G. Pravanika Sekhar**

Pharm D Intern (Gandhi Hospital, Secunderbad),  
CMR College of Pharmacy,  
Kandlakoya (V), Medchal Road, Hyderabad, 501401.  
Telangana State, India.

### ABSTRACT

**Introduction:** Thrombocytopenia is the results of falling the number of platelets to 150,00/microL. Thrombocytopenia is not a diseases but is a diagnosis. It is the second most common hematological disorder after anemia. Platelets are indicated for the prevention (prophylactic) or treatment (therapeutic) of bleeding in patients with decreased platelet count (thrombocytopenia) or defective platelet function or both. **Aim and Objectives:** To assess the platelet usage pattern in department of general medicine. The main objectives were to indicate platelet usage in various blood ailments, to correlate the platelet transfusion with laboratory tests and to estimate the significance of platelet transfusion in blood disorders and diseases. **Methodology:** A Retrospective observational study was conducted during the period of

November 2018 – January 2019. The study included both male and female patients of above 14 years with blood disorders and diseases like dengue, malaria, acute febrile illness and others diseases form In-patient, department of medicine, Gandhi hospital, secunderabad.

**Results:** 91 cases were found to be thrombocytopenic in which female patients were at greater risk of developing thrombocytopenia which was commonly caused by acute febrile illness.

**Conclusion:** The present study concluded that young female were more affected when compared to men and all other age groups. The incidence rate of acute febrile illness with thrombocytopenia were high when compared to other diseases. No correlation was observed between the platelet count and the bleeding manifestations. Significance of the

platelet count showed a rapid increase on day three and seven after the transfusion of the blood. 2 pints of platelet transfusion was mostly preferred for faster recovery.

**KEYWORDS:** thrombocytopenia, platelet transfusion.

## INTRODUCTION

Platelets were first time reported in 1860 by Zimmerman. The role of clotting blood was suggested in 1878 by Zimmerman and Hayran. They are in the shape of disc which is 2-4  $\mu\text{m}$  wideness, colorless, seedless. Platelets have a role both in primer and in secondary hemostasis. Platelets are essential for maintaining the integrity of the vascular endothelium and controlling hemorrhage from small-vessels injury through the formation of platelet plugs. More extensive injury and involvement of larger blood vessels requires, in addition to platelets, the participation of the coagulation system to provide a firm, stable, fibrin clot.

Thrombocytopenia is the results of falling of the number of platelets from 150,00/microL. Thrombocytopenia is not a disease but is a diagnosis. The classification of thrombocytopenia is 1) Artificial thrombocytopenia; 2) decreased product thrombocyte; 3) increased platelet destruction which is further divided into a) immunologic and b) non immunologic. There are three major pathophysiological mechanisms in thrombocytopenia: reducing producing, rapid demolishing and sequestration.<sup>[1]</sup>

It is the second most common hematological disorder after anemia. It has various causes such as drugs, chemicals, clinical disorders, foods and additives. It can even effect both male and female, but most likely in the pregnant women.

Treatment depends upon the severity and condition of the patient. Corticosteroids are the first line therapy for thrombocytopenia in which prednisone drug is usually used, which can help the platelet count by decreasing the activity of the immune system, and in critical cases platelet transfusion is the most suitable option.<sup>[2]</sup>

Blood transfusion can be a lifesaving procedure, but it has risks, including infections and noninfectious complications. There is debate in the medical literature concerning the appropriate use of blood and blood products. Clinical trials investigating their use suggest that waiting to transfuse at lower hemoglobin levels is beneficial.<sup>[3,4]</sup>

The goal of transfusion therapy is to correct the abnormality which was not responding to other modes of treatment and to provide the patient with better life when safer alternatives were not possible. The various components that are available for the transfusion are: (a) Oxygen carrying components: Red cell components: (b) Platelet products: single donor platelet concentrates (apheresis) and random donor platelets concentrates; (c) Plasma products: fresh frozen plasma, cryoprecipitate, cryopoor plasma.<sup>[5,6,7,8]</sup>

Platelets, although tiny in appearance, are highly active metabolically. Patients participate in a number of reactions which contribute in maintaining hemostasis in circulation.

