Journal of Cardiovascular Disease Research

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

Original research article

A clinical study on fetal and maternal outcome in preeclampsia with elevated D-Dimers

[1]Dr. Polamuri Laxmi Kiran, [2]Dr. Donepudi Vijaya, [3]Dr. Vasantha, [4]Dr. Ambati Sri Pradeepthi

[1,2,4]Assistant Professor, Department of Obstetrics and Gynecology, Government General Hospital, Kakinada, Andhra Pradesh, India

[3]Final Year Students, Department of Obstetrics and Gynecology, Government General Hospital, Kakinada, Andhra Pradesh, India

Corresponding Author:
Dr. Ambati Sri Pradeepthi

Abstract

Background: When a previously normotensive and nonproteinuric woman suddenly develops hypertension with a blood pressure of 140/90 mm Hg or greater and proteinuria after the 20th week, this is called a multisystem illness of unclear cause. Hypertension brought on by the gravida state is called pregnancy-induced hypertension (PIH). Pre-eclampsia, eclampsia, and gestational hypertension are all part of this condition.

Methods: The current study was undertaken to study the fetal and maternal outcome in pre-eclampsia with elevated d-dimers among patients of Government General Hospital, Kakinada. Hospital based prospective observational study. Patients admitted to inpatient ward in the dept. of Obstetrics and Gynecology, GGH, Kakinada from October 2020 to October 2022 with clinical diagnosis of pre-eclampsia in 100 patients.

Results: Majority of the study subjects 42% belong to age group og 21-25 years, 30% belong to low SES, 57% were primigravida, 21% belong to 36 weeks, 52% presenting complaint is headache, Mean platelet value is 140479 ± 78931.32 SD, D-dimer values of 1701-2000 ng/ml. Mean D-dimer value is 2076 ± 632 SD. 49% normal vaginal delivery, new-born 72% were pre-term, new-born 73% were low-birth weight. Maternal complications is seen in 33% of study subjects. Fetal and Maternal Mortality rate is 5% each in the study.

Conclusion: Maternal and fetal mortality rate is 5% each in the present study. Elevated-D dimers were significantly associated with maternal mortality. Elevated-D dimers were significantly associated with abnormal fetal outcome.

Keywords: Fetal and maternal outcome, preeclampsia, platelet, D-dimers

Introduction

The word "eclampsia" was derived from Greek language "*eklampsis"* meaning lightening or sudden development [1]. It is a pregnancy-specific syndrome with combined presentation of high blood pressure and proteinuria. The new definition of pre-eclampsia is maternal organ dysfunction like renal insufficiency, liver involvement, neurological and hematological complications, uteroplacental dysfunction resulting in fetal growth restriction [2].

World-wide 10% of women have high blood pressure during pregnancy and pre-eclampsia complicates 2-8% of pregnancies. Overall, 10-15% of direct maternal deaths are associated with preeclampsia and eclampsia [3]. 15-20% of maternal deaths were due to preeclampsia in developed countries [4]. The prevalence of pre-eclampsia in India, 2006 is 28.2% and in Andhra pradesh it is 21% [5].

Preeclampsia usually develops after 20 weeks of gestation. It is a heterogeneous condition with potentially maternal and fetal consequences. It is characterized by variable degrees of placental mal-perfusion, with release of soluble factors into the circulation. These factors cause maternal vascular endothelial injury, which leads to hypertension and multi-organ injury. The placental abnormality can cause fetal growth restriction and stillbirth [6].

According to International society for study of Hypertension in Pregnancy (ISSHP) pre-eclampsia is characterized by onset of hypertension, with systolic BP ≥ 140 mm Hg, diastolic ≥ 90 mm Hg at or after 20 weeks of gestation and 24 hour urine protein of ≥ 300 mg/day or spot urine protein/creatinine ratio of ≥ 0.3 mg/mg [7]. The clinical spectrum of pre-eclampsia ranges from mild to severe. Mild to moderate pre-eclampsia have no symptoms. Severe pre-eclampsia presents with symptoms like headache, upper abdominal pain, visual disturbances, raised blood pressure, ankle oedema and proteinuria [5].

The risk factors of pre-eclampsia in primiparous women is unknown, other factors include twin pregnancy, molar pregnancy, diabetes and obesity. Previous pregnancy complicated with pre-eclampsia

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

is the strongest risk factor. Genetic risk factors search is of little success [8]. Chronic hypertension, chronic renal disease, maternal age >40, previous pregnancies with placental abruptions, intra-uterine growth restrictions and still births are other risk factors [9].

Pre-eclampsia causes coagulation complications like DIC and HELLP syndrome. Hemoglobin and platelet counts were decreased, and d-dimers were elevated [10]. D-dimer is a product of blood clotting and break down process and can be measured by blood sample analysis [11]. D-dimer is exclusive biomarker to identify the venous-thromboembolisms. But during pregnancy there is limitation due to physiological increase of d-dimers during pregnancy [12].

Hence there is a need to study the d-dimers and its elevation in pre-eclampsia to determine the maternal and fetal outcome. So, the study was conducted to assess the fetal and maternal outcome in pre-eclampsia with elevated d-dimers.

Materials and Methods

The current study was undertaken to study the fetal and maternal outcome in pre-eclampsia with elevated d-dimers among patients of Government General Hospital, Kakinada. Hospital based prospective observational study. Patients admitted to inpatient ward in the dept. of Obstetrics and Gynecology, GGH, Kakinada from October 2020 to October 2022 with clinical diagnosis of pre-eclampsia in 100 patients.

Inclusion criteria

1. All pregnant women with pre-eclampsia with gestational age more than 20 weeks.
2. Age more than 18 years.
3. Patients who have given consent.

Exclusion criteria

1. Family or personal history of venous thromboembolism.
2. Maternal age more than 45 years.
3. History of smoking.
4. Suspected or confirmed DVT.
   - Coagulation disorders
   - Patients who received anti-coagulants and antihypertensive drugs
5. Previous recurrent spontaneous abortions.
6. HELLP syndrome, multiple gestation.
7. Chronic renal disease, chronic hypertension, pre-existing diabetes or gestational diabetes mellitus.

Study tools

A pre-tested, semi-structured questionnaire was used to collect information.

Data collection

Data on detailed history, clinical examination and relevant laboratory investigations of the pregnant women were taken.

Study variables

Age, Parity, gestational age, platelet count, d-dimer count, mode of delivery of pregnant women. Birth weight and outcome of baby.

Statistical analysis

Data was analyzed by using Microsoft Excel 2016, SPSS 21 and represented in the form of tables and diagrams. Percentages, means and proportions were used for descriptive variables. Appropriate statistical tests were applied wherever necessary. P-value of < 0.05 was taken as statistically significant.

