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Prevalence of Thrombocytopenia in Dengue Fever Patients

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Abstract

Dengue fever (DF) is an intense febrile disease described by abrupt beginning of fever of 3-5 days, intense migraine, myalgia, joint pain, retro-orbital agony, anorexia, gastrointestinal unsettling influences and different levels of thrombocytopenia. Thrombocytopenia has reliably been one of the likely clinical pointers of dengue severity. As our studies revealed that overall prevalence of thrombocytopenia in Dengue is high i.e., 69% from mild to severe. However, since the female to male ratio i.e., 21:79 was unfairly very low to generalize the gender-wise prevalence result. In addition, severity of clinical manifestation of dengue disease were correlated with the respective platelet counts and there was a negative correlation between platelet count and clinical complications indicating that lower the platelet count more are the complications and their respective severity as patients with lower platelet count was found to have higher chances of non-hemorrhagic complications. Further forthcoming investigations are expected to assess the utility of other blood indices in dengue fever so, there is a need to concentrate on the detail hematology profile and comprehend its significance so that the adverse outcomes of this rapidly spreading disease can be controlled to a great extent.

Keywords

Thrombocytopenia; Non-haemorrhagic complications; Platelets; Dengue.

1. Introduction

Dengue fever as the name proposes is an intense febrile infection that when an individual interacts with, they have a high possibility going through various indications that are troublesome to their wellbeing a couple of the normal models are, extreme migraine, gastro gastrointestinal aggravation, dengue shock, and (DHF) dengue haemorrhagic fever, throughout 3-5 days (Halstead, 2007; Guzman & Harris, 2015). In dengue, when inspected a patient's platelet count had appeared to diminish and on a further note this data could be utilized to anticipate the seriousness of the illness (Mehboob, et al., 2013). Such a fall in platelet count is known as thrombocytopenia (Mukker & Kiran, 2018; Schexneider & Reedy, 2005). WHO guidelines have consistently included thrombocytopenia as one of the models for deciding clinical seriousness of dengue (Boo et al., 2019). A quick fall in platelet count or a platelet count less than 150,000 for each microliter of blood are both characterized in severe dengue (Kohli et al., 2008; Selvan et al., 2015). Thus, the aim of this research is to determine the overall prevalence of thrombocytopenia among dengue patients and also to study the correlation between thrombocytopenia and severity of dengue disease (non-haemorrhagic complications).

2. Materials and Methods

This was a prospective study conducted in Civil Hospital, Quetta. Data was collected with the help of a self-developed questionnaire from patients (or their attendees) with positive dengue serology (NS1 antigen, IgM/IgG antibody to the dengue virus). Informed consent was obtained from these patients (or their attendees) keeping the sample size 100. Inclusion criteria: All patients 18 years and above with clinical features of dengue with seropositivity for dengue attending Civil hospital were included. And also, those patients who agreed to provide their platelet count results. Exclusion criteria are patients with sepsis or any other active infections such as hepatitis, acute kidney injury etc were excluded. By means of Microsoft excel 2013, statistical analysis of the data was done

3. Results

Table 1 and Figure 1 depicts the gender of the studied patients who participated in this study. Moreover, total platelets count of patients at the time of Dengue diagnosis were given in Table 2 and Figure 2.