Significant progress has been made in platelets transfusion therapy in the last part of 20<sup>th</sup> century. In many western countries in the late 1990's, there was decline in the use of red blood cell concentrate, whereas the use of platelet concentrates increased by 80% according to the surveillance of Canadian Red Cross blood transfusion service.

The disproportionate increase had considerable effect on the supply of other blood components including the amount of plasma available for fractionation. Of course India has no data available on this aspect since to date due to limitation in blood banks supplying components. Now two platelet products are available for transfusion, random donor platelets and platelets obtained by apheresis or single donor platelets. The best approach will be focused on specific issues under different headings:

- a) Improvement in the preparation of platelet concentration.
- b) Platelet derivations
- c) Platelets transfusion
- d) Newer use of platelet concentrates.<sup>[9,10,11]</sup>

Platelet transfusion may be indicated to prevent hemorrhage in patients with thrombocytopenia or platelet function defects. Contraindications to platelet transfusion include thrombotic thrombocytopenic purpura and heparin-induced thrombocytopenia. Transfusion of platelets in these conditions can result in further thrombosis.<sup>[11,12]</sup>

One unit of apheresis platelets should increase the platelet count in adult by 30 to 60 × 10<sup>3</sup> per μL (30 to 60 × 10<sup>9</sup> per L). In neonates, transfusing 5 to 10 mL per kg of platelets should increase the platelet count by 50 to 100 × 10<sup>3</sup> per μL (50 to 60 × 10<sup>9</sup> per L).<sup>[11,12]</sup> One apheresis platelet collection is equivalent to six pooled random donor platelet concentrates.<sup>[15]</sup>

Platelets are indicated for the prevention (prophylactic) or treatment (therapeutic) of bleeding in patients with decreased platelet count (thrombocytopenia) or defective platelet function or both.<sup>[6]</sup>

The indications of platelet transfusion in adults and neonates are given in the table 1<sup>[16]</sup> and table 2<sup>[12-16]</sup>

**TABLE: I**

Indications for the transfusion of platelets in adults	
<b>Prophylactic transfusion indications</b>	Platelet count ( $\times 10^3$ per $\mu\text{L}$ )
<b>Major surgery or invasive procedure, no active bleeding</b>	$\leq 50$
<b>Ocular surgery or neurosurgery, no active bleeding</b>	$\leq 100$
<b>Surgery with active bleeding</b>	< 50 (usually) >100 (rarely)
<b>Stable nonbleeding</b>	<10
<b>Stable nonbleeding, and body temperature &gt; 100.4°F or undergoing invasive procedure</b>	<20

**TABLE: II**

Indications for the transfusion of platelets in neonates	
<b>Indications</b>	Platelet count ( $\times 10^3$ per $\mu\text{L}$ )
<b>Always transfuse</b>	<20
<b>Consider transfusion; transfusion for clinical reasons (e.g.; active bleeding, lumbar puncture)</b>	20 to <30
<b>Transfusion if any of the following exists: First week of life when the birth weight &lt;1000g Intra-ventricular or intra-parenchymal cerebral hemorrhage Coagulation disorder Sepsis or fluctuating arterial venous pressure Invasive procedure Alloimmune neonatal thrombocytopenia.</b>	30 to 50

Contraindications of platelet transfusion should not be done for: (a) the patients with thrombocytopenic purpura; (b) patients with ITP (Immune thrombocytopenic purpura) unless there is life threatening bleeding or intracranial hemorrhage. (c) Heparin induced thrombocytopenia.

The adverse effects that are seen for the transfusion of platelets are: (A) Febrile nonhaemolytic transfusion reaction; (B) alloimmunization, (C) Bacterial sepsis. Unwarranted platelet transfusion generates alloimmunization reducing efficacy of future transfusion, in addition to the usual adverse effects of blood components.<sup>[7,8]</sup>

**AIM**

To assess the platelet usage pattern in department of general medicine.

**OBJECTIVES**

- ❖ To indicate platelet usage in various blood ailments.
- ❖ To correlate the platelet transfusion with laboratory tests.
- ❖ To estimate the significance of platelet transfusion in blood disorders and diseases.

