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RESEARCH ARTICLE

A STUDY ON EFFECTS OF THROMBOCYTOPENIA IN PREGNANCY AND FETOMATERNAL OUTCOME

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Abstract

Introduction: Thrombocytopenia, defined as blood platelet count below 150,000/ μ L is the second leading cause of blood disorders in pregnancy after anemia. Pregnant women with thrombocytopenia have a higher risk of bleeding excessively during or after childbirth, especially if they need to have a cesarean section or other surgical intervention during pregnancy, labor or in the puerperium. The main aim of this study was to determine the prevalence of thrombocytopenia among pregnant women attending antenatal care service at Department of Obstetrics & Gynaecology, DeenDayal Upadhyay (DDU) Hospital, Hari Nagar, New Delhi.

Materials and Methods: A was used to assess the prevalence of thrombocytopenia among pregnant women attending antenatal care service at DeenDayal Upadhyay (DDU) Hospital, Hari Nagar, New Delhi. Over 11 months 774 women were screened, out of which 62 patients with platelet count less than 1.5×10^9 /L were included in the study, 44 antenatal women could be followed till 8 weeks postpartum. These 44 patients were included in final analysis. and a structured pre-tested questionnaire was used to obtain sociodemographic information, nutritional factors, obstetrics and gynecological factors, history and clinical condition. Collect Blood samples for platelet count and other platelet parameters. Descriptive statistics will be analyzed with SPSS version 20.0 software. Continuous variables are presented as mean $\pm$ SD. Categorical variables are expressed as frequencies and percentages. The Pearson's chi-square test or Fisher's exact test is used in determining the relationship between two categorical variables. $P < 0.05$ is considered statistically significant.

Result: Total 774 antenatal women who visited our antenatal OPD and were subjected to platelet count during the study period, of which 62 patients with platelet count less than 1.5×10^9 /L were included in the study, 44 antenatal women could be followed till 8 weeks postpartum. These 44 patients were included in final analysis. In present study, the incidence of maternal thrombocytopenia was 8.01%.

Conclusion: The prevalence of thrombocytopenia was 8.01% predominantly with mild type of thrombocytopenia. An accurate diagnosis and risk assessment in the antenatal period is essential for developing specific plans for any antenatal interventions and for

management of delivery and the postpartum periods, and the neonate. In developing countries like India, diseases like Malaria and Dengue which are uncommon in other parts of the world, add to the morbidity of the condition and prove to be challenging and pose a management dilemma. Thrombocytopenia was higher among pregnant women who lived rurally. Therefore, health care providers should screen routinely for thrombocytopenia to avoid excessive bleeding during pregnancy,

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..... **Introduction:-**

Thrombocytopenia, defined as a platelet count of $<150 \times 10^9/L$, is a common hematologic abnormality during pregnancy, with an incidence of 6.6%^[1]. When thrombocytopenia is detected during pregnancy, it may be a sign of complex clinical disorders that are unique to pregnancy, such as preeclampsia and HELLP (haemolysis, elevated liver enzymes, and low platelet count) syndrome. It may also be related to a pre-existing underlying disease, such as bone marrow disease, hypersplenism, or congenital platelet disorder. Furthermore, autoimmune diseases, including systemic lupus erythematosus, antiphospholipid syndrome, thrombotic thrombocytopenic purpura, haemolytic uremic syndrome, and Immune thrombocytopenia (ITP) may relapse. Nevertheless, the most common cause of pregnancy-related thrombocytopenia is gestational thrombocytopenia, which is diagnosed through exclusion when the postpartum platelet count returns to normal and also associated with uneventful pregnancy outcome. Platelets are involved in primary haemostasis by plugging sites of endothelial damage and also act as a surface for secondary haemostasis^[7]. Thrombocytopenia affects 6–10% of all pregnant women and, other than anaemia, is the most common hematological disorder in pregnancy^[19]. Patients with a platelet count greater than $50 \times 10^9/L$ often are asymptomatic. Patients with a count from 30 to $50 \times 10^9/L$ rarely present with purpura, although they may have excessive bleeding with trauma. However, counts from 10 to $30 \times 10^9/L$ may cause bleeding with minimal trauma, and counts less than $10 \times 10^9/L$ increase the risk of spontaneous bleeding, petechiae and bruising^[20]. Pregnancy is associated with numerous metabolic, immunologic and other homeostatic changes that require careful consideration while attempting to define the cause of thrombocytopenia in a particular individual. There are many potential causes of pregnancy-associated thrombocytopenia; some of these are unique to pregnancy, whereas others may also occur in the non-pregnant setting^[19]. Also, because therapeutic interventions used to treat thrombocytopenic disorders in pregnant women have toxicities unique to pregnancy, management approaches considered.

Although a number of these pregnancy-related conditions may cause morbidity or even death if not treated promptly, most instances of thrombocytopenia are benign. Severe neonatal thrombocytopenia is infrequent; however, the incidence varies according to the causes of maternal thrombocytopenia^[1-3]. Thus, we will conduct a prospective study to evaluate maternal complications and neonatal outcomes for antenatal women who have thrombocytopenia in the Department of Obstetrics & Gynaecology, DeenDayal Upadhyay (DDU) Hospital, Hari Nagar, New Delhi.

