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A Prospective Study of Maternal and Neonatal Outcome in Women with Preeclampsia

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Abstract

Background: *Preeclampsia is a disorder of vascular endothelial dysfunction that occurs usually around 20 weeks of gestation but may present as late as 4-8 weeks postpartum. The classical features of preeclampsia include hypertension, protinuria and pathological edema. The associated features may include thrombocytopenia, increased creatinine levels, pulmonary edema and visual disturbances. We conducted this case control study to compare maternal and neonatal outcome in patients with preeclampsia with healthy pregnant women.*

Aims And Objectives: *To study the association of preeclampsia with factors such as severity of the disease and to know maternal and neonatal outcome in these patients.*

Materials and Methods: *This was a case control study in which 50 patients admitted in our hospital with preeclampsia were studied. Detailed history was taken in all the patients. General and systemic examination was done. Type of delivery was noted. Patients were monitored during peripartum period and any adverse event was managed according to standard protocol. Risk of preeclampsia in relation to several maternal characteristic was studied along with the maternal and fetal outcome in studies cases. Odds ratio were calculated at appropriate associations. $P < 0.05$ was considered as significant. The data was tabulated and analyzed using SPSS 16.0 version software.*

Results: *Mean age of the patients was found to be 24.65 +/- 3.8 years with a median age of 23.2 years. Most common age group in preeclampsia group was 21-25 years (40%). BMI was more than 30 in 17 (34 %) and 3 (6 %) patients in cases and control group respectively. The complications like post partum hemorrhage (12 %) and abruption placenta (8 %) was more in the patients with preeclampsia. Caesarian section rates were also higher in preeclampsia group (56 %) than in normal women (32 %). The most common indication for induction of labor was severity of preeclampsia specially the severity of hypertension. The birth weights of the babies were statistically significantly lower in women with preeclampsia than in healthy women. Moreover babies born to mothers with preeclampsia had a higher neonatal mortality rate than neonates born to healthy women (12 % vs. 4 %). The causes of neonatal deaths included prematurity, respiratory distress syndrome and neonatal sepsis.*

Conclusion: *Preeclampsia is associated with increased incidence of delivery by caesarian section. It is also associated with maternal and neonatal complications. It increases the incidence of NICU admissions due to increased incidence of prematurity, respiratory distress and neonatal sepsis.*

Keywords: *Preeclampsia, Maternal and neonatal outcome, Neonatal mortality and morbidity.*

Introduction

Preeclampsia is a defined by hypertension and protinuria having onset at or after 20 weeks of gestation. For diagnosis of preeclampsia a systolic blood pressure of more than 140 or a diastolic blood pressure of more than 90 mm of Hg is required. Similarly a protein concentration of > 30 mg in a minimum of 2 random urine samples collected at least 4-6 hours apart also are required[1]. All these abnormalities must resolve by 6 weeks after delivery. Preeclampsia is reported to affect 5-8% of pregnancies in developed countries. In India the incidence of preeclampsia is reported to be 8-10%[2].The risk factors of preeclampsia include elderly primi, family history of preeclampsia or eclampsia, chronic systemic diseases like hypertension, diabetes or lupus erythromatosus, high BMI and twin gestation[3]. Preeclampsia may manifest differently in different women. Many of the women with preeclampsia are asymptomatic and these cases are usually detected during routine antenatal examinations. Women with severe preeclampsia may present with headache, visual disturbances, confusion, respiratory difficulty, facial edema and abdominal pain[4]. All women who present with new-onset hypertension after 20 weeks of gestation should be presumed to be having preeclampsia unless proved otherwise and should be appropriately investigated[5]. The investigations which must be done in these patients include Complete blood count, Liver transaminases, renal function tests, and protinuria, LDH and billirubin levels. Additional investigations like coagulation profile and neuroimaging should be done in selected cases[6]. The only definitive management for preeclampsia is delivery. There is a need to balance the risks of continuing pregnancy (worsening of preeclampsia and risk of complications like intracranial hemorrhage, convulsions and pulmonary edema) with the adverse outcome of terminating the pregnancy (Prematurity, low birth weight, respiratory distress syndrome in newborn, neonatal sepsis and neonatal mortality) [7]. In patients in whom induction of labor is not desirable then the patient must be hospitalized and monitored and process of lung maturity in immature fetus is accelerated with the use of corticosteroids. In patients with mild preeclampsia which is controlled by medication the delivery is desirable at the completion of 37 weeks of gestation so that by the time the baby is delivered the lung maturity is already attained and there are less chances of respiratory distress syndrome in newborn baby[8]. While in cases of severe preeclampsia which is difficult to be controlled by medication or when there are associated symptom like headache, disturbed vision or abdominal pain the induction of labor should be considered by the end of 34 weeks[9]. In this instance all the precautions should be taken for managing a baby who might be premature and may develop respiratory distress syndrome secondary to hyaline membrane disease. In postpartum period the patient should be carefully observed for development of oliguria and hypertension. Hepatic and renal functions should also be monitored. Magnesium sulfate prophylaxis should be continued at least for 24 hours after the delivery to prevent postpartum convulsions. The blood pressure is expected to normalize within 6-12 weeks after the delivery and the patient should be carefully monitored during this period[10].

