



## **To Determine the Frequency of Thrombocytopenia in Pre Eclamptic Presented at Isra University Hospital**

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### **Authors' contributions**

This work was carried out in collaboration among all authors. Authors HK and RA were involved in conception of idea and study design. Author AN did data collection and performed bench work. Author NM performed the statistical analysis. Authors AI and Safia managed the literature searches. All authors read and approved the final manuscript.

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### **ABSTRACT**

**Objective:** To determine the frequency of thrombocytopenia in pre-eclamptic women presented at Isra University Hospital Hyderabad.

**Patients and Methods:** This cross sectional descriptive study of six months study was conducted at Isra university hospital from April 2019 to September 2019. All the patients between  $\geq 18$  - 45 years of age diagnosed preeclampsia were admitted and evaluated for thrombocytopenia.

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**Results:** During six month study period, total of 177 patients with preeclampsia were evaluated for thrombocytopenia. The majority of patients were from urban areas 125/177 (70.6%). The mean  $\pm$ SD for maternal and gestational age of the preeclamptic patient was  $32.75\pm 8.85$  and  $28.75\pm 7.63$  whereas the mean platelet count was  $93200\pm 10.74$  respectively. The majority of the patients were 21-30 years of age (54.8%) and the finding was statistically significant with gestational age [ $p=0.002$ ]. The thrombocytopenia was observed in 99/177 (55.9%) and is statistically with relation to maternal age, gestational age and parity while in context to gravida and duration of disease it is non significant.

**Conclusion:** A significantly high frequency of thrombocytopenia (55.9%) was recorded in the patients with preeclampsia and is statistically with relation to maternal and gestational age and parity.

*Keywords: Pre-eclampsia; platelet; thrombocytopenia.*

## 1. INTRODUCTION

Pre-eclampsia is a common pregnancy complication that can cause high morbidity and mortality for both the mother and the fetus [1]. Its condition accounts for 4-8% of all pregnancies worldwide and is characterized by high blood pressure, proteinuria, and edema [2]. This is characterized by malignant hypertension and convulsions requiring emergency caesarean section. One study conducted by Rathore et al. reported prevalence of pre-eclampsia in Pakistan 19% [3]. In a study examining emergency obstetric care (EOC) in Bangladesh, 5% of patients in medical facilities had pre-eclampsia. However, the precise etiology of preeclampsia is unknown [4]. The outcomes from medical research showed the relationship between the aggravation of the hypertensive complication and the change in concentration of various chemistries in the mother's serum [5,6].

Pregnancy is related to the physiological and pathological changes of platelet count and function, which may be a clinical concern because of the risk of bleeding from the fetus and mother. Thrombocytopenia during pregnancy is commonly encountered in obstetrics and gynecological practice [7]. It affects 10 % of all pregnant women [8]. It can be considered, when platelet count is below  $150 \times 10^9/L$  [9]. Normal range of platelet varies between  $150 \times 10^9/L$  and  $400 \times 10^9/L$  in pregnant women. It can be classified as mild, moderate and severe thrombocytopenia as count from  $100-150 \times 10^9/L$ ,  $50-100 \times 10^9/L$  and less than  $50 \times 10^9/L$  respectively [10,11]. The reported prevalence for thrombocytopenia in preeclampsia is 21% [12].

## 2. MATERIAL AND METHODS

This was a cross sectional descriptive study of the 177 preeclamptic ladies at the department of Obstetrics and gynecological department of Isra University Hospital from April 2019 to September 2019.

All pregnant women aged between 18 - 45 years diagnosed to have preeclampsia and patients relative gave the written consent to participate in the study were included in this study. Exclusion criteria were known case of idiopathic thrombocytopenic purpura (as platelets are lyzed in this disease), known case of a plastic anemia, myelodysplastic syndrome, osteopetrosis (in which platelet production is impaired), already on drug therapy (fansidar, septran, thiazides and chemotherapeutic agents that can lead to thrombocytopenia), had history of repeated blood / platelet transfusion, non-consenting patients. The data were collected by filling specified proforma by patients admitted in labour room after obtaining an informed written consent. All the pregnant preeclamptic patients were admitted into the ward and were further evaluated for thrombocytopenia for which 3cc venous blood sample was collected in disposable syringe, transferred to CP bottle and sent to the laboratory for analysis.

## 3. RESULTS

During the six months study period a total of 177 patients with preeclampsia were evaluated for thrombocytopenia. The Majority of patients were from urban areas 125/177 (70.6%). The mean  $\pm$ SD for maternal and gestational age of the preeclamptic patient was  $32.75\pm 8.85$  and  $28.75\pm 7.63$  whereas the mean platelet count was  $93200\pm 10.74$  respectively. The distribution of maternal age against the gestational age, parity,

gravida, duration of disease and thrombocytopenia. The distribution of gestational age against the parity, gravida, duration of disease and thrombocytopenia is shown in Table 1. The gravida in context to duration of disease and thrombocytopenia is shown in Table 2 whereas the thrombocytopenia in relation to the duration of disease is mentioned in 2.

#### 4. DISCUSSION

Thrombocytopenia is 2nd only to anemia, found as the most frequent hematological abnormality at some stage in pregnancy. Hypertensive problems 21% cases of thrombocytopenia in pregnancy [13,14].