Material and methods:-

All antenatal patients attending ANC OPD in Department of Obstetrics & Gynaecology, DeenDayal Upadhyay Hospital, New Delhi. It was Prospective Descriptive study, Study period from July 2017 to May 2018, Study duration was 11 months and screening sample size 471. A recent study conducted by Chauhan Vikrant et al in 2016 on Maternal and Fetal outcome among pregnant women presenting with thrombocytopenia. Taking this as our reference actual number of antenatal cases (incidence) who had thrombocytopenia, were (p)=8.4% (6), in patients attending OPD and with 2.5% margin of error, the minimum required sample size at 5% level of significance is 471 antenatal patients. Minimum 471 patients have to be screened for thrombocytopenia. Inclusion criteria all pregnant women visiting antenatal OPD in the department of OBG at DDU Hospital and willing to participate in the study. After obtaining a written and informed consent all women attending antenatal OPD were enrolled in the study at first visit, irrespective of gestational age. All underwent detailed history, general, systemic and obstetric examination. All were subjected to a blood test for Hb, TLC, DLC, TPC, RBS, TSH, urine albumin and sugar, HBsAg, HIV, HCV, VDRL at their first visit irrespective of period of gestation. Over 11 months 774 women were screened, out of which 62 patients with platelet count less than $1.5 \times 10^9/L$ were included in the study, 44 antenatal women could be followed till 8 weeks postpartum. These 44 patients were included in final analysis. Women with normal platelet count before 28 weeks had a repeat platelet count at 28 weeks, 32 weeks, labor. All the

thrombocytopenic cases were followed up throughout the antenatal period, during and till 8 weeks after delivery, to record outcome and any complications like preterm labor, abruption, preeclampsia and any other morbidity. Platelet count was repeated once in the postpartum period at 8 weeks. Tests were done, if clinically indicated were antiphospholipid antibodies, antinuclear antibodies, Direct Coombs test, further investigated for LFT, KFT, peripheral smear, coagulation profile, USG abdomen. Women with fever were tested for Blood Peripheral smear for Malaria, Dengue IgM. Coagulation tests (PT, APTT, FDP and fibrinogen) was done in a patient with signs or symptoms of DIC. Platelet count of all antenatal women was done at the time of enrolment. The collection of sample was done after taking informed consent of the participant, blood specimens were withdrawn from the antecubital vein using a dry sterile disposable syringe and needle. 2ml of blood was dispensed into EDTA anticoagulant tube. The specimens were labeled with subject's name, age, sex and C.R. number, and sent to the laboratory for platelet count estimation. Platelet count assessment was performed through automated blood count analyzer with routine antenatal haematological evaluation of the patient. Neonatal APGAR and birth weight were recorded. Neonates too were screened for thrombocytopenia and any other complications. Duration of pregnancy at the time of delivery, indication of induction and method (if required) and mode of delivery including indication for instrumental delivery or caesarean section were also recorded. Progress of labor was monitored by partograph.

Statistical Methods:-

Descriptive statistics will be analyzed with SPSS version 20.0 software. Continuous variables are presented as mean $\pm$ SD. Categorical variables are expressed as frequencies and percentages. The Pearson's chi-square test or Fisher's exact test is used to determining the relationship between two categorical variables. $P < 0.05$ is considered statistically significant.

Results:-

Total 774 antenatal women who visited our antenatal OPD and were subjected to platelet count during the study period, of which 62 patients with platelet count less than $1.5 \times 10^9 / L$ were included in the study, 44 antenatal women could be followed till 8 weeks postpartum. These 44 patients were included in final analysis. In present study the incidence of maternal thrombocytopenia was 8.01% ($62/774 \times 100$). most common age group age range from 21 to 25 year (50%). After applying one way ANOVA test, it was found that there was no statistically significant difference between various age groups of ANC patients and total platelet count ($F(2,41) = 2.966$, $p = 0.063$) [TABLE 1]. Most common gravida are G1. After applying one way ANOVA test, it was found that there was no statistically significant difference between the parity of ANC patients and total platelet count ($F(3,40) = 1.892$, $p = 0.146$) [TABLE 2]. This study found that, ANC patients in 3rd trimester had statistically significantly lower TPC ($80,433.33 \pm 28,145.78$ per ul) as compared to patients in 2nd trimester ($1,29,714 \pm 28,145$ per ul), $t(42) = 7.633$, $p = 0.0001$ [TABLE 3]. Out of 44 patients 5(11.4) were severe thrombocytopenic, 22(50%) were moderate and the rest were mild 17(38.6%) [TABLE 4]. Maximum incidence is of gestational thrombocytopenia 31(70.5%), pre eclampsia/eclampsia with HELLP together account for 4(9%), malaria 1(2.3%), dengue 4(9%), hemolytic anemias 3(6.9%), ITP 1(2.3%) [TABLE 5]. This study found that ANC mothers who had vaginal delivery, had lower TPC ($88,834 \pm 35,232$ per ul) as compared to ANC mothers who had undergone LSCS had TPC ($1,05,846 \pm 36,372$ per ul) which was statistically not significant, $t(42) = -1.447$, $p = 0.155$. [TABLE 6]. Total 13 patients underwent LSCS, all were performed for maternal indications FAILED INDUCTION 2(4.54%), PREV 1 LSCS 9(20.5%), PREV 2 LSCS 1(2.3%), PLACENTA PREVIA 1(2.3%) [TABLE 7]. This study found that ANC patients with maternal complications had statistically significantly lower TPC ($4,90,000 \pm 24,518$ per ul) as compared to ANC mothers without complications ($1,03,833 \pm 30,178$ per ul), $t(42) = 4.786$, $p = 0.0001$ [TABLE 8]. 18 patients underwent blood transfusion, 4 patients received only PCV, 4 only Platelets, 7 PCV alongwith Platelet and remaining 3 received PCV, Platelet and FFP [TABLE 9]. Pearson correlation was run to determine the relationship between 1st visit TPC and APGAR score of the neonate. There was a strong positive correlation between 1st visit TPC and APGAR score, which was statistically significant ($r = 0.558$, $n = 44$, $p = 0.001$). A Pearson correlation was run to determine the relationship between TPC at labour and APGAR score of the neonate. There was a strong positive correlation between TPC at labour and APGAR score, which was statistically significant ($r = 0.612$, $n = 44$, $p = 0.001$). A Pearson correlation was run to determine the relationship between 28 weeks TPC and APGAR score of the neonate. There was a strong positive correlation between 8 weeks postpartum TPC and APGAR score, which was statistically significant ($r = 0.531$, $n = 44$, $p = 0.001$) [TABLE 10]. Only 9(20.5%) neonates required NICU admission, mostly belong to mothers with moderate to severe thrombocytopenia alongwith other comorbidity [TABLE 11]. This study found that neonates admitted in NICU had statistically significantly lower TPC ($5,92,000 \pm 37,718$ per ul) as compared to neonates not admitted to NICU ($1,02,771 \pm 30,100$ per ul), $t(42) = -3.667$, $p =$