Ethical issues

Prior approval from the Institutional Ethics Committee (IEC) has been obtained. Informed consent from the study subjects was obtained. The interviews were ensured confidentiality and comfort.

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

Results

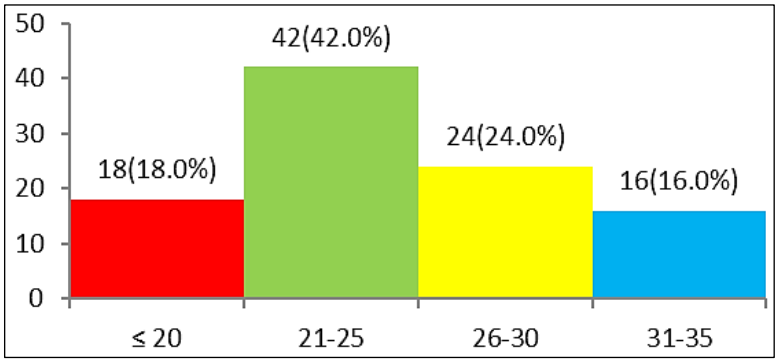

Fig 1: Distribution of study subjects based on Age group (n=100)

In the present study, study subjects of ≤20 years of age group constitutes 18%, 21-25 years age group constitute 42%, 26-30 years age group constitute 24% and 31-35 years age group constitute 16%. Majority of study subjects belong to age group of 21-25 years. Mean age of study subjects is 25 ± 4.78 SD.

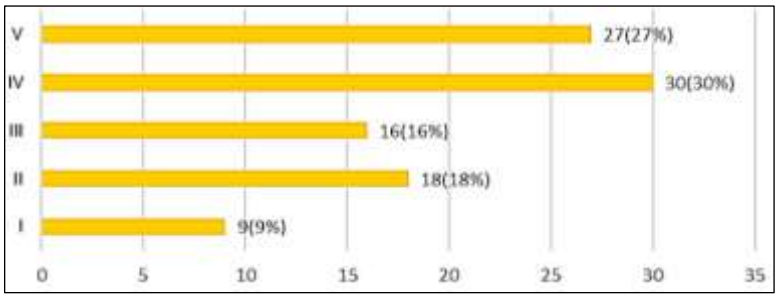

Fig 2: Distribution of study subjects based on SES (n=100)

According to BG Prasad socio-economic classification, study subjects were classified based on monthly income. 9% of study subjects belong to class I SES, 18% belong to class II SES, 16% belong to class III SES, 30% belong to class IV SES and 27% belong to class V SES. Most study subjects belong to class IV SES.

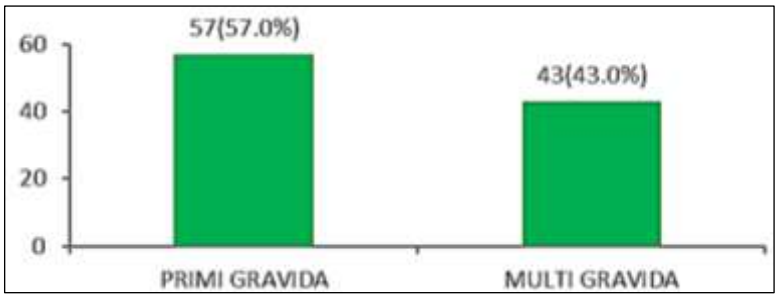

Fig 3: Distribution of study subjects based on Parity (n=100)

In the present study, 57% of study subjects were primigravida and 43% were multigravida. More than half of the study subjects were primigravida.

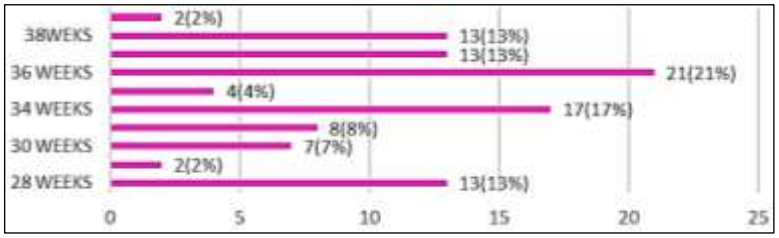

Fig 4: Distribution of study subjects based on Gestational Age (n=100)

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

In the present study, 13% were 28 weeks of GA, 2% were 29 weeks, 7% were 30 weeks, 8% were 32 weeks, 17% were34 weeks, 4% were 35 weeks, 21% were 36 weeks, 13% were 37 weeks, other 13% were 38 weeks and 2 % were 39 weeks. Majority of the study subjects were of 36 weeks.

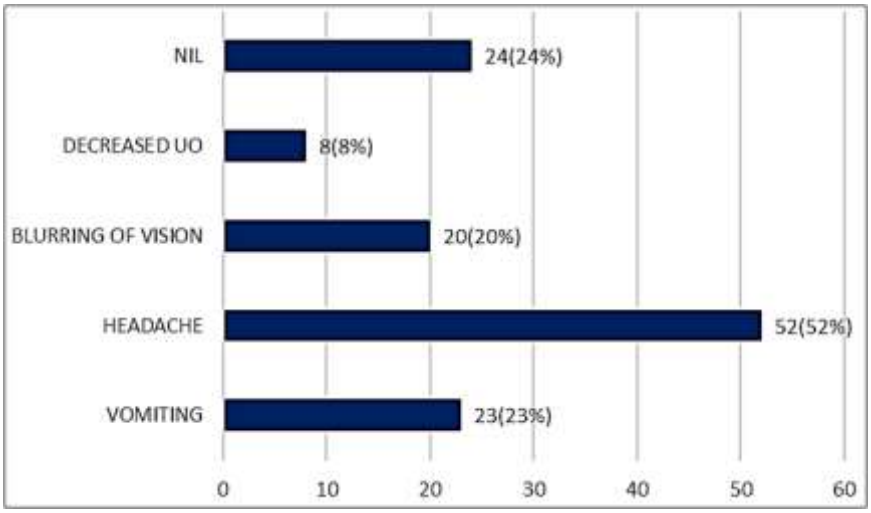

Fig 5: Distribution of study subjects based on Presenting complaints (n=100)

In the present study, 24% have no complaints, 8% have decreased urine output, 20% have blurring of vision, 52% have headache and 23% have vomiting. More than half of the study subjects have headache as a presenting complaint. Study subjects have more than one complaint.

