

Maternal and fetal outcome in pre-eclampsia in a secondary care hospital in South India

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ABSTRACT

Background: Hypertensive disorders in pregnancy are one of the common causes for perinatal and maternal morbidity and mortality in developing countries. Pre-eclampsia is a condition which typically occurs after 20 weeks of gestation and has high blood pressure as the main contributing factor. The aim was to study the effects of pre-eclampsia on the mother and the fetus in rural South Indian population. **Materials and Methods:** This was a descriptive study conducted in a secondary level hospital in rural South India. A total of 1900 antenatal women were screened for pre-eclampsia during the period August 2010 to July 2011 to study the effects on the mother and fetus. **Results:** Of the 1900 women screened 93 were detected with pre-eclampsia in the study. Among these, 46.23% were primigravida, 30.1% belonged to socio-economic class 4 and 48.8% were among those with BMI 26–30. The incidence of severe pre-eclampsia was higher in the unregistered women. The most common maternal complication was antepartum hemorrhage (13.9%) and the most common neonatal complication was prematurity (23.65%). **Conclusions:** Treating anemia and improving socioeconomic status will improve maternal and neonatal outcome in pre-eclampsia. Antenatal care and educating women on significance of symptoms will markedly improve perinatal morbidity and mortality. Prematurity, growth restriction and low birth weight are neonatal complications to be anticipated and dealt with when the mother has pre-eclampsia. A good neonatal intensive care unit will help improve neonatal outcomes.

Keywords: Fetal outcome, maternal outcome, pre-eclampsia

Introduction

Hypertensive disorders are one of the most important causes of perinatal and maternal mortality and morbidity in both developing and developed countries. Pre-eclampsia is a multisystem disorder that complicates about 3–8% pregnancies. The incidence is high in developing countries due to hypoproteinemia, malnutrition and poor obstetric facilities. Overall, 10–15% of maternal deaths are directly associated with pre-eclampsia and eclampsia.^[1] The risk of pre-eclampsia is two to five times more in women with maternal history of this disorder. Depending on ethnicity, the incidence of pre-eclampsia ranges from 3% to 7% in healthy nulliparas^[2] and 1% to 3% in multiparas.^[3]

Pre-eclampsia is a complex, pregnancy-specific hypertensive syndrome of reduced organ perfusion related to vasospasm and activation of the coagulation cascade affecting multiple systems.

The nervous system is commonly affected and is a cause of significant morbidity and death in these women.^[4] The major risk to the fetus results from decreased placental perfusion leading to decreased blood supply of oxygen and nutrients necessary for fetal growth and wellbeing. Due to lack of facilities, the patient in a rural setting usually presents late.

The aim was to study pre-eclampsia and its effects on the mother and fetus in rural south Indian patients.

Materials and Methods

This was a descriptive study which was conducted in a rural secondary level referral center in Tamil Nadu from August 2010 to July 2011.

All antenatal women with pre-eclampsia were included. This includes 93 women of the 1900 women admitted for safe confinement.

Pre-eclampsia is defined as high blood pressure of 140/90 mmHg or more along with proteinuria or any derangement in platelet

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count, liver enzymes or renal function tests.^[5] Mild pre-eclampsia is defined as diastolic blood pressure of 90 mmHg or more on two different occasions at least 6 h apart combined with proteinuria (two or more occurrences of protein on dipstick, >300 mg total protein in 24 h urine collection, or ratio of protein to creatinine >30 mg/mmol).^[6] Severe pre-eclampsia is defined as a blood pressure more than or equal to 160/110 mmHg, proteinuria 3+ or more on dipstick or more than 5 g in 24 h, impaired renal or liver function, neurological signs or symptoms, microangiopathic hemolytic anemia, thrombocytopenia or fetal complications such as fetal growth restriction.^[7]

Statistical analysis was done using the SPSS ver. 11.5 software.

Results

Women ($n = 1900$) were screened and 93 women detected with pre-eclampsia. Out of 93 patients with pre-eclampsia, the distribution according to age was as follows: 21–25 (46.23%), remaining 16.12%, 23.65%, 10.75%, 3.23% are in the age groups of 15–20 yrs, 26–30 yrs, 31–35 yrs, >36 yrs, respectively [Table 1]. Distribution according to parity was as follows: Primigravida (61.2%). Remaining 21.5% were second gravida, 15.05% were third gravida and 2.15% were fourth gravida [Table 2].