0.001 [TABLE 12]. This study found that ANC mothers (who gave birth to neonates with <2.5 kg weight) had lower TPC ($84,631 \pm 34,598$ per ul) as compared to ANC mothers (who gave birth to neonates with >2.5 kg weight) TPC ($1,00,880 \pm 36,152$ per ul) which was statistically not significant, $t(42) = -1.504$, $p = 0.140$ [TABLE 13].

Discussion:-

In a prospective study of over 11 months all pregnant patients with thrombocytopenia with platelet count less than or equal to one lakh fifty thousand per mL were included. Their detailed history, examination findings, investigations were noted. Course of pregnancy was followed up and the maternal, obstetric and fetal outcome was noted.

Incidence:

In present study the incidence of maternal thrombocytopenia was 8.01% which is comparable to study by Dwivedi et al^[7] (8.17%), Vyas et al (7.60%), Burrows et al (7.60%) and Singh et al (8.80%). According to Vikrant Chauhan et al the incidence of maternal thrombocytopenia was 8.4%. Similar incidence of thrombocytopenia was in the studies by Ajibola et al (13.50%) and Onisai et al (11.11%). Lower incidence was noted in the study of Brohi et al (1.90%) and Lin et al (4.30%). In a study conducted Gondar University Hospital on a total of 217 women thrombocytopenia among 19 pregnant women showed a prevalence of 8.8%. Keith R. McCrae in their study of Thrombocytopenia in Pregnancy showed that thrombocytopenia affects 6% to 10% of all pregnant women and other than anemia is the most common hematologic disorder in pregnancy.

Distribution according to age of patient and gestational age:

Maximum incidence of cases being in 20 to 27 years age group with mean age 27.57 ± 5.64 years. According to study conducted by Singh Nisha, Dhakad Amita, Singh Uma, K. Tripathi, Sankhwar Pushplata (Prevalence and Characterization of Thrombocytopenia in Pregnancy in Indian Women) there was no significant difference in the distribution of cases and controls according to age ($P = 0.923$), religion ($P = 0.947$) and parity ($P = 0.068$). According to Genovese study the mean age was 30 ± 2 years and average gestational age diagnosis was 28+3 weeks. In this study 68% patients enrolled in late second trimester since most antenatal women in our population seek advice in late pregnancy or when a complication arises.

Gravidity Of Patient:

In this study 43.18% cases were primigravidas, 34% cases were gravida 2, 23% cases were gravida 3 to 5. Huparikar Anita et al stated that of 76 patients enrolled in their study 34 cases are primigravida, 28 cases 2nd gravida and 14 cases are 3rd gravid. However, this is incidental finding and has no effect on platelet count.

Severity Of Thrombocytopenia:

Out of 44 cases of thrombocytopenia, 17 (38.6%) patients had mild, 22 (50%) patients had moderate and 5 (11.4%) patients had severe thrombocytopenia. In contrast Vikrant Chauhan et al stated 63% of the women had mild thrombocytopenia while 35.4% and 1.5% of women were moderate and severe thrombocytopenic respectively. According to study conducted by Singh Nisha, Dhakad Amita, Singh Uma, K. Tripathi, Sankhwar Pushplata (Prevalence and Characterization of Thrombocytopenia in Pregnancy in Indian Women) 2012, prevalence of thrombocytopenia was 8.8%. There were 74.7% cases of mild thrombocytopenia, 17.9% of moderate thrombocytopenia and 7.4% with severe thrombocytopenia.