Table 1. Gender distribution of the studied patients

S.no	Gender	No of patients (%) (n=100)
1	Females	21
2	Males	79

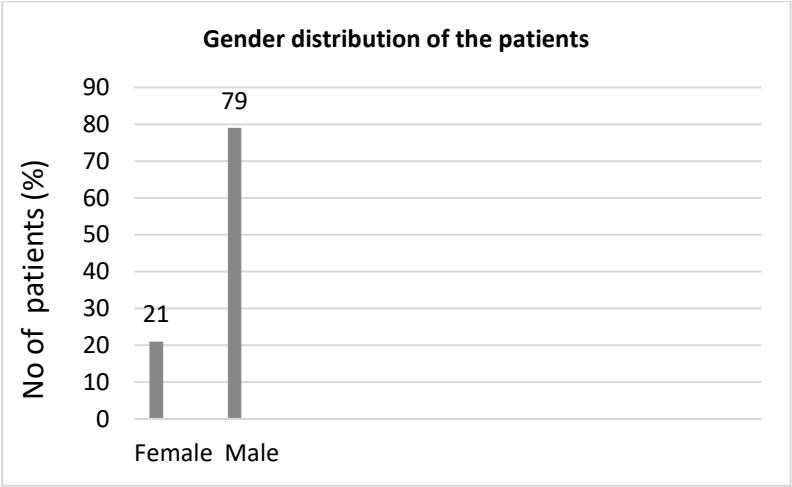

Figure 1. Gender distribution of the patients

Advancement of thrombocytopenia in dengue patients essentially lays on two occasions: diminished creation of platelets in the bone marrow and additionally expanded obliteration and leeway of platelets from fringe blood (Garcia et al., 1995; Aroor et al., 2015). The progressions in platelet proportions reflects the bone marrow contribution in dengue infection. Interestedly, early bone marrow concealment has long been perceived as a typical clinical component in dengue infected patients (Jayanthi & Tulasi, 2016). Of the 100 seropositive cases, 31% had normal platelet count while 47% had low platelet count, 19% accounts for moderately low count and 3% had severely low platelets count as depicted in Figure 2 and Table 2.

Table 2. Total platelets count of Dengue patients

S.no	**Total platelets count (Normal count: 150,000 to 400,000 platelets /µl of blood)**	**No of Patients (%) (n=100)**
1	> 400,000 (high)	0
2	150,000 - 400,000 (normal)	31----- (19 females i.e., 6) (81 males i.e., 25)
3	100,000 – 150,000 (low)	47-----(24 females i.e.,11) (76 males i.e.,36)
4	50,000 – 99,000 (moderately low)	19----- (21 females i.e.,4) (79 males i.e.,15)
5	< 50,000 (severely low)	3-----(males)

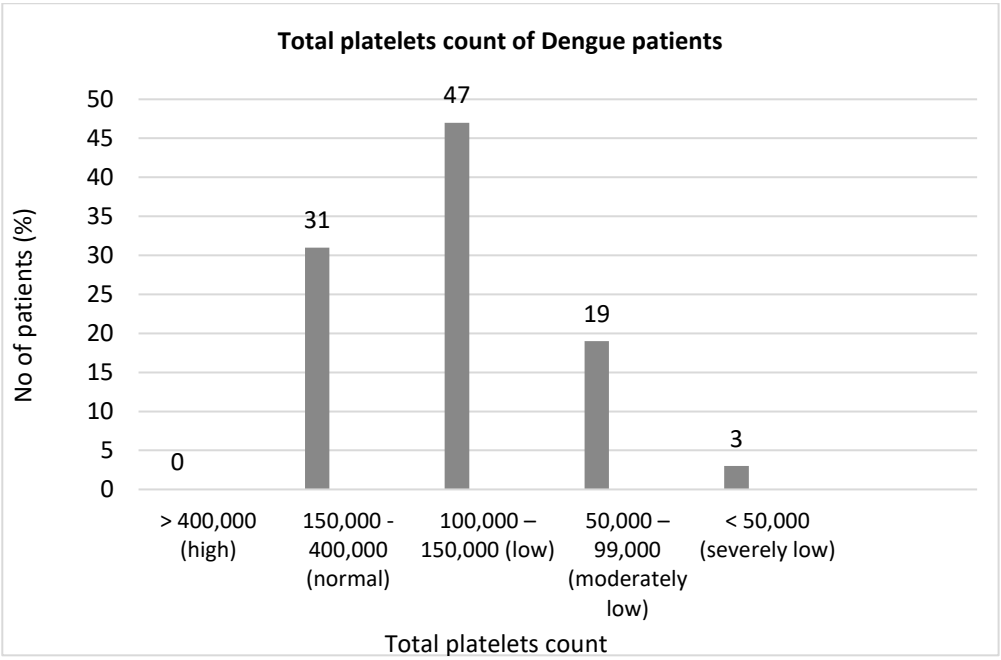

Figure 2. Total platelets count of Dengue patients

Overall prevalence of thrombocytopenia among Dengue patients given in Table 3 and Figure 3. Dengue fever (DF) is an intense febrile disease described by abrupt beginning of fever of 3-5 days, intense migraine, myalgia, joint pain, retro-orbital agony, anorexia, gastrointestinal unsettling influences and different levels of thrombocytopenia (Wiwanitkit, 2010; Effler et al., 2005). Thrombocytopenia has reliably been one of the likely clinical pointers of dengue severity (Nelson & Bierman, 1964). As our studies revealed that overall prevalence of thrombocytopenia in Dengue is high i.e., 69% from mild to severe as shown in Figure 3 and Table 3.