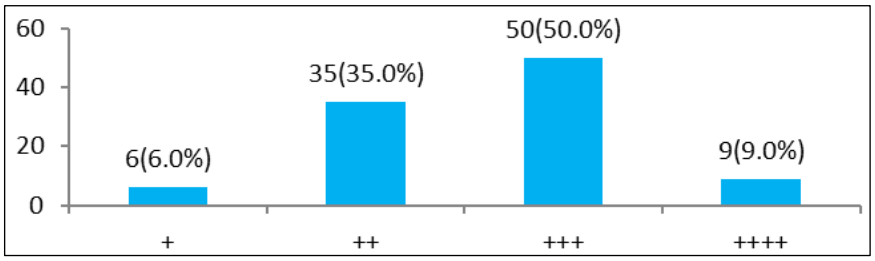

Fig 6: Distribution of study subjects based on Urine albumin (n=100)

Based on dip-stick test, 6% of study subjects have +1 urine albumin levels, 35% have +2 urine albumin levels, 50% have +3 urine albumin levels and 9% have +4 urine albumin levels. Half of the study subjects have + 3 urine albumin levels.

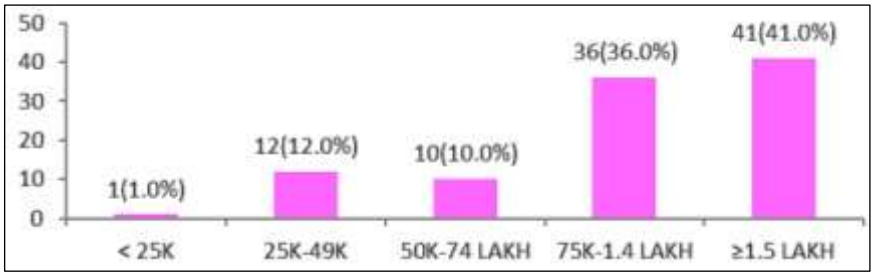

Fig 7: Distribution of study subjects based on Platelet count (n=100)

In the present study, 1% of study subjects have < 25,000 platelet count, 12% have between 25,000-49,000 platelet count, 10% have between 50,000-74,000 platelet count, 36% have between 75,000-1,00,000 count and 41% have >1,50,000 count. Most of the study subjects have >1,50,000 platelet count.

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

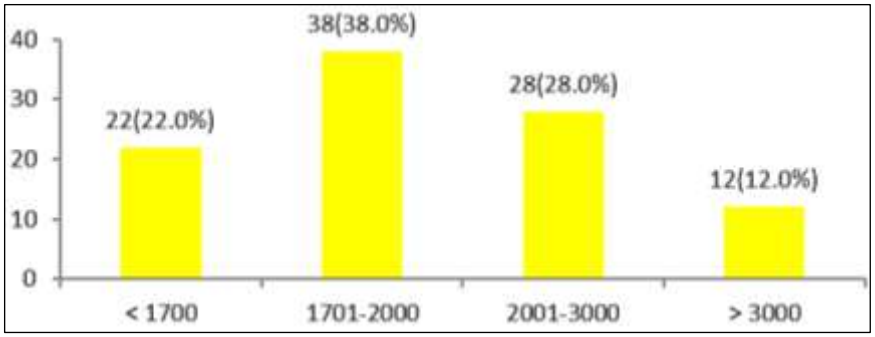

Fig 8: Distribution of study subjects based on D-dimer values (n=100)

In the present study, 22% of study subjects have < 1700 ng/ml D-dimer levels. 38% of study subjects have values between 1701-2000 g/ml, 28% have between 2001-3000 ng/ml and 12% have > 3000 ng/ml d-dimer values. Majority of study subjects have d-dimer values between 1701-2000 ng/ml.

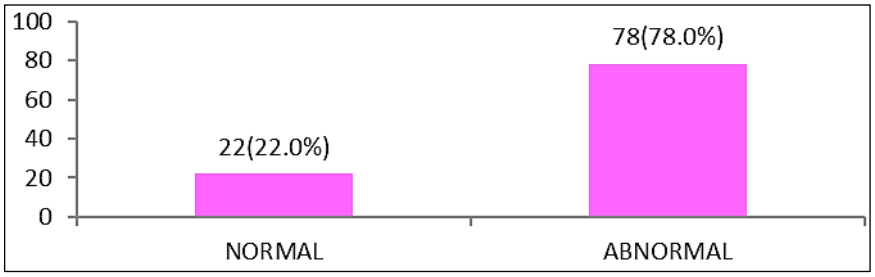

Fig 9: Grouping of study subjects based on D-dimer values (n=100)

Based on D-dimer values, study subjects were classified. 22% of study subjects have normal D-dimer values and 78% of study subjects have abnormal D-dimer values.

Fig 10: Distribution of study subjects based on Mode of delivery (n=100)

In the present study, 49% have undergone Normal vaginal delivery, 3% have undergone forceps delivery and 48% have undergone emergency LSCS. Nearly half of the study subjects undergone emergency LSCS.

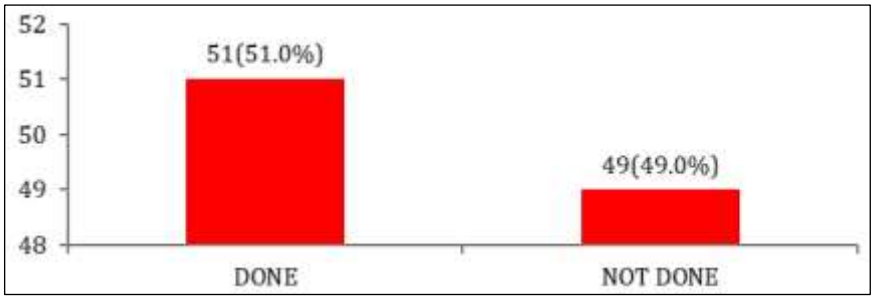

Fig 11: Distribution of study subjects based on Blood transfusion (n=100)

In the present study, 51% of study subjects have undergone blood transfusion and 49% did not. More than half of the study subjects have undergone blood transfusion.

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

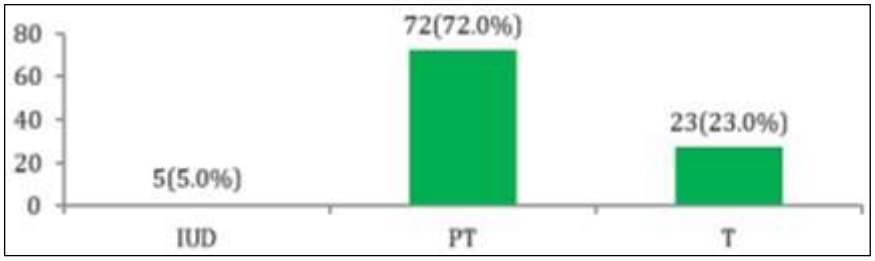

Fig 12: Distribution of study subjects based on fetal outcome (n=100)

In the present study, 5% of study subject fetus were Intrauterine deaths (IUD), 72% were pre-term (PT) and 23% were term (T). Nearly two-thirds of study subject babies were pre-term.