Materials and Methods

We conducted a case control study of 50 women with preeclampsia who were admitted in our hospital. These patients were compared with 50 healthy pregnant women who were admitted to our hospital during the study period. The patients were explained in detail about the study and only those patients who gave consent were included in this study. Patient having any exclusion criteria were excluded from this study. Detailed history was taken in all the patients. General and systemic examination was done. Type of delivery was noted. Patients were monitored during peripartum period and any adverse event was managed according to standard protocol. Risk of

preeclampsia in relation to several maternal characteristic was studied along with the maternal and fetal outcome in studies cases. Odds ratio were calculated at appropriate associations. P < 0.05 was considered as significant. The data was tabulated and analyzed using SPSS 16.0 version software.

Inclusion Criteria

1) Pregnant women admitted to our hospital and having preeclampsia.
2) Those who have given consent to be part of this study.

Control group consisted of age matched pregnant healthy women without preeclampsia.

Exclusion Criteria

1) Women with preexisting essential hypertension.
2) Pregnant females with past history of epilepsy.
3) Pregnant Females with type II diabetes.
4) Those patients who refused consent.

Results

In the present case control study, preeclampsia patients were taken as cases (n=50) and age matched patients without pre-eclampsia were enrolled as controls (n=50). Mean age of patients was 24.65 ± 3.8 years with a median age of 23.2 years (Table 1). Incidence of eclampsia was found to be highest between 21-25 years of age with 20 patients (40 %). Youngest woman with eclampsia was aged 19 years whereas eldest was 38 years.

Table 1: Age distribution of the studied cases

Age (in years)	Cases	Controls	Percentage
≤ 20	5	5	10
21- 25	20	20	40
26- 30	15	15	30
≥30	10	10	20
Total	50	50	100

Table 2 shows the educational status of patients. Illiteracy was more common in women who were in the control group with a total 8 cases (16 %) whereas only 5 (10 %) women from the preeclampsia group were illiterate. 2 (4 %) women in preeclampsia group have studied till post graduation while 4 (8 %) women in control group had their masters degree. Equal numbers of patients have studied up to graduation in cases as well as control groups (12 % each).

Table 2: Distribution of patients according to educational qualification

Educational Status	Cases	Percentage	Controls	Percentage
Illiterate	5	10	8	16
Primary	10	20	16	32
Secondary	15	30	10	20
Higher Secondary	12	24	6	12
Graduate	6	12	6	12
Post Graduate	2	4	4	8
Total	50	100	50	100

Since increased BMI is reported to be a risk factor for development of preeclampsia and eclampsia we studied body mass index of all pregnant women who were part of this study. It was found 17 (20.9%) women from pre eclampsia group had BMI ≥30 while only 3 (1.8%) women from control group had BMI more than 30. The difference in BMI of cases and control was found to be statistically significant with P value of 0.01 (Table 3).

Table 3: Distribution according to BMI in cases and control group

BMI	Cases	Percentage	Controls	Percentage
BMI (<30.00)	33	66	57	94
BMI (≥30.00)	17	34	3	6

In preeclampsia cases 42 patients were booked before the diagnosis of preeclampsia and were under routine follow up since early pregnancy and in control group also majority of the patients (38/50) were under regular follow up since early pregnancy (Figure 1).