Table 3. Prevalence of thrombocytopenia among Dengue patients

S.no	Overall prevalence of thrombocytopenia (< 150,000 platelets /µl of blood)	No of Patients (%) (n=100)
1	100,000 – 150,000 (Mild thrombocytopenia)	47
2	50,000 – 99,000 (Moderate thrombocytopenia)	19
3	< 50,000 (Severe thrombocytopenia)	3
		Total = 69

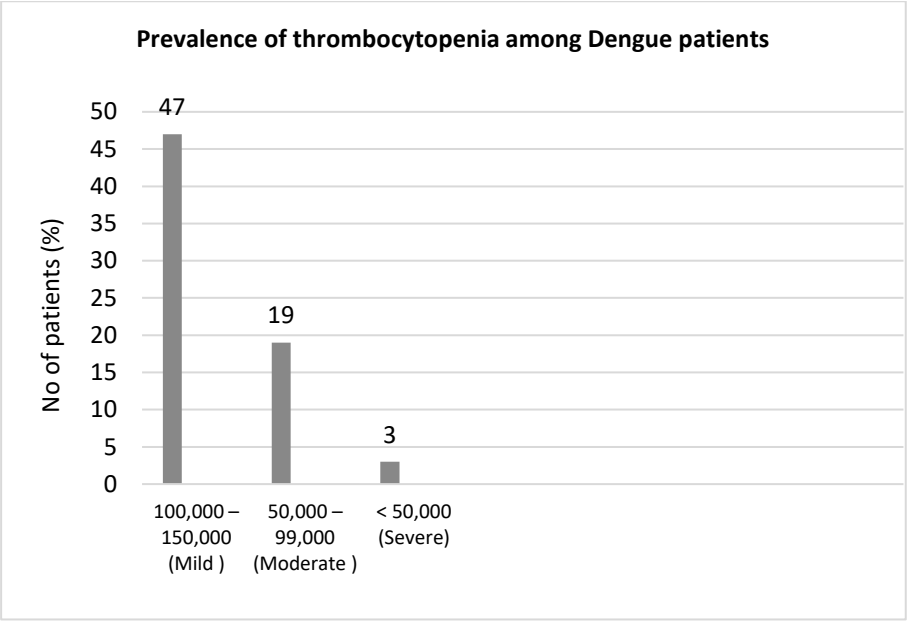

Figure 3. Prevalence of thrombocytopenia among Dengue patients

The decreasing platelet counts have found to predict the severity of thrombocytopenia in dengue disease as shown in Figure 3 and Table 3 that 47% of dengue patients had mild thrombocytopenia but as the platelet count is further decreased it leads to moderate thrombocytopenia i.e., 19% and even to severe conditions that could be fatal leading to prolonged recovery phase suggesting that as platelet count decreases the duration of hospital stay increases. Thus, a significant association was observed between the platelets count and severity of thrombocytopenia effecting disease recovery phase (Ojha et al., 2017; Raikar et al., 2013). Gender-wise prevalence of thrombocytopenia among Dengue patients were given in Table 4 and Figure 4.

Table 4. Gender-wise prevalence of thrombocytopenia among Dengue patients

S.no	Prevalence of thrombocytopenia	No of Patients (%)
1	Males (n=79)	68
2	Females (n=21)	71