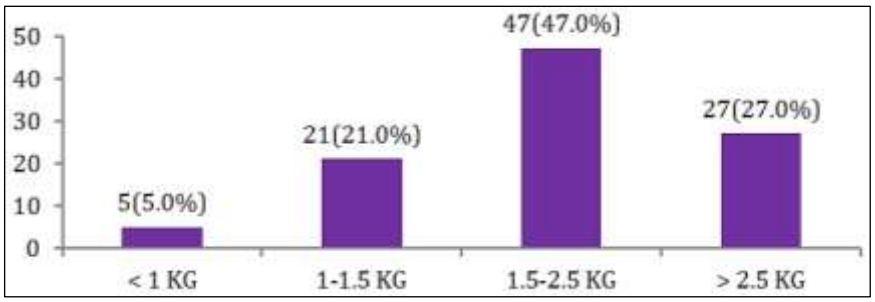

Fig 13: Distribution of study subjects based on Baby weight (n=100)

In the present study, 5% of study subject babies were < 1 kg (extremely low birth weight), 21% were 1-1.5 kg (very low birth weight), 47% were 1.5-2.5 kg (low birth weight) and 27% were > 2.5 kg (normal weight). Two-thirds of the study subjects were of low birth weight.

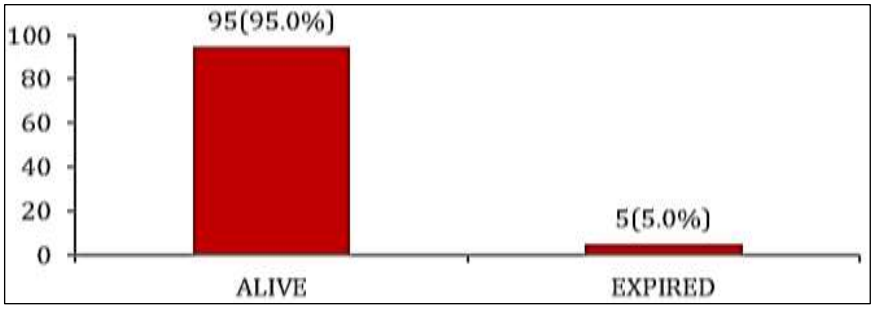

Fig 14: Distribution of study subjects based on Maternal Outcome (n=100)

In the present study, 95% of study subjects with pre-eclampsia were alive and 5% were dead. The mortality rate is 5%.

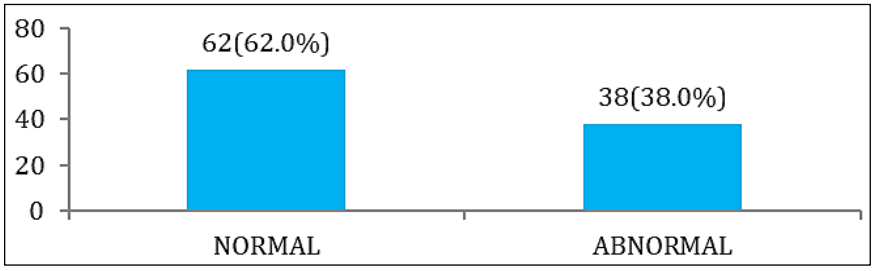

Fig 15: Distribution of study subjects babies based on Apgar score (n=100)

Based on Apgar score, new born babies were assessed. 62% of new born have normal Apgar scores and 38% have abnormal Apgar scores. Majority of the new born have good Apgar scores.

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

Table 1: Crosstab showing distribution of study subjects based on D-dimer levels and maternal outcome

Outcome (M)	D-dimer values			Chi-square Df P value
	Normal	Abnormal	Total	
Alive	19 (20.0%) 86.4%	76 (80.0%) 97.4%	95 (100.0%) 95.0%	4.4289 18 0.035
Expired	3 (60.0%) 13.6%	2 (40.0%) 2.6%	5 (100.0%) 5.0%	
Total	22 (22.0%) 100.0%	78 (78.0%) 100.0%	100 (100.0%) 100.0%	

Among study subjects with normal D-dimer levels, 86.4% were alive and 13.6% were expired, and among abnormal values, 97.4% were alive and 2.6% were expired. Elevated d-dimer levels were significantly associated with maternal outcome.

Table 2: Crosstab showing distribution of study subjects based on D-dimer levels and fetal outcome

Outcome (B)	D-dimer levels			Chi-square Df P value
	Normal	Abnormal	Total	
Normal	18 (29.0%) 81.8%	44 (71.0%) 56.4%	62 (100.0%) 62.0%	4.702 12 0.03
Abnormal	4 (10.5%) 18.2%	34 (89.5%) 43.6%	38 (100.0%) 38.0%	
Total	22 (22.0%) 100.0%	78 (78.0%) 100.0%	100 (100.0%) 100.0%	

Among the study subjects with normal d-dimer levels, 81.8% have normal Apgar scores and 18.2% have abnormal scores whereas among study subjects with abnormal d-dimer levels 56.4% have normal Apgar scores and 43.6% have abnormal scores. Elevated D-dimer levels resulted in abnormal Apgar scores which is statistically significant in the present study.

Table 3: Mean values of Investigations

S. No.	Variable	Mean Value
1.	Weight of Mother(kgs)	57 ± 5.63 SD
2.	Systolic Blood pressure (mm/hg)	161.26 ± 17.07 SD
3.	Diastolic Blood pressure (mm/hg)	112.3 ± 10.94 SD
4.	HB %	8.9 ± 2.48 SD
5.	Platelet count	140479 ± 78931.32 SD
6.	D-dimer levels (ng/ml)	2076 ± 632 SD
7.	Newborn weight(kgs)	2 ± 0.69 SD
8.	Normal D-dimer values	1211 ± 683 SD
9.	Abnormal D-dimer values	2320 ± 620 SD

Table 4: Comparison of parameters of study subjects with normal and abnormal D-dimers values

S. No.	Parameters	Normal D-dimers (n=22)	Abnormal D-dimers (n=78)
1.	SBP	166.8± 18.3 SD	159.6±17.1
2.	DBP	116.3±12.2	111.1±10.5
3.	HB	9.8±2.6	8.6±2.4
4.	Platelet count	171049±85518	131856±77652.7
5.	Baby Weight	2.18±0.6	2±0.6
6.	Preterm	14(64%)	58(74%)
7.	Term	8(36%)	19(24%)
8.	IUD	1(4%)	4(5%)
9.	Expired(M)	2(9%)	3(3.8%)
10.	Complications(M)	4(18%)	30(38%)
11.	D-dimer values	1211±682.5	2320±621.9
12.	Blood Transfusion	9(41%)	42(54%)

Table 5: Distribution of study subjects based on complications of mother

Complications (n=100)	N (%)
NIL	67(67%)
Disseminated Intravascular Coagulation (DIC)	4(4%)
Abruptio Placenta	10(10%)

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

Acute Respiratory Failure (ARF)	6(6%)
Cerebral Edema	2(2%)
Cardio-vascular Thrombosis (CVT)	6(6%)
Multi-organ dysfunction (MODS)	1(1%)
Pulmonary Embolism (PE)	2(2%)
Pleural Effusion	2(2%)

In the present study, 67% of study subjects have no complications and 33% of study subjects have complications.4% of study subjects have DIC, 10% have abruptio placenta, 6% have ARF, 2% cerebral edema, 6% CVT, 1% MODS, 2% PE and another 2% Pleural effusion.