Etiology Of Thrombocytopenia:

Gestational thrombocytopenia was the most common etiological factor with 70.4% cases, followed by 9.09% for hypertensive disorders including HELLP syndrome, 9.09% Dengue, 6.8% Hemolytic anemia, followed by 2.27% for Malaria, 2.3% ITP. Gestational thrombocytopenia occurs in approximately 8% of all pregnancies and accounts for more than 70% of cases with thrombocytopenia in pregnancy (Usha Pereppu et al). Immune thrombocytopenia occurs in 1 in 1000-10,000 pregnancies, accounting for 3% of all thrombocytopenic gravidas.^{32,55} Vikrant Chauhan et al reported that amongst 65 thrombocytopenic women 1.5% had HELLP Syndrome, 26.3% had PIH and 68.2% had gestational thrombocytopenia. In study conducted by Monica Arora et al in 2016 thrombocytopenia due to Preeclampsia and HELLP syndrome accounted for 24%. Preeclampsia is the second most frequent cause of thrombocytopenia developing in the late second or third trimester, accounting for 21% of cases of thrombocytopenia at the time of delivery⁵⁶. The HELLP syndrome is often considered to be a variant of preeclampsia. It is serious complication specific to pregnancy, affects 0.5-0.9% of all pregnancies and develops in 10% of patients with preeclampsia⁴³. The major findings of our study is that thrombocytopenia points to a higher degree of severity of the primary disease, which is known to increase perinatal complications, both maternal and neonatal. Platelet counts

normalize within 4-10 weeks following delivery. Burrows reported that all women with Gestational Thrombocytopenia had normal or normalizing platelet counts by the seventh postpartum day.

Mode of delivery:

The route of delivery of the 44 cases was 31(70.45%) delivered vaginally and LSCS in 13(29.54%) cases. 6 patients had pre term delivery (13.6%). Mode of delivery is not influenced by platelet count. LSCS was done for obstetric and medical conditions like previous LSCS (22.8%), failed induction (4.6%) , placenta previa (2.3%). According to study conducted in 2011 in kolkata, 91 cases delivered during the study, 61.54% had normal vaginal delivery, 36.26% had CS and 2.2% had instrumental delivery. All the cesarean sections were performed for obstetric/medical causes and none for thrombocytopenia.

Maternal Complications:

Of 44 patients, 7(15.9%) patients landed in PPH, 1(2.3%) had DIC whereas 36 (81.8%) had uncomplicated delivery. Patient with ITP landed in DIC , had platelet count as low as 7000 per ul D-dimer 0.3mg/L, FDP 16mg/L. Gum bleeding, petechiae, hematuria occurred ultimately developed sepsis. Poor perinatal outcome recorded with ICU admission in this patient. Patient had multiple blood transfusion. No mortality reported though. So according to this study, thrombocytopenia is not directly related to maternal outcome, there are also other factors which influence the maternal outcome like anemia, preeclampsia, sepsis etc. thrombocytopenia is an additional factor and not independent factor. According to study conducted by DhakadAmita (2011) incidence of PPH was 9.89% among cases. PPH was seen in 30% of medical, 15% of obstetric and only 4.92% of gestational thrombocytopenia. Incidence was significantly higher in medical thrombocytopenia ($P = 0.008$).Blood transfusion was done in 18 patients. Of these 4 patients required only PCV transfusion, 4 only platelets, and 7 both PCV and platelets. 3 patients needed all i.e PCV, platelet and FFP. These patients had either severe anemia, DIC or HELLP syndrome.

Neonatal Outcome:

1 neonate born to mother with ITP had platelet count less than 1 lakh , 2 had platelet count between 1lakh – 1 lakh fifty thousand per ul, rest others have platelet more than 1.5lakh per ul.. Neonatal thrombocytopenia of 90,000 per ul on day-1 returned to normal on day eight. None of the babies had any bleeding complications.According to study conducted by Nisha singh in 2011 Out of the 91 newborns, platelet count assessment could be done in 75 (81.4%). All had normal platelet counts at birth except the one born to mother with ITP.This study found that mothers who gave birth to neonates with <2.5 kg weight had lower TPC as compared to mothers who gave birth to neonates with >2.5 kg weight TPC which was statistically not significant, $t(42) = -1.504$, $p = 0.140$. Vikrant Chauhan et al found mean baby weight in their study was 2.84 ± 0.32 kg which was not related to maternal platelet count.However, APGAR Score of neonate with maternal platelet count moderate to severe was lower, which is indirectly because of underlying etiology and associated comorbid conditions rather than thrombocytopenia per se.

Neonatal Complications:

9(20.5%) babies were admitted in NICU of which 3 (6.8%) were meconium stained and 4(9%) developed Respiratory Distress Syndrome, 6 neonates (13.6%) were preterm. The association of preterm deliveries with severe thrombocytopenia was not statistically significant. Neonatal complications are not directly related to maternal platelet count. The fetal complications like birth asphyxia (6.8%), low birth weight(11.3%) and neonatal thrombocytopenia were also higher in the patients with Preeclampsia, HELLP syndrome , DIC, Dengue and Malaria. 3(33.3%) NICU admission were in neonates born to mother with Dengue 1baby had RDS with MSL, 1 had RDS while one was IUGR. 1(11.1%) admission of neonate reported in mother with ITP in which platelet count of neonate was lowest in this study 90,000ul, baby was meconium stained and developed RDS. 1(11.1) baby admitted was of mother with Eclampsia, 1(11.1) admission was in mother with malaria, 2(22.2%) in mother with hemolytic anemia in all these babies were LBW and IUGR. Only one admission was reported in patients with Gestational thrombocytopenia. The results were in concordance with the study of Burrows et al[10] and Dwivedi et al[5].This study found that neonates admitted in NICU had statistically significantly lower TPC ($92,000 \pm 37,718$ per ul) as compared to neonates not admitted to NICU ($1,02,771 \pm 30,100$ per ul), $t(42) = -3.667$, $p = 0.001$. However, none of the neonate had any bleeding diathesis nor any other complication due to low platelet count. Platelet count returned to normal within a week.