**METHODOLOGY**

**Study-site:** In-patient department of medicine, Gandhi hospital, Secunderabad.

**Study-design:** A retrospective observational study.

**Study-duration:** 3 months.

**Study-period:** November 2018 to January 2019.

**Inclusion-criteria**

1. Both male and female patients of above 14 years with blood disorders and diseases like dengue, malaria, acute febrile illness and others diseases.
2. In-patient, department of medicine, Gandhi hospital, Secunderabad.

**Exclusion-criteria:**

- Emergency department cases are excluded.
- Patients with severe organ failure are excluded.
- Tuberculosis patient are excluded.
- Patients who are on treatment with antiplatelet drugs.
- Diagnosed cases of immune thrombocytopenia purpura.
- Patients who had undergone surgeries.

**STUDY PROCEDURE**

The study was conducted in the department of medicine, Gandhi Hospital, Secunderabad.

- Data regarding the study was collected using the suitable data collection form.
- Data collection form included:
  - Demographic details of patient
  - PC Transfusion details.
  - Information regarding disease.
  - Detail basis of laboratory investigations

- The platelet transfusion details were reviewed during ward rounds on a daily basis from the day of admission to day of discharge.

## RESULTS

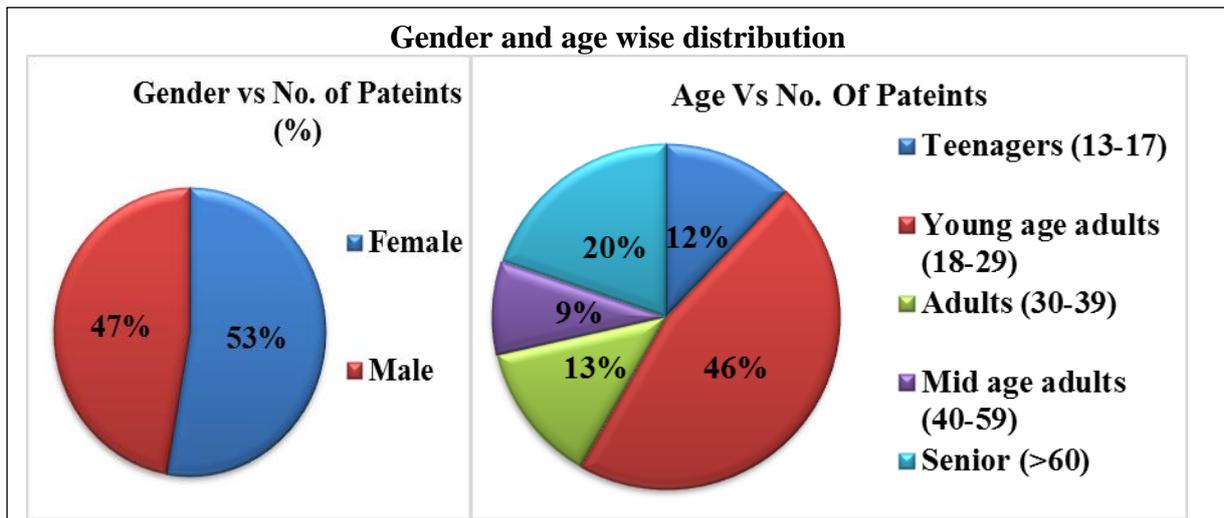
A total of 91 cases were collected and analyzed. The results were obtained as follows.

**Table III: Number of patients and their percentages in different categories.**

	No. of Pts:	%
<b>GENDER</b>		
Female	48	53
Male	43	47
<b>PLATELET COUNT</b>		
1 pint	17	19
2 pints	51	56
3 pints	5	5
4 pints	18	20
<b>WITHOUT BLEEDING LAB VALUES</b>		
>200	28	70
200-400	11	27
400-800	1	3
<b>WITH BLEEDING LAB VALUES</b>		
>200	4	8
200-400	10	20
400-800	37	72
<b>3<sup>rd</sup> DAY OF PLATELET COUNT AFTER TRANSFUSION</b>		
<600	12	13
600-800	41	45
800-1L	30	33
>1L	8	9
<b>7<sup>th</sup> DAY OF PLATELET COUNT AFTER TRANSFUSION</b>		
800-1L	24	31
>1L	39	43
Discharge	28	26
<b>AGE:</b>		
Teenagers (13-17)	11	20
Young age adults (18-29)	42	46
Adults (30-39)	12	13
Mid age adults (40-59)	8	9
Senior (>60)	18	20
<b>DISEASE:</b>		
Others(chronic liver disease,)	8	9
Anemia	22	24
Fever	45	49
Plasmodium vivax	5	6
Dengue	11	12