Discussion

Age

In the present study, study subjects of ≤20 years of age group constitutes 18%, 21-25 years age group constitute 42%, 26-30 years age group constitute 24% and 31-35 years age group constitute 16%. Majority of study subjects belong to age group of 21-25 years. Mean age of study subjects is 25 ± 4.78 SD.

Agustin Conde Agudelo *et al*., in their study reported that >35 years is a significant risk factor for pre-eclampsia [13].

Maryam Kashanian *et al*., 2005-06 in their study reported that 15-20 years constitute 9.3%, 21-30 years constitute 23.7% and >31 years constitute 17% [14].

Whereas Ramesh K *et al*., 2013 in their case-control study among 100 cases of preeclampsia and 200 controls in Karnataka reported that mean age of cases was 21 years and controls is 23.5 years [15].

Seema Das *et al*., 2017 in their study reported that 15-19 years constitute 4.7%, 20-24 years constitute 44.7%, 25-29 years constitute 21.2%, 30-34 years constitute 17.6% and >35 years is 11.8% [16].

Sailaja B *et al*., 2017 in their study reported that pre-eclampsia is more among study subjects with 25-35 years age group [17].

In the present study pre-eclampsia is more common in age of >25 years which is similar to several studies.

SES

According to BG Prasad socio-economic classification, study subjects were classified based on monthly income. 9% of study subjects belong to class I SES (upper), 18% belong to class II SES (upper middle), 16% belong to class III SES (middle), 30% belong to class IV SES (lower middle) and 27% belong to class V SES (lower). Most study subjects belong to class IV SES.

In a study conducted by Parveen M Aabidha, 2010-11 reported that 2% of study subjects belong to class I SES (upper), 29% belong to class II SES (upper middle), 24% belong to class III SES (middle), 30% belong to class IV SES (lower middle) and 15% belong to class V SES (lower) [18].

Sailaja B *et al*., in their study reported that pre-eclampsia is more among study subjects with II and III SES [17].

Pre-eclampsia is more common among low socio-economic classes.

Parity

In the present study, 57% of study subjects were primigravida and 43% were multigravida. More than half of the study subjects were primigravida.

Whereas Maryam Kashanian *et al*., 2005-06 in their study reported that only 24% were primigravida and 76% were multigravida [14].

Seema Das *et al*., 2017 in their study reported that 65% were primigravida and 35% were multigravida [15].

Charity Ndwiga *et al*., 2020 in their study reported that 36% of study subjects were primigravida and 64% of study subjects were multigravida [19].

Primigravida is more common compared to multigravida which is similar in all studies.

Gestational age

In the present study, 13% were 28 weeks of GA, 2% were 29 weeks, 7% were 30 weeks, 8% were 32 weeks, 17% were 34 weeks, 4% were 35 weeks, 21% were 36 weeks, 13% were 37 weeks, other 13% were 38 weeks and 2 % were 39 weeks. Majority of the study subjects were of 36 weeks.

Also, Ramesh K *et al*., 2013 conducted a case-control study among 100 cases of preeclampsia and 200 controls in Karnataka reported that 98% of cases gestational age is > 30 weeks [15].

Ajay Chhabra *et al*., 2015 in their study reported that 6% were < 30 weeks, 24% were 30-34 weeks, 30% were >34-37 weeks and 40% were >37 weeks [20].

Seema Das *et al*., 2017 in their study reported that 33% were < 37 weeks, 65% were 37-41 weeks and 3.5% were >41 years [16].

Whereas in a retrospective analysis conducted by Kartik K Venkatesh *et al*., 2020 among 2217 pregnant

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

women reported that severe preeclampsia along with comorbidity and <34 weeks of gestational age causes fetal growth restriction [21].
In several of the studies pre-eclampsia is most common in gestational age of >30 weeks.

Presenting complaints
In the present study, 24% have no complaints, 8% have decreased urine output, 20% have blurring of vision, 52% have headache and 23% have vomiting. More than half of the study subjects have headache as a presenting complaint. Study subjects have more than one complaint.
Mou A *et al*., 2021 in their study reported that 13.5% had blurring of vision, 34% had headache, 44.1% had nausea and vomiting and 8.4% of other symptoms [22].
The majority of the study subjects had headaches as a common complaint.

Table 6: Comparison of parameters among studies

S. No.	Variable	Present Study	Mou A *et al*., [22]	Ahoud Khalid Osman *et al*., [23]
1.	Weight of mother (kgs)	57 ± 5.63 SD	60.4 ±11.8	-
2.	SBP (mm/hg)	161.26 ± 17.07 SD	122.2 ±19.9	158.62 ± 20.21
3.	DBP (mm/hg)	112.3 ± 10.94 SD	79.8 ±13.6	102.72 ± 12.69

Table 7: Comparison of BP among studies

BP (mm/hg)	Present Study		Best L *et al*., Study [24]	
SBP	166.8 ± 18.3 SD (n=22)	159.6±17.1 (n=78)	133.2± 20.3	122.3 ±17.7
DBP	116.3±12.2	111.1±10.5	79.2 ±12.7	71.7 ±11.6

Urine albumin
Based on dip-stick test, 6% of study subjects have +1 urine albumin levels, 35% have +2 urine albumin levels, 50% have +3 urine albumin levels and 9% have +4 urine albumin levels. Half of the study subjects have + 3 urine albumin levels.
Indranil Banerjee *et al*., 2021 in their study reported that 33% had negative, 27% had trace amounts, 25% of study subjects have +1 urine albumin levels, 8.5% have +2 urine albumin levels and 6.5% have +3 urine albumin levels [25].
Urine albumin levels were high in the present study compared to other studies.

Platelet count
In the present study, 1% of study subjects have < 25,000 platelet count, 12% have between 25,000-49,000 platelet count, 10% have between 50,000-74,000 platelet count, 36% have between 75,000-1,00,000 count and 41% have >1,50,000 count. Most of the study subjects have >1,50,000 platelet count. Mean platelet count was 140479 ± 78931.32 SD.