Conclusion:-

Thrombocytopenia affects 6% to 10% of all pregnant women and other than anemia is the most common hematologic disorder in pregnancy.Most common cause of moderate to severe thrombocytopenia in pregnancy is

mainly Gestational Thrombocytopenia, while ITP, preeclampsia, and HELLP syndrome, Dengue, Malaria are less common. Patients with Gestational Thrombocytopenia have favorable maternal and perinatal outcomes. Mode of delivery does not depend upon platelet count, but is guided by obstetric and medical indications. Platelet count of neonates has no relation with maternal platelet count. However, patients with moderate to severe thrombocytopenia alongwith other comorbid condition associated needed NICU admission due to RDS, asphyxia, LBW, preterm delivery. Proper diagnosis and risk evaluation in the antenatal period are essential. It help for developing specific plans for any antenatal interventions and for management of delivery and the postpartum periods, and also very helpful for neonate. In developing countries like India, diseases like Malaria and Dengue which are uncommon in other parts of the world, add to the morbidity of the condition and prove to be challenging and pose a management dilemma. Careful observation is required for these pregnancies in high-risk patient for early detection and treatment of possible complications, in order to try to reduce maternal and neonatal morbidities. Further future studies among these high-risk populations with moderate to severe thrombocytopenia should investigate, make early diagnosis and to make the efficacy of possible surveillance programs.

Table 1:- Age Wise Distribution Of Thrombocytopenic Patients.

	Age of patients	Frequency	Percent(%)
1	15 to 20 yrs	1	2.3
2	21 to 25 yrs	22	50.0
3	26 to 30 yrs	14	31.8
4	31 to 35 yrs	6	13.6
5	35 to 40 yrs	1	2.3
	Total	44	100.0

In this table most common age group age range from 21 to 25 year (50%). After applying one way ANOVA test, it was found that there was no statistically significant difference between various age groups of ANC patients and total platelet count ($F(2,41) = 2.966$, $p = 0.063$).

Table 2:- Number Of Patients According To Gravidity.

Parity of patients	Number of patients according to GRAVIDITY
G1	19
G2	15
G3	8
G4	1
G5	1
	44

Most common gravida are G1. After applying one way ANOVA test, it was found that there was no statistically significant difference between the parity of ANC patients and total platelet count ($F(3,40) = 1.892$, $p = 0.146$).

Table 3:- Incidence Of Thrombocytopenia According To Gestational Period T-Test between period of gestation and total platelet count.

Group Statistics			
Trimester	N	Mean	Std. Deviation
2 nd	14	129714.29	14625.734
3 rd	30	80433.33	28145.782

This study found that, ANC patients in 3rd trimester had statistically significantly lower TPC ($80,433.33 \pm 28,145.78$ per ul) as compared to patients in 2nd trimester ($1,29,714 \pm 28,145$ per ul), $t(42) = 7.633$, $p = 0.0001$

Table 4:- Severity Of Thrombocytopenia.

Total platelet counts	Mean	N	%	Std. Deviation
Less than 50,000/L (severe)	26600.00	5	11.4	17672.012
50,001- 1,00,000/L (moderate)	81863.64	22	50	15821.310
1,00,001- 1,50,000/L (mild)	129176.47	17	38.6	11912.364
Total	93863.64	44	100	36012.008

Out of 44 patients 5(11.4) were severe thrombocytopenic, 22(50%) were moderate and the rest were mild 17(38.6%).

Table 5:- Etiology Of Thrombocytopenia.

Etiology	Number of patients	Percentage(%)
Idiopathic (gestational)	31	70.5
Pre-eclampsia with HELLP	3	6.9
Haemolytic	3	6.9
ITP	1	2.3
Dengue	4	9.0
Malaria	1	2.3
Eclampsia with HELLP	1	2.3
Total	44	100

Maximum incidence is of gestational thrombocytopenia 31(70.5%), pre eclampsia/eclampsia with HELLP together account for 4(9%), malaria 1(2.3%), dengue 4(9%), hemolytic anemias 3(6.9%),ITP 1(2.3%).

Table 6:-Lscs / Vaginal Delivery.

	Frequency	Percent(%)
LSCS	13	29.5
VAGINAL	31	70.5
Total	44	100.0

This study found that ANC mothers who had vaginal delivery, had lower TPC ($88,834 \pm 35,232$ per ul) as compared to ANC mothers who had undergone LSCS had TPC ($1,05,846 \pm 36,372$ per ul) which was statistically not significant, $t(42) = -1.447$, $p = 0.155$.

Indication Of Lscs:

Table 7:-Indication Of Lscs.

	Frequency	Percent(%)
FAILED INDUCTION	2	4.54
PLACENTA PREVIA	1	2.3
PREV 1 LSCS	9	20.5
PREV 2 LSCS	1	2.3
Total	13	29.7

Total 13 patients underwent LSCS , all were performed for maternal indications FAILED INDUCTION 2(4.54%), PREV 1 LSCS9(20.5%), PREV 2 LSCS 1(2.3%), PLACENTA PREVIA 1(2.3%)

Table 8:-Maternal Complications.