**Table 1: Gender and Age wise distribution.**

Gender			AGE		
Gender	No. Of Patients	Percentage	Age	No. of Patients	Percentage
Female	48	53	Teenagers (13-17)	11	20
Male	43	47	Young age adults (18-29)	42	46
			Adults (30-39)	12	13
			Mid age adults (40-59)	8	9
			Senior (>60)	18	20

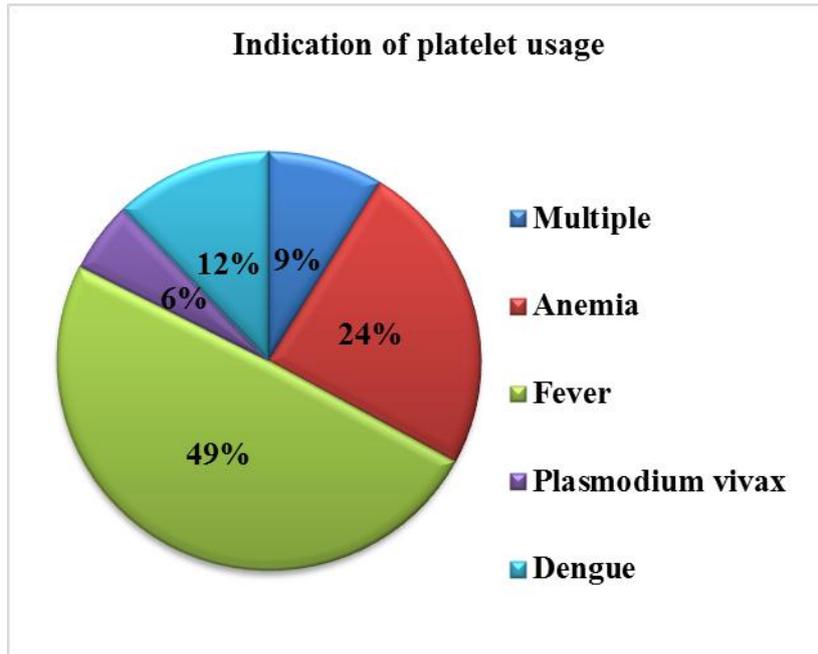


**Fig A: Gender and age wise distribution.**

**Report:** In the above table and fig., out of 91 cases collected, female patients are more affected in thrombocytopenia i.e., 48 (53%) then male i.e., 43(47%) and transfusion was done in young aged adults 42(46%) followed by senior citizens 18(20%), adults 12(13%), teenagers 11(12%), mid aged adults 8(9%).

**Table 2: Indication of Platelet Usage.**

DISEASE	No. of Patients	Percentage (%)
Multiple	8	9
Anemia	22	24
Fever	45	49
Plasmodium vivax	5	6
Dengue	11	12