The following SES classification was used modified “Kuppusamy scale,”^[8] where the highest class is 1 and the lowest class is assigned a value of 5. From the study it was found that 30.1% were in the socioeconomic status class 4. Remaining 2.15%, 29.03%, 23.65% and 15.05% were in the socioeconomic class 1, 2, 3 and 5, respectively [Table 3].

48.88% patients were in the BMI of 26–30. Incidence of pre-eclampsia is found to increase with increase in BMI [Table 4].

Out of the 45 registered patients, 21 had mild pre-eclampsia and 24 cases had severe pre-eclampsia. Out of 48 unregistered cases, most of them had severe pre-eclampsia (39) and only 9 cases had mild pre-eclampsia [Table 5].

Out of the 45 registered patients, 51% of the patients had more than nine antenatal visits, while 4% had less than three antenatal visits.

The factors associated with pre-eclampsia in the study were anemia (55.91%), diabetes (3.22%), twins (4.3%) and previous history of pre-eclampsia (7.52%). However, there were no associated factors in 34% of the women with pre-eclampsia.

In labor, 41.9% went into spontaneous labor while in the remaining were induced. Among those who delivered, 48.3% underwent caesarean section while the remaining delivered vaginally.

The most common complication associated with pre-eclampsia in this study was antepartum hemorrhage (13.97%). Other

Table 1: Distribution of pre-eclampsia according to age

Age	Frequency	Percentage
15-20	15	16.12
21-25	43	46.23
26-30	22	23.65
30-35	10	10.75
>36	3	3.225

Table 2: Distribution of pre-eclampsia according to parity

Parity	Frequency	Percentage
Primi	57	61.2
Second	20	21.5
Third	14	15.05
Fourth	2	2.15

Table 3: Distribution of pre-eclampsia by socio economic status

Socioeconomic class	Frequency	Percentage
Class 1	2	2.15
Class 2	27	29.03
Class 3	22	23.65
Class 4	28	30.10
Class 5	14	15.05

Table 4: Distribution of pre-eclampsia according to BMI

BMI	Frequency	Percentage
<18	2	4.45
18-25	16	35.55
26-30	22	48.88
31-35	5	11.11

BMI: Body mass index

Table 5: Distribution of severity of pre-eclampsia according to whether registered or unregistered

	Mild Pre-eclampsia	Severe Pre-eclampsia	Total	Percentage
Registered	21	24	45	48.38
Unregistered	9	39	48	51.61
Total	30	63	93	-
Percentage	32.25	67.74	-	100

complications associated were post partum hemorrhage (10.75%) and eclampsia (5.37%). There were no cases of maternal mortality.

From the study it was found that the most common neonatal complication was pre-maturity (23.65%), low birth weight (7.52%) and intra uterine growth restriction (9.67%). The perinatal mortality constitutes about 15%, which includes intra uterine demise of the fetus (8.6%), still births (2.15%) and neonatal deaths (4.3%).

The fetal outcome in registered patients was better when compared to unregistered patients (P value 0.023). The perinatal mortality was higher in unregistered patients [Table 6].

Those with severe pre-eclampsia had a higher perinatal mortality when compared to those with mild pre-eclampsia [Table 7].

Discussion

The incidence of pre-eclampsia in our setting is similar to those in other studies.

Advanced maternal age has been found to be an independent risk factor for pre-eclampsia, while in this study most of the cases were in the age group 21–25, which is probably because we are dealing with women from rural South India, where early marriage is more common. The parity has followed the similar pattern reported in most existing literature with pre-eclampsia common among the primigravida. Hernandez *et al.* in his study found that the risk of pre-eclampsia was 4.1% in the first pregnancy and 1.7% in later pregnancies overall. The risk for multiparous women without a history of pre-eclampsia was around 1%.^[9]