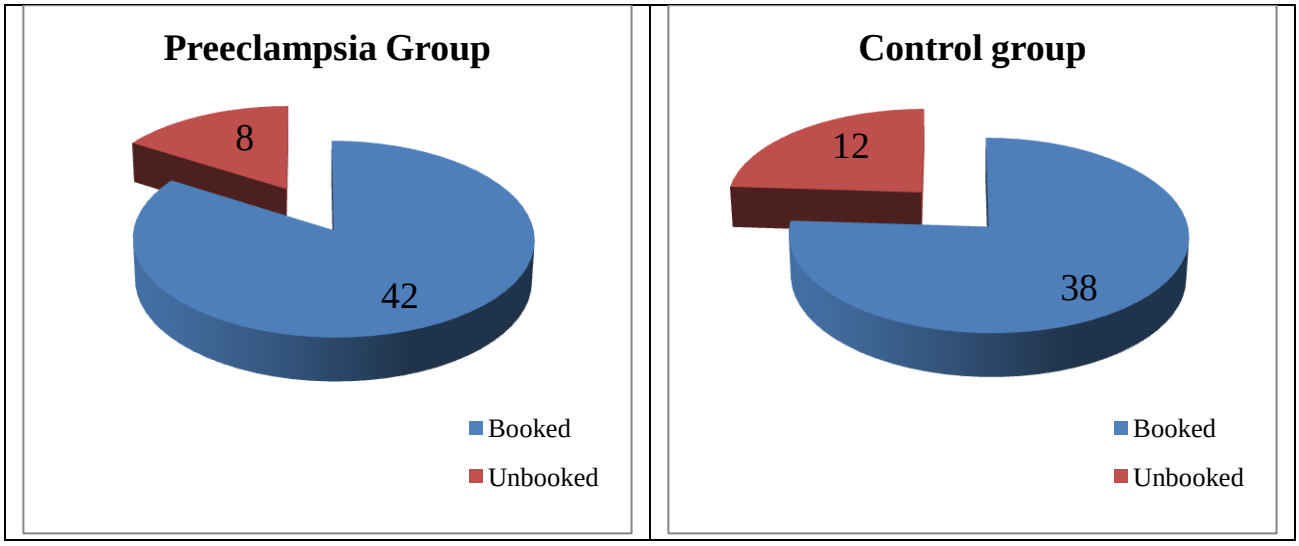

Figure 1: Booked and Unbooked cases in both the groups.

All preeclampsia patients were conscious and oriented with no focal deficits. The blood pressure readings of the preeclampsia patients were taken and analyzed. All the patients had systolic blood pressure of more than 140 mm of Hg. Majority of the patients (56 %) had a systolic blood pressure between 140 and 150 mm of hg. 16 (32%) Patients were found to have blood pressure between 150 and 160 mm of hg and 6 (12 %) patients had blood pressure more than 160 mm of hg. The analysis of diastolic blood pressure showed that in majority of the patients (48%) the diastolic blood pressure was between 90 and 100 mm of hg while it was between 100 to 110 and more than 110 mm of hg in 22 (44%) and 4 (8 %) patients respectively.

Table 4: Systolic and diastolic Blood Pressures in cases and controls

Blood Pressure (Systolic) mm of Hg	Cases	Percentage	Blood Pressure (Diastolic) mm of Hg	Cases	Percentage
140-150	28	56	90-100	24	48
≥150-160	16	32	100-110	22	44
>160	6	12	>110	4	8

There were 2 (4 %) patients who didn't have albuminuria whereas 16 (32 %) patients had albuminuria of +4. 12 (24 %) patients had +2 albuminuria and 20 (40 %) patients had +3 albuminuria at the time of admission.

Table 5: Severity of albuminuria in studied cases

ALBUMINURIA	NUMBER OF PATIENTS	PERCENTAGE
NIL	2	4
2+	12	24
3+	20	40
4+	16	32

Characteristic of deep tendon reflexes as seen in eclampsia patients at the time of admission was noted. 42 (84 %) patient had normal reflexes whereas 8 (16 %) had exaggerated (brisk) deep tendon reflexes.