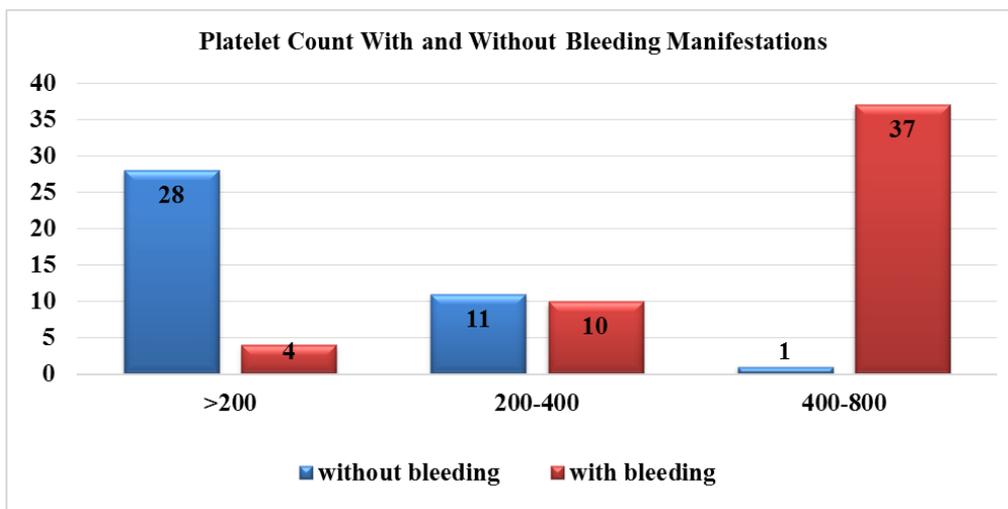


**Fig. B: Indication of Platelet Usage.**

**Report:** From cases collected, the most common disease associated with thrombocytopenia was found to be acute febrile illness (fever) (49%), followed by anemia (24%), dengue (12%), multiple diseases (9%), plasmodium vivax (6%).

**Table 3: Percentage of Platelet Count With and Without Bleeding Manifestations.**

platelet count	without bleeding	with bleeding	Total
>200	28	4	32
200-400	11	10	21
400-800	1	37	38
Total	40	51	91