	Frequency	Percent(%)
No complications	36	81.8
PPH	7	15.9
DIC	1	2.3
Total	44	100.0

This study found that ANC patients with maternal complications had statistically significantly lower TPC ($4,90,000 \pm 24,518$ per ul) as compared to ANC mothers without complications ($1,03,833 \pm 30,178$ per ul) , $t(42) = 4.786$, $p = 0.0001$.

Table 9:- Blood product transfused.

	Blood transfusion	PCV transfusion (n = 44)	Platelet transfusion (n = 44)	PCV + Platelet Transfusion (n = 44)	PCV, Platelet and FFP(n = 44)
No of patient	18	4	4	7	3

Percentage (%)	40	9	9	15.9	6.8
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18 patients underwent blood transfusion, 4 patients received only PCV, 4 only Platelets, 7 PCV alongwith Platelet and remaining 3 received PCV, Platelet and FFP.

Table 10:- apgar score

Correlations

Descriptive Statistics			
	Mean	Std. Deviation	N
APGAR SCORE	8.05	1.725	44
1ST VISIT TPC	96113.64	33735.094	44

Correlations			
		APGAR SCORE	1ST VISIT TPC
APGAR SCORE	Pearson Correlation	1	.558**
	Sig. (2-tailed)		.000
	N	44	44

Correlation is significant at the 0.01 level (2-tailed).

Pearson correlation was run to determine the relationship between 1st visit TPC and APGAR score of the neonate. There was a strong positive correlation between 1st visit TPC and APGAR score, which was statistically significant (r=0.558, n=44, p=0.001).

Correlations:

Descriptive Statistics			
	Mean	Std. Deviation	N
APGAR SCORE	8.05	1.725	44
TPC AT LABOR	86454.55	23805.857	44

Correlations			
		APGAR SCORE	TPC AT LABOR
APGAR SCORE	Pearson Correlation	1	.612**
	Sig. (2-tailed)		.000
	N	44	44

Correlation is significant at the 0.01 level (2-tailed).

A Pearson correlation was run to determine the relationship between TPC at labour and APGAR score of the neonate. There was a strong positive correlation between TPC at labour and APGAR score, which was statistically significant (r= 0.612, n=44, p=0.001).

Descriptive Statistics			
	Mean	Std. Deviation	N
APGAR SCORE	8.05	1.725	44
8 weeks postpartum TPC	229930.23	64751.685	44

Correlations			
		APGAR SCORE	8 weeks postpartum TPC
APGAR SCORE	Pearson Correlation	1	.531**
	Sig. (2-tailed)		.000
	N	44	44

Correlation is significant at the 0.01 level (2-tailed).

A Pearson correlation was run to determine the relationship between 28weeks TPC and APGAR score of the neonate. There was a strong positive correlation between 8 weeks postpartum TPC and APGAR score, which was statistically significant ($r = 0.531$, $n = 44$, $p = 0.001$)

Table 11:- Nicu Admission.

	Frequency	Percent(%)
NO	35	79.5
YES	9	20.5
Total	44	100.0

Only 9(20.5%) neonates required NICU admission, mostly belong to mothers with moderate to severe thrombocytopenia alongwith other comorbidity.

Table 12:- Indication Of Nicu Admission.

	Frequency	Percent(%)
Normal	35	79.5
FGR	1	2.3
LBW	1	2.3
LBW;IUGR	1	2.3
LBW;RDS	1	2.3
RDS	1	2.3
RDS;MSL	2	4.5
VLBW;FGR	1	2.3
VLBW;FGR;MSL	1	2.3
Total	44	100.0

This study found that neonates admitted in NICU had statistically significantly lower TPC ($5,92,000 \pm 37,718$ per ul) as compared to neonates not admitted to NICU ($1,02,771 \pm 30,100$ per ul), $t(42) = -3.667$, $p = 0.001$.

Table 13:- Distribution According To Weight Of Neonate T-Test.

Group Statistics					
	wt_neonate	N	Mean	Std. Deviation	Std. Error Mean
TPC	Less than 2.5kg	19	84631.58	34598.026	7937.331
	More than equal to 2.5kg	25	100880.00	36152.824	7230.565

This study found that ANC mothers (who gave birth to neonates with <2.5 kg weight) had lower TPC ($84,631 \pm 34,598$ per ul) as compared to ANC mothers (who gave birth to neonates with >2.5 kg weight) TPC ($1,00,880 \pm 36,152$ per ul) which was statistically not significant, $t(42) = -1.504$, $p = 0.140$.