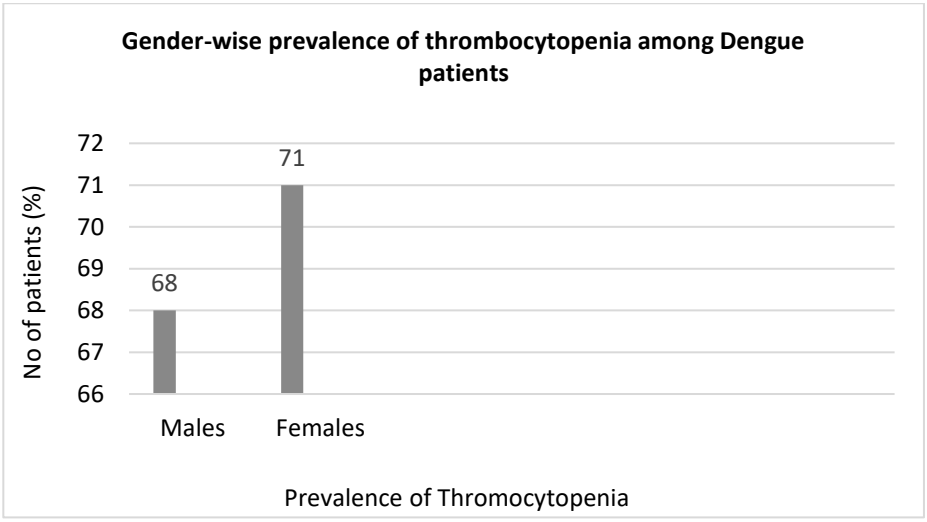

Figure 4. Gender-wise prevalence of Thrombocytopenia

Thrombocytopenia might be related with alterations in megakaryocytopoieses caused by the disease of human hematopoietic cells and impaired progenitor cell development, bringing about platelet dysfunction (platelet enactment and aggregation), increased annihilation or consumption (Nugent et al., 2009; Azeredo et al., 2015). In addition, we could say that the gender-wise prevalence of thrombocytopenia was also found to be high in both the genders as depicted in Figure 4 and table 4 however since the female to male ratio i.e., 21:79 was unfairly very low to generalize the gender-wise prevalence result.

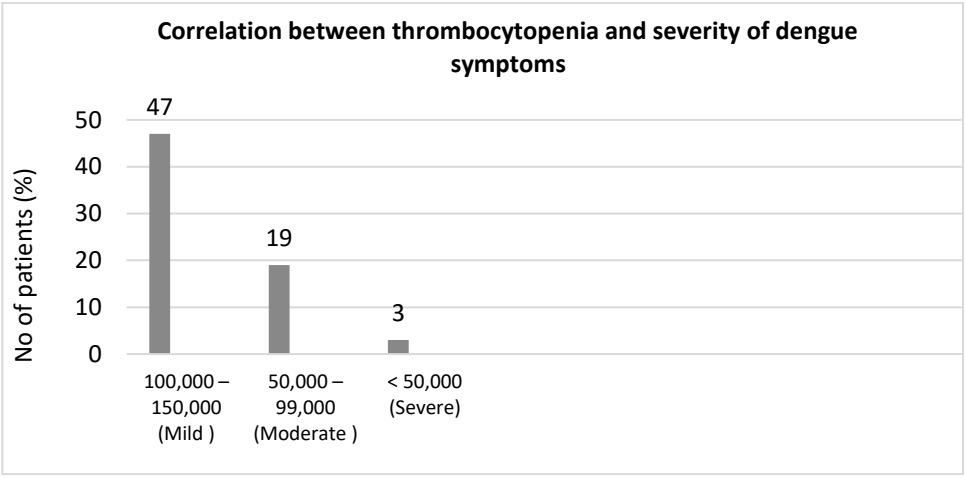

Figure 5. Correlation between thrombocytopenia and severity of dengue symptoms

The correlation between thrombocytopenia and severity of dengue disease based on the clinical manifestation in dengue as depicted in Figure 5. In addition, the correlation between

thrombocytopenia and severity of dengue disease as depicted in Figure 5 revealed a negative correlation indicating that lower the platelet count more are the complications and thus severity of dengue as patients with lower platelet count was found to have higher chances of non-hemorrhagic complications (Khare & Raj, 2017; Halsey et al., 2012).

5. Conclusion

The prevalence of thrombocytopenia in dengue fever was reported to be high in our research due to low platelet count of the infected patients and hence can be used as a predictor of Dengue severity. Further forthcoming investigations are expected to assess the utility of other blood indices in dengue fever so, there is a need to concentrate on the detail hematology profile and comprehend its significance so that the adverse outcomes of this rapidly spreading disease can be controlled to a great extent.

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