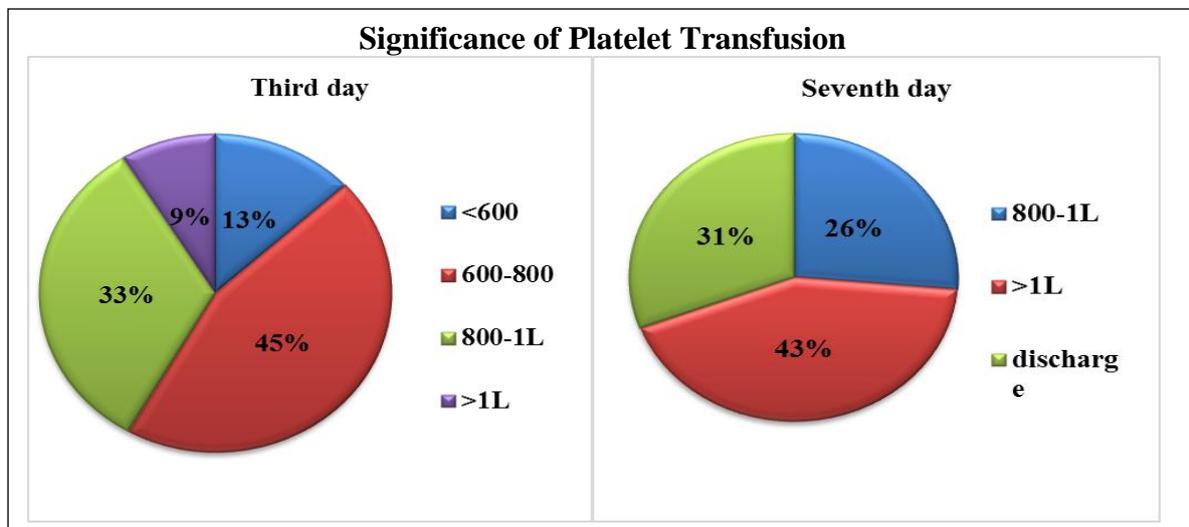


**Report:** from 91 cases collected, the platelet count of the patients are

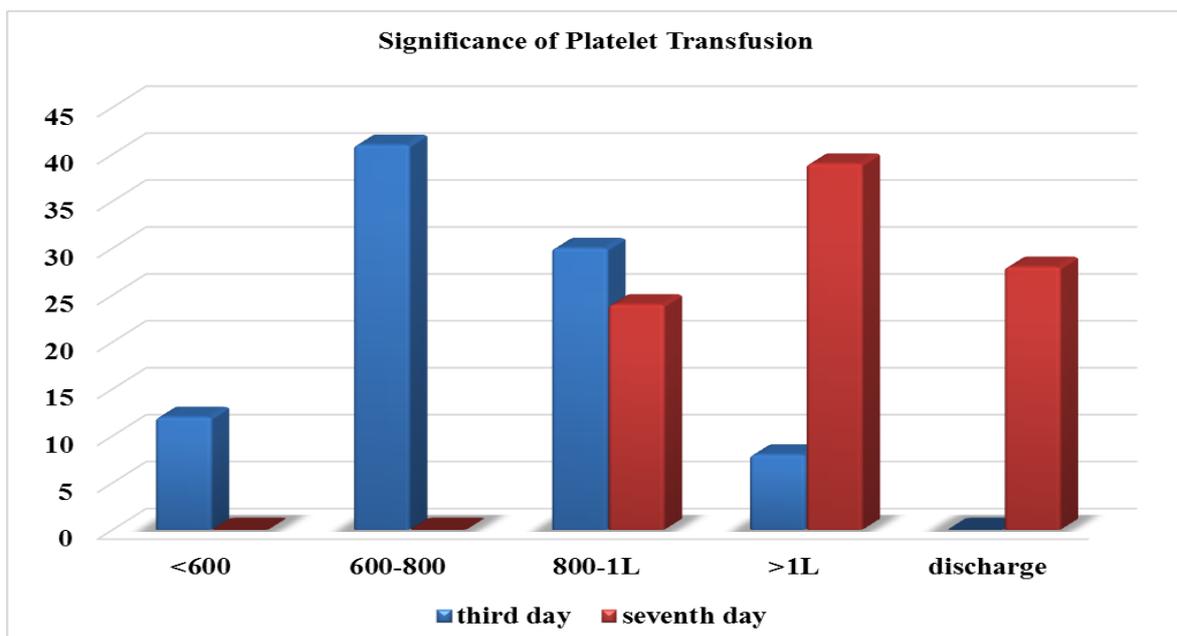
1. Without bleeding manifestations shows high levels for >200 followed by 200-400 then 400-800.
2. With bleeding manifestations shows high levels for 400-800 followed by 200-400 then >200.

**Table 4: Significance of Platelet Transfusion.**

Platelet count	third day	seventh day
<600	12	0
600-800	41	0
800-1L	30	24
>1L	8	39
discharge	0	28



**Fig. D: Significance of Platelet Transfusion.**



**Report:** From 91 cases collected, the third day after transfusion of platelets shows a rapid increase upto 600-800 (45%) followed by 800-1L (33%), <600 (13%) then >1L (9%). of the platelet count. the seventh day, after platelet transfusion the platelet count increases upto 1L for (43%) followed by discharged patients (26%) and then 800-1L (26%).

## DISCUSSION

Among the cases collected, 91 cases were considered to be thrombocytopenia and were included in the present study.

- ✚ In this study, it was found that the female population was at a greater risk of developing thrombocytopenia and young adults are more affected , this study gives a positive response to the study conducted by Sajwani FH, Tunaiji H O A (2014).<sup>[17]</sup>
- ✚ Fawas M N, Beevi K B, Vlliyot B, Balakrishnan S (2017) conducted a study in which it showed that dengue fever had been the most common cause of thrombocytopenia whereas in this study, it gives a negative response i.e., acute febrile illness is the most common cause of thrombocytopenia.<sup>[18]</sup>
- ✚ The study conducted by sreenivasa B, Manjunatha b, Nivil J (2017), found that there is no correlation between the platelet count and increase of incidence of bleeding manifestations in dengue fever which showed a similar response as per the present study.<sup>[19]</sup>
- ✚ The significance of the platelet count rapidly increases after the transfusion and the stay in hospital is decreased in this present study which is similar to the study conducted by Jayanthi HK, Tulasi SK (2016).<sup>[20]</sup>

## CONCLUSION

The present study concluded that young females were more affected when compared to men and all other age groups. The incidence rate of acute febrile illness with thrombocytopenia was high when compared to other diseases. No correlation was observed between the platelet count and the bleeding manifestations. Significance of the platelet count showed a rapid increase on day three and seven after the transfusion of the blood. 2 pints of platelet transfusion was mostly preferred for faster recovery.