68% of the patients with pre-eclampsia fall under socioeconomic classes 3–5, which is similar to the Generation R study conducted by Silva *et al.*,^[10] a population-based cohort study, which examined data of 3547 pregnant women. Odds ratios of pre-eclampsia for low, mid-low and mid-high educational level compared with high educational level were calculated. Women with low educational level were more likely to develop pre-eclampsia (odds ratio 5.12; 95% confidence interval: 2.20, 11.93) than women with high educational level. Another study that shows low socioeconomic status as a risk factor for pre-eclampsia is one done in Sudan.^[11]

This study demonstrated that the incidence of pre-eclampsia increases with BMI. An increased BMI also increases the incidence of induction of labor, caesarean section, pre-term labor and macrosomia. Therefore, we advice pregnant women to attain a normal BMI of 20–24.

There is also an increase of incidence in severe pre-eclampsia in unregistered women. This indicates that women who are registered have pre-eclampsia diagnosed earlier and treated and could also indicate that women with pre-eclampsia were being referred to our institution for further management.

Table 6: Fetal outcome according to whether registered or not

Fetal outcome	Unregistered	Registered
Good	27	38
Still birth	9	0
Neonatal death	10	4

Table 7: Fetal outcome according to severity of pre-eclampsia

Fetal outcome	Mild Pre-eclampsia	Severe Pre-eclampsia
Good	27	38
Still birth	1	11
Neonatal death	2	12

We found that anemia, diabetes mellitus, previous history of pre-eclampsia and multiple pregnancies were associated with pre-eclampsia. Women who have pre-eclampsia in a first pregnancy have seven times the risk of pre-eclampsia in a second pregnancy.^[12]

An important factor associated with pre-eclampsia was anemia in our study which is similar to the study conducted in Sudan where women with severe anemia were found to have a 3.6 times higher risk of pre-eclampsia than women with no anemia. It was recently observed that 17 (17.7%) of 97 women with severe anemia had gestational hypertension or pre-eclampsia and 2 (2.1%) had eclampsia.^[13] The susceptibility of women with severe anemia to pre-eclampsia could be explained by a deficiency of micronutrients and antioxidants. Recent results indicate that reduction in serum levels of calcium, magnesium and zinc during pregnancy might be possible contributors to the development of pre-eclampsia.^[14]

58% of the patients were induced and 45% of them needed caesarean section due to obstetric indication, some of them were posted for LSCS for absent or reversed diastolic flow with fetal distress. This is similar to HYPITAT study where they advise induction at 37 weeks rather than expectant management.^[15] Delivery of the fetus is the only way pre-eclampsia can be treated. Induction of labor once the fetus reaches maturity is the general management. There are no extra benefits for delivery by elective caesarean section.^[16]

The incidence of abruption and eclampsia are higher when compared to other studies due to increased number of unregistered women who came to the hospital at a later stage. The women are sometimes unable to afford the cost of proper health care, or even because some people mistrust expert medical care and reluctant to use it even when available. They are the ones most likely to develop complications.

In our study, 10% of the neonates are with Apgar score less than 5 and 10% were stillbirths. Main factors determining perinatal mortality was the lack of regular antenatal checkups, complicated cases of pre-eclampsia and lack of awareness regarding significance of symptoms like decreased fetal movements and late arrival at hospital, all contributing to stillbirths.^[17] The incidence of perinatal mortality is low in the study, with neonatal deaths being 4.3% when compared to other studies. This shows that effective neonatal care with NICU with a good back up by efficient pediatricians will bring out better fetal outcome.

In conclusion, pre-eclampsia tends to threaten maternal health and fetal viability adding to maternal and neonatal mortality and morbidity. There is a high frequency of pre-eclampsia in our setting and the consequences of pre-eclampsia for neonatal mortality and morbidity outcome are alarmingly high. There is need for patients' education in recognizing the warning symptoms of severe pre-eclampsia before the intrauterine demise of fetus occurs or mother develops one of the grave

complications. Antenatal care, treatment of anemia and educating the women on significance of symptoms will go a long way in improving maternal and perinatal morbidity and mortality. There is no added advantage of an elective caesarean section but the presence of an NICU with effective neonatal care will improve the fetal outcome. Reversing the present trend in maternal health-seeking behavior is therefore an issue that needs to be effectively addressed if significant improvement in maternal health is to be achieved.

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