Table 8: Comparison of platelet counts among pre-eclampsia cases

Studies	Platelet Count
Present study	1,40,479
Mohapathra *et al*., [26]	1,80,000
Vrunda *et al*., [27]	1,40,000
Dube *et al*., [28]	1,90,000
Annam *et al*., [29]	1,55,500
Ahoud Khalid Osman *et al*., [23]	2,36,160

Charity Ndwiga *et al*., 2020 in their study reported that 29% of study subjects with pre-eclampsia had low platelet count (<1 lakh) [19].
A Near similar distribution of platelet count is seen among study subjects with pre-eclampsia in all the studies except a few studies.

D-Dimer Values
In the present study, 22% of study subjects have < 1700 ng/ml D-dimer levels. 38% of study subjects have values between 1701-2000 g/ml, 28% have between 2001-3000 ng/ml and 12% have > 3000 ng/ml d-dimer values. Majority of study subjects have d-dimer values between 170-2000 ng/ml. Mean abnormal D-dimer values were 2320 ± 620 SD.
In a cross-sectional study conducted by Mirjana Kovac *et al*., 2010 reported that first trimester had 6.7-7.6-time higher level of D-dimer than the mean value in the reference group, and in the third trimester thrombotic women had 2.0-3.8-time higher level of D-dimer and 100% sensitivity of d-dimer test in diagnosing thrombosis [30].
In a cross-sectional study conducted by Serif Ercan *et al*., 2014 among pregnant women reported the reference values of d-dimers as follows: 0.11-0.40 mg/L; 0.14-0.75 mg/L and 0.16-1.3 mg/L in first,

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

second and third trimester, respectively [31].
V O Osunkalu *et al*., 2014 conducted a study in Nigeria among 365 pregnant and non-pregnant women and reported the reference ranges as follows 338-624 ng/mL; 451-799 ng/mL and 665-1262 ng/mL in 1st, 2nd, and 3rd trimester of pregnancy respectively. Median D-dimer levels for pregnant female in 1st, 2nd, and 3rd trimester were 485 ng/ml; 620 ng/mL; and 1185 ng/mL respectively [32].
In a cohort study conducted by Yolima Rodriguez-Pena *et al*., 2017-18 among 132 pregnant women, reported that elevated d-dimers were strongly associated with pre-eclampsia compared to control group [33].
Irene Gutierrez Garcia *et al*., 2018 conducted a longitudinal prospective study among pregnant women reported the trimester specific reference values for D-dimers which are as follows, first trimester: 169-1202 µg/L, second trimester: 393-3258 µg/L and third trimester: 551-3333 µg/L [34].
Elevated D-dimers is associated with complications of maternal and fetal outcomes in all the studies.

Mode of delivery
In the present study, 49% have undergone Normal vaginal delivery, 3% have undergone forceps delivery and 48% have undergone emergency LSCS. Nearly half of the study subjects undergone emergency LSCS.
Charity Ndwiga *et al*., 2020 in their study reported that 29% had normal vaginal delivery, 1% had assisted delivery and 70% had emergency LSCS [19].
Majority of the study subjects had undergone LSCS.

Fetal outcome
In the present study, 5% of study subject fetus were Intrauterine deaths (IUD), 72% were pre-term (PT) and 23% were term (T). Nearly two-thirds of study subject babies were pre-term.
In a prospective observational study conducted by Bassam Haddad *et al*., 2004 among pre-eclampsia women reported 5.4% perinatal deaths [35].
N. Vijayan A *et al*., 2014-15 conducted a retrospective study in South India among pregnant women with preeclampsia reported that 36.8% had perinatal mortality due to preeclampsia [36].
Ajay Chhabra *et al*., 2015 in their study reported that IUDs were 18% and 16% perinatal mortality [20].
Charity Ndwiga *et al*., 2020 in their study reported that perinatal mortality was 26% [19].
Sharma M *et al*., 2020 in their study reported that 4% IUDs, 31% have pre-term births, 8% perinatal deaths [37].
Indranil Banerji *et al*., 2021 in their study reported that perinatal mortality was 4% [25]. Mortality rate of baby is different in different studies due to other associated factors.

Baby weight
In the present study, 5% of study subject babies were < 1 kg (extremely low birth weight), 21% were 1-1.5 kg (very low birth weight), 47% were 1.5-2.5 kg (low birth weight) and 27% were > 2.5 kg (normal weight). Two-thirds of the study subjects were of low birth weight.
In a descriptive study conducted by Parveen M Aabidha, 2010-11 among 1900 antenatal women reported that prematurity, low birth weight, growth restriction were neonatal complications [18].
Charity Ndwiga *et al*., 2020 in their study reported that 55% had birth weight < 2.5kgs [19].
Sharma M *et al*., 2020 in their study reported that 23.1% had birth weight < 2.5kgs [37].
Indranil Banerji *et al*., 2021 in their study reported that 50.5%had birthweight < 2.5 kgs and 49.5% had birthweight >2.5 kgs [25].
Low birth weight is a predominant complication of fetal outcome in all the studies.

Maternal outcome
In the present study, 95% of study subjects with pre-eclampsia were alive and 5% were dead. The mortality rate is 5%.
Sara Jaber *et al*., 2022 conducted a retrospective cohort study among 1172 pre-eclampsia women reported that 5-fold increase in maternal morbidity which needs immediate care and delivery of the baby without delay [38].
Ajay Chhabra *et al*., 2015 in their study reported that maternal mortality was 4% [20].
Sailaja B *et al*., 2017 in their study reported that maternal mortality was 4.6% [17].
Charity Ndwiga *et al*., 2020 in their study reported that maternal mortality was 2.4% [19].
Sharma M *et al*., 2020 in their study reported that maternal mortality was 15.4% [49].
Indranil Banerji *et al*., 2021 in their study reported that maternal mortality was 7.5% [25].
Mortality rate of mother is different in different studies due to other associated factors.

Complications
In the present study, 67% of study subjects have no complications and 33% of study subjects have complications. 4% of study subjects have DIC, 10% have abruptio placenta, 6% have ARF, 2% cerebral

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

edema, 6% CVT, 1% MODS, 2% PE and another 2% Pleural effusion.
Similarly, N. Vijayan A *et al*., 2014-15 conducted a retrospective study in South India among pregnant women with preeclampsia reported that 34.3% had adverse maternal outcomes [36].
Ajay Chhabra *et al*., 2015 in their study reported that 6% had abruptio placenta, 4% PPH and 12% pulmonary edema [20].
Sailaja B *et al*., 2017 in their study reported that 32.9% have maternal complications [17].
Charity Ndwiga *et al*., 2020 in their study reported that 0.6% had DIC, 0.6% had DVT, 3% had CVA and 4% had APH and 8% had PPH [19].
A Near similar distribution of complications were present in all the studies.

Apgar score
Based on Apgar score, new born babies were assessed. 62% of new born have normal Apgar scores and 38% have abnormal Apgar scores. Majority of the new born have good Apgar scores.
Y P Bansal *et al*., in their study reported that 26% of new born had abnormal apgar scores [39]. Majority of the study subjects have good apgar scores.