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References:-

1. Burrows RF, Kelton JG. Fetal thrombocytopenia and its relation to maternal thrombocytopenia. *N Engl J Med* 1993;329:1463e6.
2. Payne SD, Resnik R, Moore TR, Hedriana HL, Kelly TF. Maternal characteristics and risk of severe neonatal thrombocytopenia and intracranial hemorrhage in pregnancies complicated by autoimmune thrombocytopenia. *Am J ObstetGynecol*1997;177:149e55.
3. Webert KE, Mittal R, Sigouin C, Heddle NM, Kelton JG. A retrospective 11-year analysis of obstetric patients with idiopathic thrombocytopenic purpura. *Blood* 2003;102:4306e11.
4. Sullivan CA, Martin JN Jr. Management of the obstetric patient with thrombocytopenia. *ClinObstetGynecol*1995; 38(3):521-34.
5. Kam PC, Thompson SA, Liew AC. Thrombocytopenia in the parturient. *Anaesthesia*2004; 59(3):255-64.
6. Chauhan Vikrant et al Maternal and fetal outcome among pregnant women presenting with thrombocytopenia. *Int J Reprod Contracept ObstetGynecol* 2016Aug;5(8):2736-2743
7. Boehlen F, Hohlfeld P, Extermann P, Perneger TV, de Moerloose P. Platelet count at term pregnancy: a reappraisal of the threshold. *ObstetGynecol*2000; 95(1):29-33.
8. Sainio S, Kekomäki R, Riikonen S, Teramo K. Maternal thrombocytopenia at term: a population based study. *ActaObstetGynecolScand*2000; 79(9):744-9.
9. Rodeghiero F, Stasi R, Gernsheimer T, Michel M, Provan D, Arnold DM, et al. Standardization of terminology, definitions and outcome criteria in immune thrombocytopenic purpura of adults and children: report from an international working group. *Blood* 2009; 113(11): 2386-93.
10. Gernsheimer T, James AH, Stasi R. How I treat thrombocytopenia in pregnancy. *Blood* 2013; 121(1):38-47.
11. ACOG practice bulletin: Thrombocytopenia in pregnancy. Number 6, September 1999. Clinical management guide lines for obstetriciangynecologists. American College of Obstetricians and Gynecologists. *Int J GynaecolObstet*1999; 67(2):117-128.
12. Cunningham FG, Gant NF, Leveno KJ, Gilstrap III LC, Hauth JC, Wenstrom KD. Williams obstetrics, 21st edn. McGraw-Hill, Hematological disorders; 2001, p. 1307–38 [Chapter 49]
13. Shehata N, Burrow RF, Kelton JG. Gestational thrombocytopenia. *ClinObstetGynecol*1999; 42(2): 327-34.
14. Cines DG, Blanchette VS. Immune thrombocytopenic purpura. *N Engl J Med*2002; 346(13): 995-1008.
15. ACOG practice bulletin. Diagnosis and management of preeclampsia and eclampsia. Number 33, January 2002. *Obstet Gynecol.* 2002; 99(1):159-167.
16. Knight M, Nelson-Piercy C, Kurinczuk JJ, Spark P, Brocklehurst P. A prospective national study of acute fatty liver of pregnancy in the UK. *Gut*2008; 57(7):951-956.
17. Neunert C, Lim W, Crowther M, Cohen A, Solberg LJr, Crowther MA et al. The American Society of Hematology 2011 evidence-based practice guideline for immune thrombocytopenia. *Blood*2011; 117(16):4190-207.
18. Provan D, Stasi R, Newland AC, Blanchette VS, Bolton-Maggs P, Bussel JB, et al. International consensus report on the investigation and management of primary immune thrombocytopenia. *Blood* 2010.
19. McCrae KR. 2006. Thrombocytopenia in Pregnancy. In: Michelson AD, editor, Platelets. New York, Elsevier; pp 925–933.
20. Cines DB, Blanchette VS. 2002. Immune thrombocytopenic purpura. *New England Journal of Medicine* 346:995–1008.
21. Cines DB, Bussel JB. 2005b. How I treat idiopathic thrombocytopenic pur-pura (ITP). *Blood* 106:2244–51.
22. Verdy E, Bessous V, Dreyfus M, Kaplan C, Tchernia G, Uza S. 1997. Longitudinal analysis of platelet count and volume in normal pregnancy. *Thrombosis and Haemostasis* 77:806–807.
23. Burrows RF, Andrew M. 1990a. Neonatal thrombocytopenia in the hyper-tensive disorders of pregnancy. *Obstetrics and Gynecology* 76:234–238.