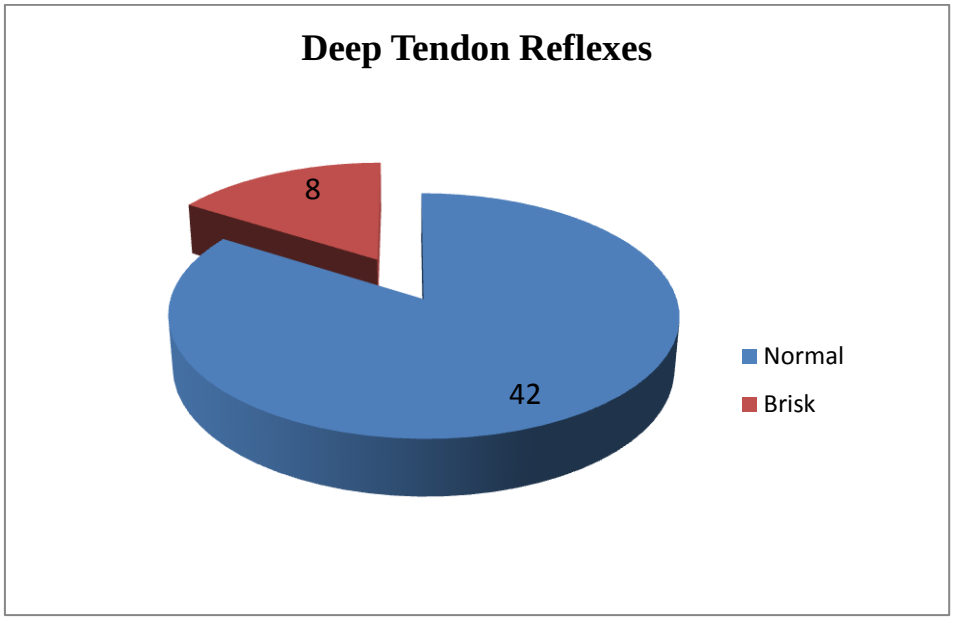

Figure 2: Deep tendon reflexes in preeclampsia patients

The analysis of mode of delivery amongst both the studied groups revealed that 28 (56 %) patients were delivered through caesarean section in eclampsia group while 26 (32 %) from the control group were delivered by LSCS. 22 (44 %) women with preeclampsia delivered vaginally while 34 (68 %) from the control group delivered vaginally.

Table 6: Distribution of cases according to the type of delivery

Type Of Delivery	Cases	Percentage	Controls	Percentage
Normal Vaginal	22	44 %	34	68 %
Caesarean Section	28	56 %	16	32 %

Various maternal complications seen in patients of preeclampsia were studied. Most common complication seen in these patients was found to be postpartum hemorrhage (12 %) followed by abruption placenta (8 %). Less frequent complications included thrombocytopenia (4 %), Deranged coagulation profile (4 %), HELLP syndrome (4 %), renal insufficiency (2 %) and pulmonary edema (2 %). There was no maternal mortality in any of the studied groups.

Table 7: Maternal Complication seen in patients of eclampsia

Complication	Number Of Patients	Percentage
Abruptio Placenta	4	8 %
Postpartum Hemorrhage	6	12 %
Thrombocytopenia	2	4 %
Deranged coagulation profile	2	4 %
HELLP Syndrome	2	4 %
Renal insufficiency	1	2 %
Pulmonary edema	1	2 %

Distribution of neonatal outcome in terms of birth weight showed that 12 (24 %) babies were less than 1.5 kg from preeclampsia group versus only 6 (12 %) babies with weight less than 1.5 kg in control group. 14 (28 %) babies were between 1.5 to 1.9 kg in preeclampsia group versus only 3 (6 %) in control group. There were 9 (18 %) babies from preeclampsia group whose weight was above 2.5kg whereas there were 36 (72 %) babies above 2.5kg in control group. Mean birth weight in eclampsia group was 1.98 ± 0.6 kg versus 2.3 ± 0.7 kg in the control group.