Conclusion
More than one-third of the study subjects belong to the age group of 21-25 years. Nearly one-third of study subjects belong to low SES. More than half of the study subjects were primigravida. Majority of the study subjects were in third trimester of pregnancy. In half of the study subject's predominant complaint is headache. Half of the study subjects have +3 albumin levels. Normal platelet count is seen in majority of the study subjects. Two-thirds of the study subjects have elevated D-dimers. In half of the study subject's normal vaginal delivery was done. Blood transfusion is done in half of the study subjects. Predominant fetal outcome was pre-term and low birth weight in the study. One -third of study subjects have adverse maternal outcomes. Maternal and fetal mortality rate is 5% each in the present study. Elevated-D dimers were significantly associated with maternal mortality. Elevated-D dimers were significantly associated with abnormal fetal outcome.

Funding source: None.

Conflict of interest: Nil.

References
1. Bell MJ. A Historical Overview of Preeclampsia-Eclampsia.
2. Mol BWJ, Roberts CT, Thangaratinam S, Magee LA, De Groot CJM, Hofmeyr GJ. Pre-eclampsia. The Lancet. 2016 Mar;387(10022):999-1011.
3. Duley L. The Global Impact of Pre-eclampsia and Eclampsia. Semin Perinatol. 2009 Jun;33(3):130-7.
4. Sibai B, Dekker G, Kupferminc M. Pre-eclampsia. The Lancet [Internet]. 2005 Feb;365(9461):785-99. [cited 2022 Oct 4]. Available from: http://linkinghub.elsevier. com/retrieve/pii/S0140673605179872
5. Walia GK, Agrawal S, Walia GK. Prevalence and Risk Factors for Symptoms Suggestive of Pre-Eclampsia in Indian Women. Article in Journal of Womens Health Issues and Care [Internet]. 2014 [cited 2022 Oct 9]; Available from: http://dx.doi.org/10.4172/2325-9795.1000169
6. Chappell LC, Cluver CA, Kingdom J, Tong S. Pre-eclampsia. The Lancet. 2021 Jul;398(10297):341-54.
7. Brown MA, Magee LA, Kenny LC, Karumanchi SA, McCarthy FP, Saito S, *et al*., Hypertensive Disorders of Pregnancy. Hypertension [Internet]. 2018 Jul;72(1):24-43. [cited 2022 Oct 9].
8. Trogstad L, Magnus P, Stoltenberg C. Pre-eclampsia: Risk factors and causal models. Best Pract Res Clin Obstet Gynaecol. 2011 Jun;25(3):329-42.
9. Graham J, Burton CWRJM Roberts, AM. Pre-eclampsia: pathophysiology and clinical implications. BMJ [Internet]. 2019;10(1136):366-2381.
10. View of Coagulation Abnormalities in Pre-Eclampsia-A Study of 40 Subjects. [Internet]. [cited 2022 Oct 17]. Available from: https://www.annalskemu.org/journal/index.php/annals/article/view/2301/1670
11. Bounds EJ, Kok SJ. Dimer D. Stat Pearls [Internet], 2022 Jul. [cited 2022 Oct 17]; Available from: https://www.ncbi.nlm.nih.gov/books/NBK431064/.
12. Gutiérrez García I, Pérez Cañadas P, Martínez Uriarte J, García Izquierdo O, Angeles Jódar Pérez M, García de Guadiana Romualdo L. D-dimer during pregnancy: establishing trimester-specific reference intervals. Scand J Clin Lab Invest [Internet]. 2018 Aug;78(6):439-42. [cited 2022 Oct 17]; Available from: https://pubmed.ncbi.nlm.nih.gov/29975107/.
13. Conde-Agudelo A, Belizán JM. Risk factors for pre-eclampsia in a large cohort of Latin American and Caribbean women. BJOG [Internet]. 2000 Jan;107(1):75-83. [cited 2022 Dec 4];