## REFERENCES

1. Erkurt MA, Kaya E, Berber I, Koroglu M, Kuku I. Thrombocytopenia in adults; review article, *j hemtol*, 2012; 1(2-3): 44-53.

- [https://www.researchgate.net/publication/229428495\\_Thrombocytopenia\\_in\\_Adults\\_Review\\_Article](https://www.researchgate.net/publication/229428495_Thrombocytopenia_in_Adults_Review_Article).
2. Chaudhary B, Jyothi Y, Rabbani SI. Thrombocytopenia and its causes. *Journal of chemical and pharmaceutical research*, 2016; 8(2): 184-189.  
<http://www.jocpr.com/articles/thrombocytopenia-and-its-causes.pdf>.
  3. Sharma S, Sharma P, Tyler LN. Transfusion of blood and blood products: indications and complications. *Am Fam Physician*, 2011 mar 15; 83(6): 719-724.
  4. Hebert PC, et al. a multicenter, randomized, controlled clinical trial of transfusion requirements in critical care. Transfusion requirements in critical care investigators, Canadian critical care trials group. *N Engl J Med*. 1999;340(6):409-417.
  5. Resident manual, JIPMER, poducherry.
  6. Michael F. Murphy and Derwood H. Pamphilon (ed). *Practical transfusion medicine*, 2009.
  7. Morcela Contreras (ed). *ABC of transfusion*, 4<sup>th</sup> edition.
  8. Resident manual, SGPGI, lucknow.
  9. Mohanty D, current concepts in platelet transfusion. *Asian J Transfus Sci.*, 2009 jan; 3(1): 18-21.
  10. Heddle NM, Klama LN, Griffith L, Roberts R, Shukla g, Kelto IC. The role of plasma from platelet concentrates in transfusion reactions. *N Engl Med*, 1994; 331: 625-8.
  11. Seghatchian J. platelet therapy: current opininons on laboratory and clinical aspects. *Transfuse Sci.*, 1997; 18: 345-50.
  12. British committee for standards in haematology, blood transfusion task force: guidelines for the use of platelet transfusions. *Br J Haematol*, 2003; 122(1): 10-23.
  13. Schiffer CA, etal. Platelet transfusion for patients with cancer: clinical practice guidelines of the American society of clinical oncology. *J Clin Oncol*, 2001; 19(5): 1519-1538.
  14. King KE, Bandarenko N. *Blood transfusion therapy: A Physician's handbook*. 9<sup>th</sup> edition Bethesda, MD.: American Association of blood banks, 2008; 236.
  15. Poterjov BS, Josephson CD. Platelets, frozen plams, and cryoprecipitate: what is the clinical evidence for their use in the neonatal intensive care unit? *Semin Perinatal*, 2009; 33(1): 66-74.
  16. Ljumbruno G, etal. Italian society of transfusion medicine and immunohematology work group. Recommendations of plasma and platelets. *Blood transfuse*, 2009; 7(2): 132-150.
  17. Sajwani FH, Tunaiji H O A. Demographic and clinical analysis on hospitalized patients with thrombocytopenia, 2014; 5(2): 58-64.

<http://www.jahjournal.org/article.asp?issn=16585127;year=2014;volume=5;issue=2;spage=58;epage=64;aulast=Sajwani;type=3>.

18. Fawas MN, BEEVI KB, Valliyot B, Balakrishnan S. Study of acute febrile illness with thrombocytopenia in a tertiary care centre. *Int J Res Med Sci.*, 2018; 6: 455-8.  
<https://www.msjonline.org/index.php/ijrms/article/view/4451/3658>.
19. Sreenivasa B, Manjunatha b, Nivil J. Bleeding manifestations in dengue and their correlation with the platelet count. *Sri lanka journal of child health*, 2017; 46(3): 218-221.
20. Jayanthi HK, Tulasi SK. Correlation study between platelet count leukocyte, nonhemorrhagic complications, duration of hospital stay in gangue fever with thrombocytopenia. *J Family Med Prim Cre*, 2016; 5(1): 120-123.  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4943117>.