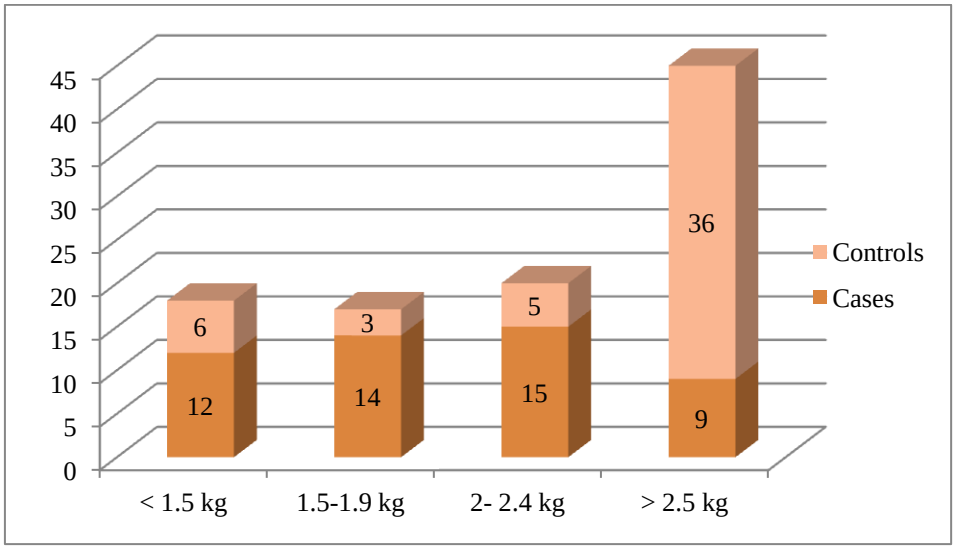

Figure 3: distribution of birth weight of children in cases and controls

Distribution of babies on basis of APGAR of the neonate at 1 minute after delivery was studied. It showed that 6 (12%) babies had APGAR less than 6 at 1 minute in preeclampsia group versus 3 (6 %) babies of control group. 38 (76 %) babies in cases group had APGAR more than 6 at 1 min versus 45 (90%) babies from the control group. This data excludes stillbirths. There were 6 (12 %) stillbirths in preeclampsia group and 2 (4 %) stillbirths in control group.

Table 8: Distribution of neonates according to APGAR at 1 minute in both the groups

APGAR Score	Cases (n=96)	Percentage	Controls (n=105)	Percentage
<6	6	12 %	3	6 %
≥6	38	76 %	45	90 %

Lastly the neonatal outcome was studied and it was found that 41 (82%) of the babies were less than 2.5 kg in cases with preeclampsia while in control group 14 (28 %) patients delivered babies who weighed less than 2.5 kg. The incidence of preterm deliveries in patients with preeclampsia was found to be 32 % (16/50) while this percentage was found to be 16 % in control group. The analysis of incidence of stillbirths showed that in preeclampsia group and in control group 6 (12 %) and 2 (4 %) babies were stillborn. Lastly the incidence of neonatal mortality was studied in both the cases. It was found that 6 (12 %) babies died in neonatal period from preeclampsia group while 2 (4 %) neonatal deaths were seen in control group.

Table 9: Distribution of Neonates according to the incidence of LBW, Prematurity, stillbirth and neonatal mortality.

		Cases	Percentage	Controls	Percentage
Low Birth Weight	YES	41	82 %	14	28 %
	NO	9	18 %	36	72 %
Preterm Birth	YES	16	32 %	8	16 %
	NO	34	68 %	42	84 %
STILLBIRTHS	YES	6	12 %	2	4 %
	NO	44	88 %	48	96 %
NEONATAL MORTALITY	YES	6	12 %	2	4 %
	NO	38	76 %	46	92 %

The analysis of cause of neonatal deaths in preeclampsia group as well as the control group revealed that out of 6 neonatal deaths in preeclampsia group 2 neonates died due to respiratory distress secondary to hyaline membrane disease, 2 succumbed to neonatal sepsis, 1 died of severe birth asphyxia and in 1 case the cause of death was complex congenital heart disease. In control group out of 2 neonatal deaths 1 neonate died due to severe respiratory distress syndrome secondary to meconium aspiration syndrome while another one died of early onset neonatal sepsis.