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

14. Maryam Kashanian MD•1 HRBMSBMRAM. Risk Factors for Pre-Eclampsia: A Study in Tehran, Iran. [cited 2022 Dec 4]; Available from: https://www.sid.ir/paper/280793/en#downloadbottom.
15. Ramesh K, Gandhi S, Rao V. Socio-Demographic and Other Risk Factors of Pre-Eclampsia at a Tertiary Care Hospital, Karnataka: Case Control Study. J Clin Diagn Res [Internet]. 2014;8(9):JC01 [cited 2022 Oct 18]. Available from: /pmc/articles/PMC4225915/
16. Das S, Das R, Bajracharya R, Baral G, Jabegu B, Odland JØ, *et al*., Incidence and risk factors of pre-eclampsia in the paropakar maternity and women's hospital, Nepal: A retrospective study. Int J Environ Res Public Health, 2019 Oct, 16(19).
17. Sailaja B, Cooly V, Sailcheemala B, Sailaja S. A study on risk factors, maternal and foetal outcome in cases of preeclampsia and eclampsia at a tertiary care hospital of South India. Int J Reprod Contracept Obstet Gynecol [Internet]. 2017 Dec;7(1):266-71. [cited 2022 Dec 4]. Available from: https://www.ijrcog.org/index.php/ijrcog/article/view/3922.
18. Aabidha PM, Cherian AG, Paul E, Helan J. Maternal and fetal outcome in pre-eclampsia in a secondary care hospital in South India. J Family Med Prim Care [Internet]. 2015;4(2):257. [cited 2022 Oct 17]. Available from:/pmc/articles/PMC4408711/.
19. Ndwiga C, Odwe G, Pooja S, Ogutu O, Osoti A, Warren CE. Clinical presentation and outcomes of pre-eclampsia and eclampsia at a national hospital, Kenya: A retrospective cohort study. PLoS One [Internet]. 2020 Jun;15(6):e023-3323. [cited 2022 Dec 4];
20. Chhabra A, Grover S, Shergill HK. Clinical profile and outcome of cases of eclampsia at a tertiary hospital of north India Related papers Clinical profile and outcome of cases of eclampsia at a tertiary hospital of north India. International Journal of Medical and Health Research International Journal of Medical and Health Research www.medicalsciencejournal.com [Internet], 2018. [cited 2022 Dec 4];4. Available from: www.medicalsciencejournal.com
21. Venkatesh KK, Strauss RA, Westreich DJ, Thorp JM, Stamilio DM, Grantz KL. Adverse maternal and neonatal outcomes among women with preeclampsia with severe features <34 weeks gestation with versus without comorbidity. Pregnancy Hypertens. 2020 Apr;20:75-82.
22. Mou AD, Barman Z, Hasan M, Miah R, Hafsa JM, Das Trisha A, *et al*., Prevalence of preeclampsia and the associated risk factors among pregnant women in Bangladesh. Scientific Reports 2021 11:1 [Internet]. 2021 Oct;11(1):1-9. [cited 2022 Dec 4]. Available from: https://www.nature.com/articles/s41598-021-00839-w.
23. Osman AK. Evaluation of Platelets Count and Indices in Pre-Eclampsia Compared to Normal Pregnancies. Article in IOSR Journal of Dental and Medical Sciences [Internet]. 2016 [cited 2022 Dec 4]; Available from: www.iosrjournals.org.
24. Best LG, Lunday L, Webster E, Falcon GR, Beal JR. Pre-eclampsia and risk of subsequent hypertension: in an American Indian population. http://dx.doi.org/101080/1064195520161250905 [Internet]. 2016 Apr;36(2):131-7. [cited 2022 Dec 4]. Available from: https://www.tandfonline.com/doi/abs/10.1080/10641955.2016.1250905.
25. Banerjee I, Kumari A, Mukherjee G, Banerjee I, Kumari A, Mukherjee G. Study of the Role of Ethnicity in the Pathophysiology of Preeclampsia: A Prospective Observational Study in a Rural Hospital in India. Open J Obstet Gynecol [Internet]. 2021 Jul;11(8):978-1004. [cited 2022 Dec 4]. Available from: http://www.scirp.org/journal/PaperInformation.aspx?PaperID=111268.
26. Mohapatra S, Pradhan BB, Satpathy UK. Arati Mohanty. Platelet estimation: its prognostic value in pregnancy induced hypertension-PubMed [Internet]. [cited 2022 Dec 4]. Available from: https://pubmed.ncbi.nlm.nih.gov/18175660/.
27. Vrunda JK, Saila S. Lowered platelet count. A prognostic index in pregnancy induced hypertension. J Obstet Gynaecol Ind. 2004;54(3):235-236. Google Search [Internet]. [cited 2022 Dec 4]. Available from: https://www.google.com/search?q=Vrunda+JK%2C+Saila+S.+Lowered+platelet+count.+A+prognostic+index+in+pregnancy+induced+hypertension.+J+Obstet+Gynaecol+Ind.+2004%3B+54+(3)%3A235-236.&oq=Vrunda+JK%2C+Saila+S.+Lowered+platelet+count.+A+prognostic+index+in+pregnancy+induced+hypertension.+J+Obstet+Gynaecol+Ind.+2004%3B+54+(3)%3A235-236.&aqs=chrome.0.69i59.1928j0j7&sourceid=chrome&ie=UTF-8.
28. Dube B, Bhattacharya S, Kanta Dube R. Blood coagulation profile in Indian patients with pre-eclampsia and eclampsia. Br J Obstet Gynaecol [Internet]. 1975 [cited 2022 Dec 4];82(1):35-9. Available from: https://pubmed.ncbi.nlm.nih.gov/1138817/
29. Annam V, Yatnatti SK. Evaluation of platelet indices and platelet counts and their significance in pre-eclampsia and eclampsia. Extramedullary Plasmacytoma of the Jugular Bulb-A Rare Case Report View project Evaluation of platelet indices and platelet counts and their significance in Pre-eclampsia and eclampsia a b c d. International Journal of Biological & Medical Research Int J Biol Med Res [Internet]. 2011;2(1):425-8. [cited 2022 Dec 4].
30. Kovac M, Mikovic Z, Rakicevic L, Srzentic S, Mandic V, Djordjevic V, *et al*., The use of D-dimer with new cutoff can be useful in diagnosis of venous thromboembolism in pregnancy. Eur J Obstet

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

Gynecol Reprod Biol [Internet]. 2010 [cited 2022 Oct 18];148(1):27-30. Available from: https://pubmed.ncbi.nlm.nih.gov/19804940/.

31. Ercan Ş, Özkan S, Yücel N, Orçun A. Establishing reference intervals for D-dimer to trimesters. J Matern Fetal Neonatal Med [Internet]. 2015 May;28(8):983-7. [cited 2022 Oct 18]; Available from: https://pubmed.ncbi.nlm.nih.gov/25060670/
32. Plasma D-dimer reference ranges in pregnant Nigerians-PubMed [Internet]. [cited 2022 Oct 18]. Available from: https://pubmed.ncbi.nlm.nih.gov/26223147/.
33. Rodríguez-Peña Y, Ibáñez-Pinilla M. Elevated levels of D-dimer tested by immunoturbidimetry are associated with the extent of severity of pre-eclampsia. International Journal of Gynecology & Obstetrics [Internet]. 2020 Aug;150(2):241-7. [cited 2022Oct 17]. Available from: https://onlinelibrary.wiley.com/doi/full/10.1002/ijgo.13163.
34. Gutiérrez García I, Pérez Cañadas P, Martínez Uriarte J, García Izquierdo O, Angeles Jódar Pérez M, García de Guadiana Romualdo L. D-dimer during pregnancy: establishing trimester-specific reference intervals. Scand J Clin Lab Invest [Internet]. 2018 Aug;78(6):439-42. [cited 2022 Oct 18]; Available from: https://pubmed.ncbi.nlm.nih.gov/29975107/.
35. Haddad B, Deis S, Goffinet F, Paniel BJ, Cabrol D, Sibaï BM. Maternal and perinatal outcomes during expectant management of 239 severe preeclamptic women between 24 and 33 weeks' gestation. Am J Obstet Gynecol. 2004 Jun;190(6):1590-5.
36. Maternal and perinatal outcomes in women undergoing expectant management of early-onset pre-eclampsia: a retrospective cohort study | South African Journal of Obstetrics and Gynaecology [Internet]. [cited 2022 Oct 18]. Available from: https://journals.co.za/doi/abs/10.7196/SAJOG.2018.v24i3.1378.
37. Sharma M, Mazumder MA, Mahanta PJ, Doley PK, Pegu G, Alam S. P0587 Clinical Profile and Short-Term Outcomes of Acute Kidney Injury in Patients with Pre-Eclampsia and Eclampsia. Nephrology Dialysis Transplantation [Internet], 2020 Jun, 35(3). [cited 2022 Dec 4]. Available from: https://academic.oup.com/ndt/article/35/Supplement_3/gfaa142.P0587/5853290
38. Jaber S, Jauk VC, Cozzi GD, Sanjanwala AR, Becker DA, Harper LM, *et al*., Quantifying the additional maternal morbidity in women with preeclampsia with severe features in whom immediate delivery is recommended. Am J Obstet Gynecol MFM. 2022 May;4(3):100-565.
39. Bansal YP. Pre-eclampsia/eclampsia: a profile from Pumwani Maternity Hospital, Nairobi, Kenya-PubMed [Internet]. [cited 2022 Dec 4]. Available from: https://pubmed.ncbi.nlm.nih.gov/4092623/.