24. Nagey DS, Alger LS, Edelmann BB, Heyman MR, Pupkin MU, Crenshaw C Jr. 1986. Reacting appropriately to thrombocytopenia in pregnancy. *Southern Medical Journal* 79:1385–1388.
25. Burrows RF, Kelton JG. 1990. Thrombocytopenia at delivery: a prospective survey of 6715 deliveries. *American Journal of Obstetrics and Gynecology* 162:732–734.
26. Letsky EA, Greaves M. 1996. Guidelines on the investigation and management of thrombocytopenia in pregnancy and neonatal alloimmune thrombocytopenia. Maternal and Neonatal Haemostasis Working Party of the Haemostasis and Thrombosis Task Force of the British Society for Haematology. *British Journal of Haematology* 95:21–26.
27. Christiaens GC, Nieuwenhuis HK, Bussel JB. 1997. Comparison of platelet counts in first and second newborns of mothers with immune thrombocytopenic purpura. *Obstetrics and Gynecology* 90: 546–552.
28. Christiaens GC, Nieuwenhuis HK, Borne AEG, Ouwehand WH, Helmerhorst FM, Dalen CM et al. 1990. Idiopathic thrombocytopenic purpura in pregnancy: a randomized trial on the effect of antenatal low dose corticosteroids on neonatal platelet count. *British Journal of Obstetrics and Gynaecology* 97:893–8.
29. Lescale KB, Eddleman KA, Cines DB, Samuels P, Lesser ML, McFarland JG, Bussel JB. 1996. Antiplatelet antibody testing in thrombocytopenic pregnant women. *American Journal of Obstetrics and Gynecology* 174:1014–1018.
30. Burrows RF, Kelton JG. 1988. Incidentally detected thrombocytopenia in healthy mothers and their infants. *New England Journal of Medicine* 319:142–145.
31. Levy JA, Murphy LD. 2002. Thrombocytopenia in Pregnancy. *The Journal of the American Board of Family Practice* 15:290–297.
32. Gill KK, Kelton JG. 2000. Management of idiopathic thrombocytopenic purpura in pregnancy. *Seminars in Hematology* 37:275–283.
33. McCrae KR, Samuels P, Schreiber AD. 1992. Pregnancy-associated thrombocytopenia: pathogenesis and management. *Blood* 80:2697–2714.
34. Stavrou E, McCrae KR. 2009. Immune thrombocytopenia in pregnancy. *Hematology/Oncology Clinics of North America* 23:1299–1316.
35. Gernsheimer T, McCrae KR. 2007. Immune thrombocytopenic purpura in pregnancy. *Current Opinion in Hematology* 14:574–580.
36. Boehlen F, Hohlfeld P, Extermann P, de Moerloose P. 1999. Maternal anti-platelet antibodies in predicting risk of neonatal thrombocytopenia. *Obstetrics and Gynecology* 93:169–173.
37. Bhatla N, Buckshee K, Bhargava VL, Takkar D, Malhotra OP. 1994. Pregnancy with idiopathic thrombocytopenic purpura. *Journal of Association of Physicians of India* 42:105–106.
38. Cines DB, McMillan R. 2005a. Management of adult idiopathic thrombocytopenic purpura. *Annual Review of Medicine* 56:425–442.
39. Kelton JG. 2002. Idiopathic thrombocytopenic purpura complicating pregnancy. *Blood Reviews* 16:43–46.
40. Moise KJ Jr. 1991. Autoimmune thrombocytopenic purpura in pregnancy. *Clinical Obstetrics and Gynecology* 34:51.
41. George JN, Woolf SH, Raskob CE, Wasser JS, Aledort LM, Ballem PJ et al. 1996. Idiopathic thrombocytopenic purpura: a practice guideline developed by explicit methods for the American Society of Hematology. *Blood* 88:3–40.
42. McCrae KR. 2010. Thrombocytopenia in Pregnancy. *Hematology American Society of Hematology Education Program*: 397–402.
43. Kirkpatrick CA. 2010. The HELLP syndrome. *Acta Clinica Belgica* 65: 91–97.
44. Lain KY, Roberts JM. 2002. Contemporary concepts of the pathogenesis and management of preeclampsia. *The Journal of the American Medical Association* 287:3183–3186.
45. McCrae KR, Cines DB. 1997. Thrombotic microangiopathy during pregnancy. *Seminars in Hematology* 34:148–158.
46. Baschat AA, Gembruch U, Reiss I, Gortner L, Weiner CP, Harman CR. 2000. Absent umbilical artery end-diastolic velocity in growth-restricted fetuses: a risk factor for neonatal thrombocytopenia. *Obstetrics and Gynecology* 76:234–239.
47. Bacq Y. 1998. Acute fatty liver of pregnancy. *Seminars in Perinatology* 22:134–140.
48. Ibdah JA, Bennett MJ, Rinaldo P, Zhao Y, Gibson B, Sims HF et al. 1999. A fetal fatty-acid oxidation disorder as a cause of liver disease in pregnant women. *New England Journal of Medicine* 340:1723–1731.
49. Kenyon AP, Girling JC. 2011. Obstetric Cholestasis. *Royal college of Obstetricians and Gynaecologists* 1–14.
50. Esplin MS, Branch DW. 1999. Diagnosis and management of thrombotic microangiopathies during pregnancy. *Clinical Obstetrics and Gynecology* 42:360–367.

51. Fakhouri F, Fremeaux-Bacchi V. 2007. Does hemolytic uremic syndrome differ from thrombotic thrombocytopenic purpura? *Nature Clinical Practice Nephrology* 3:679–687.
52. Furlan M, Robles R, Galbusera M, Remuzzi G, Kyrle PA, Brenner B et al. 1998. Von Willebrand factor-cleaving protease in thrombotic thrombo-cytopenicpurpura and the hemolytic uremic syndrome. *New England Journal of Medicine* 339:1578–1584.
53. Fakhouri F, Roumenina L, Provot F, Sallee M, Caillard S, Couzi L et al. 2010. Pregnancy-associated hemolytic uremic syndrome revisited in the era of complement gene mutations. *Journal of the American Society of Nephrology* 21:859–867.
54. Scully M, Hunt BJ, Benjamin S, Liesner R, Rose P, Peyvandi F et al. 2012. Guidelines on the diagnosis and management of thrombotic thrombocytopenicpurpura and other thrombotic microangiopathies. *British Journal of Haematology* 158:323–335.
55. Segal JB, Powe NR. Prevalence of immune thrombocytopenia: analyses of administrative data. *J ThrombHaemost.* 2006 Nov;4(11):2377-83.
56. Burrows RF, Kelton JG: Fetal thrombocytopenia and its relation to maternal thrombocytopenia. *N Engl J Med* 1993;329(20):1463-1466.