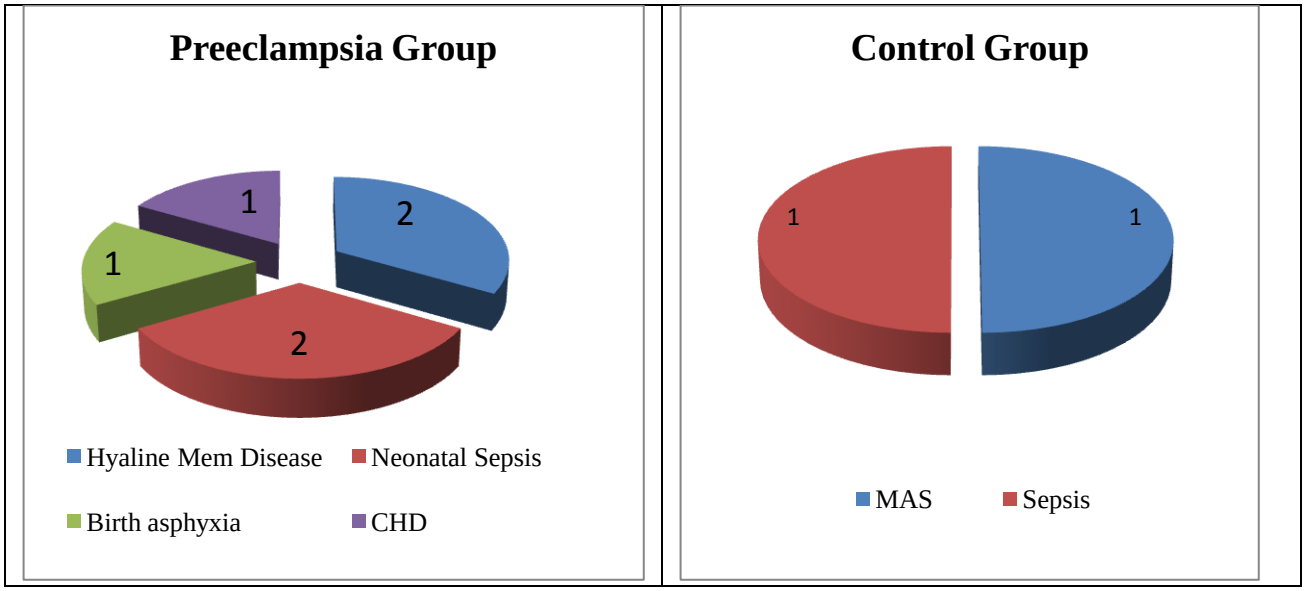

Fig 4: Causes of Neonatal Mortality in Preeclampsia and Control Group.

Discussion

This study was carried out to assess the various risk factors associated with eclampsia and maternal and fetal outcome in such patients. During the study period a total of 820 pregnant females were examined out of whom a total of 50 patients were diagnosed to be having preeclampsia hence incidence of preeclampsia was found to be 6.09 %. Similar incidence rates were found in the studies conducted by Parveen Aabidah et al and CH Backes et al[11,12].

Advanced maternal age and increased BMI is found to be a risk factor for development of preeclampsia so as the family history. In contrast to other studies our study found that the most common age group affected was between 20-25 years. This may be due to the fact that early marriage before 20 years is common in many parts of our country. This is in contrast to the studies conducted by Cavazos Rehg et al[13].Similarly the association of increased BMI with increased incidence of preeclampsia is shown in various studies. In this study we found that women with a BMI more than 30 were more likely to develop preeclampsia than those with BMI less than 30. Similar findings were seen in the studies conducted by Poorolajal J et al who in their study found sufficient evidence to say that excess body mass index is significantly associated with increased risk of preeclampsia. The authors concluded that the overweight and obesity can be considered as predictors of preeclampsia[14].

The incidence of cesarean section was more in patients with preeclampsia than their healthy counterparts. In our study LSCS was done in preeclampsia and control group in 56% and 32% patients respectively. Hence it was found that patients with preeclampsia are more likely to deliver by LSCS than the healthy pregnant females. Many authors have studied this aspect and have found that the LSCS is in fact associated with better perinatal outcome in patients with preeclampsia. Mashiloane et al in their study of 108 women who presented with preeclampsia

over a period of 1 year found that 63 % patients were delivered by LSCS. The authors concluded that LSCS is associated with a better perinatal outcome than vaginal deliveries in patients with preeclampsia15. Similar Findings were also reported by [16].

Various complications in patients with preeclampsia found in this study were post partum hemorrhage, abruption placenta, thrombocyto-penia and deranged coagulation profile. Similar complications were reported by other authors who studied complication in women with preeclampsia. Minire et al in their study found that the common complications associated with preeclampsia included abruption placenta, hepatic damage, HELLP syndrome and pulmonary edema. The authors concluded that preeclampsia is associated with substantial morbidity and mortality for mother. The authors further concluded that the only way to save the life of mother in severe cases is delivery of the baby by suitable means[17.] Similar findings were reported by Kjell H et al[18].

Finally the analysis of neonatal outcome showed that the babies born to mothers with preeclampsia were more likely to be low birth weight and premature hence they were at increased risk of developing complications of prematurity. Moreover these babies are more likely to have complications like birth asphyxia (Low APGAR score) and more likely to suffer from consequences of birth asphyxia like hypoxic ischemic encephalopathy. The rate of still births and neonatal mortality was also found to be more in preeclampsia group than in healthy women. Similar findings were reported by the authors like HC Backes et al and S Ngwenya et al[19,20].

Conclusion

Preeclampsia is associated with increased complications and maternal as well as neonatal morbidity. These patients should be managed appropriately so as to prevent maternal and neonatal morbidity and mortality. In severe cases delivery is the only definitive treatment.

Conflict of Interest: None

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