**Table 1. Age distribution against different variables (n=177)**

Variable	AGE DISTRIBUTION (Years)				P value
	18-20 years	21-30 years	31-40 years	41-45 years	
<b>PARITY</b>					
• 0	3	8	9	1	0.01
• 1-2	10	32	21	7	
• 3-5	10	27	2	3	
• >5	6	30	7	1	
<b>GRAVIDITY</b>					
• 1-2	7	16	7	0	0.63
• 3-5	14	52	20	9	
• >5	8	29	12	3	
<b>DURATION OF THE DISEASE (Weeks)</b>					
• 21-25	3	19	7	4	0.02
• 26-30	24	53	17	5	
• 31-36	2	25	15	3	
<b>RELATION TO THROMBOCYTOPENIA</b>					
• Yes	15	63	20	1	0.002
• No	14	34	19	11	

**Table 2. Gestational age against different variables (n=177)**

Variable	GESTATIONAL AGE (Weeks)			P value
	21-25 weeks	26-30 weeks	31-36 weeks	
<b>PARITY</b>				
• 0	18	3	00	<0.01
• 1-2	45	23	2	
• 3-5	8	33	1	
• >5	00	65	38	
<b>GRAVIDITY</b>				
• 1-2	17	9	4	0.27
• 3-5	34	35	26	
• >5	20	21	11	
<b>DURATION OF THE DISEASE (Weeks)</b>				
• 21-25	12	16	5	0.02
• 26-30	47	33	19	
• 31-36	12	16	17	
<b>RELATION TO THROMBOCYTOPENIA</b>				
• Yes	25	41	33	<0.01
• No	46	24	8	

The reasons for thrombocytopenia from being pregnant- triggered hypertension and HELLP (hemolysis, increased liver enzymes, low platelet count number) syndrome are unknown. One clarification is that it is probably initiated through microvascular damage that consequences in platelet activation. Degranulation of the platelets is observed through vasospasm and similarly endothelial damage [13]. The most effective acknowledged remedy for this cycle is the delivery of the fetus. Thrombocytopenia occurs more commonly associated with mild and severe forms of pre-eclampsia (15%-18%) [15,16], whereas the present study observed 55.9% prevalence of thrombocytopenia in preeclamptic women. In this current study the mean  $\pm$  SD for maternal and gestational age observed was  $32.75 \pm 8.85$  and  $28.75 \pm 7.63$  and it is consistent with the study by Nazli R, et al. [17]. Recent studies have recorded that increased plasma levels of soluble vascular endothelial cell growth factor (VEGF), receptor type 1 (sFlt1) [15], endoglin, an endothelial cell-derived member of the tumor growth factor- $\alpha$  (TGF- $\alpha$ ) receptor family [18], are present in patients intended to develop preeclampsia as early as the late first trimester. The placenta of preeclamptic patients contain a significant level of sFlt1 and endoglin mRNA, these neutralize VEGF and placental growth factor (PLGF). Another important member of the VEGF family, its level increases significantly during pregnancy, and endoglin inhibits TGF- $\alpha$  binding to endothelial cells [19].

Thrombocytopenia is seen noticeably often in severe pre-eclampsia, with the prevalence range of 11-29% [20]. The seriousness of pregnancy-related hypertensive issues and thrombocytopenia noticed are firmly related, which shows that thrombocytopenia is straightforwardly corresponding to the seriousness of pregnancy-related hypertensive problems. An international study of Bockenstedt PL was reported 11.6% cases pregnancy-related hypertensive disorders associated with thrombocytopenia [21]. One more review from Pakistan, which showed that the platelet count was not essentially associated with the seriousness of hypertensive issues during pregnancy [22].

Study of Line et al reported the prevalence of thrombocytopenia associated with preeclampsia was 50%. The motive given by using the writer for this high incidence became that they included women unwell enough to be admitted inside the intensive care unit. Stavrou E, et al reported a

prevalence of 35% in preterm proteinuria hypertensive patients. Thrombocytopenia is generally moderate and platelet number not often decreases to less than 20,000/ $\mu$ l and constantly correlates with the severity of the sickness, reported by Perepu U, et al. [23,24].

In particular, it is not clear whether these peripheral changes are a cause or a consequence of the occlusive vascular lesions in the uteroplacental arteries associated with fetal growth retardation. Because of the variation in counts between patients no diagnostic importance can be attached to a single low reading; thus platelet counts would not be a good screening test for pre-eclampsia. They are simpler to obtain than other measurements of disturbed coagulation, however, and repeated readings in the same patient can be useful in showing a consistent trend towards lower counts, which may herald the onset of preeclampsia. Thus the platelet count can be helpful in monitoring high-risk pregnancies [25,26].

The haemostatic work starts when the platelets come into contact with damaged endothelial wall or with circulatory coagulation factors, particularly thrombin, bringing about platelet activation, aggregation and clot formation. Thus, the endothelial dysfunction and the increase in vascular reactivity are proven to be involved in preeclampsia pathogenesis: the generalized endothelial alteration from preeclampsia causes vasoconstriction and promotes the adhesion and aggregation of the platelets, as well as the activation of the coagulation factors, inducing supplementary hypoxic injury of the endothelium [27].

The etiopathogenic factors of preeclampsia are very complex: the endothelium is the key in comprehension of a multi-step process in which the platelet likewise has a significant impact. It is necessary to recognize the molecular and cellular alterations, due to the fact those precede with quite a few months the clinical features, subsequently presenting a massive advantage and the possibility of prevention.

## **5. CONCLUSION**

A significantly high frequency of thrombocytopenia i.e. 99 patients (55.9%) was recorded in the patients who had preeclampsia. It is important to remember that most patients have a benign condition but a few seriously ill patients are at risk of developing serious morbidity and

mortality. These patients have good results as well and can be safely treated by family doctors of appropriate consultation with obstetricians and hematologists.

## CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author(s).

## ETHICAL APPROVAL

The study was conducted after getting an approval from the ethical committee of Isra university Hospital.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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