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Original Research Article

Study of sociodemographic profile, maternal, fetal outcome in preeclamptic and eclamptic women: a prospective study

Vedavathi*¹, Rajeev Sood²

¹Department of Obstetrics and Gynecology, Akash Institute of Medical Sciences and Research Centre, Devanahalli, Bengaluru, Karnataka, India

²Department of Obstetrics and Gynecology, Kamla Nehru State Hospital, Shimla, Himachal Pradesh, India

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***Correspondence:**

Dr. Vedavathi,

E-mail: vedavathidr@gmail.com

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ABSTRACT

Background: Preeclampsia is pregnancy specific disease, lead to maternal, perinatal morbidity and mortality. This study is conducted to identify the socio demographic profile of subjects suffering from preeclampsia and its effect on maternal and fetal health.

Methods: This prospective study was conducted at department of obstetrics and gynecology, Kamla Nehru State Hospital, Shimla, in this, 100 preeclamptic women were included. Preeclampsia was diagnosed with blood pressure of $\geq 140/90$ mmHg noted for the first-time during pregnancy, after 20 wks of gestation and proteinuria. Demographic details were collected. Investigations i.e. hemogram, liver and renal function tests, coagulation profile and fundoscopy were done. Maternal and perinatal outcomes were recorded.

Results: In this study, majority of the subjects were primigravida 65. In this, 11 subjects had systolic blood pressure of 140-159 mmHg and 89 subjects had systolic blood pressure of > 160 mmHg. 25 subjects had diastolic blood pressure of 90-109 mmHg and 75 subjects had diastolic blood pressure of > 110 mmHg. In this, 82 subjects had warning symptoms, mainly headache 49. 14 subjects showed hypertensive changes in fundus. Unfavorable Bishop Score, observed in 86 subjects and 78 subjects were induced after controlling blood pressure. Majority of subjects had vaginal delivery 73. Majority of the subjects had deranged liver function 61. Maternal morbidity was reported in 54 subjects. Intrauterine death reported in 14 subjects. Birth weight was < 2.5 kg was observed in 70 babies. Out of 74 live births, 53 neonates required admission in NICU and 16 neonates died in NICU.

Conclusions: It may be concluded that, maternal and neonatal morbidity and mortality can be reduced by early identification of risk factors and timely intervention is the hall mark in preventing the maternal and perinatal morbidity and mortality.

Keywords: Fetal complications, Intrauterine death, Maternal complications, Severe preeclampsia, Unfavorable bishop score

INTRODUCTION

Preeclampsia is pregnancy specific disease, characterized by new onset of hypertension (blood pressure $\geq 140/90$ mmHg) and proteinuria (0.3g/24 hours) after 20 weeks of gestation in a previously normotensive and non proteinuric pregnant women.¹ Preeclampsia complicates 3 to 8% pregnancies and constitutes a major source of

morbidity and mortality.² In India, preeclampsia and eclampsia are seen in 4.6% of all deliveries and the neonatal mortality rate is around 43/1000 live births.³ The major cause of maternal deaths in India are hemorrhage, sepsis, hypertensive disorders of pregnancy, obstructed labour, abortion which are direct causes. Besides indirect causes like heart disease, other medical disorder's like

diabetes, renal disease etc also contribute quite a good number in maternal morbidity and mortality.⁴

The symptoms of preeclampsia are persistent headache, blurred vision, epigastric pain, vomiting and edema.⁵ The risk factors of preeclampsia are first pregnancy, family history of preeclampsia/eclampsia, medical history of chronic hypertension, renal disease, diabetes mellitus, and obesity.¹

The exact cause of preeclampsia is not known clearly, preeclampsia has been called 'the disease of theories. Studies have reported that, accelerated oxidative stress, leads to endothelial dysfunction.⁶ Endothelial dysfunction is a one of the causative factor of preeclampsia, leads to increased systemic vascular resistance.^{7,8} Preeclampsia is associated with abnormal trophoblastic invasion and differentiation, linked to altered vascular remodelling of spiral arteries, leads to decreased placental perfusion, ischemia and creating a hypoxic environment, results oxidative damage, intravascular inflammation and endothelial dysfunction. Elevated reactive oxygen species (ROS) may also trigger a redox signalling process to induce cell apoptosis.^{9,10}

Hypertensive disorders of pregnancy are associated with maternal complications such as development of uncontrolled hypertension, superimposed to preeclampsia and eclampsia, HELLP syndrome (haemolysis, elevated liver enzymes, low platelet count) acute pulmonary edema, hepatic failure, cerebrovascular accidents, congestive heart failure, intracranial hemorrhage, proteinuria more than 4-5 g/day, microangiopathic hemolytic anemia, abruptio placentae, deep vein thrombosis, disseminated intravascular coagulation and consumptive coagulopathy.¹¹ The perinatal complications include preterm delivery, low birth weight, prematurity, intra uterine death, birth asphyxia and neonatal deaths.¹²

In developing countries evidence of association between the risk factors mentioned above and preeclampsia is scarce. As there is paucity of data on risk factors of preeclampsia in India. So, the study of risk factors of preeclampsia can be used to assess risk of preeclampsia at ante natal booking.¹³ Hence the study is conducted to identify the socio demographic profile of subjects suffering from preeclampsia and its effect on maternal and fetal health.

METHODS

This prospective observational study was conducted at department of obstetrics and gynecology, Kamla Nehru State Hospital, Shimla, Himachal Pradesh. In this study 100 consecutive cases of preeclamptic women were included. Study duration was January 2015 to December 2015. Preeclampsia was diagnosed with blood pressure of $\geq 140/90$ mmHg noted for the first-time during pregnancy on two occasions at least 4 hours apart, after 20 weeks of gestation with proteinuria of 0.3g/24 hours or 1+ by

dipstick method in a random urine sample. (ACOG Guidelines 2002). Severe preeclampsia was defined as the presence of any of the following criteria; blood pressure $\geq 160/110$ mmHg on two separate measurements, at 6 hours intervals, elevated serum creatinine concentrations > 1.1 mg/dL or doubling of the serum creatinine concentration in the absence of other renal diseases, elevated liver transaminase to twice normal concentration, platelet count $< 100,000$ /microliter, headache, visual impairment, epigastric pain or pain in the right upper quadrant. The study has been approved by the ethics committee and informed consent from the study subjects. Subjects with renal disease, liver disease, thyroid disorder, chronic hypertension, gestational diabetes, cardiovascular disease, convulsions due to epilepsy or any other causes and subjects who had given any other anticonvulsant like diazepam or phenytoin were excluded from the study.

Physical and clinical examination was done for all the subjects and demographic details were collected. A thorough general physical examination, systemic examination, obstetric examination and pelvic examination done for all the subjects. Investigations i.e. complete hemogram, platelet count, liver function tests, renal function tests, coagulation profile, funduscopy and 24 hours quantitative estimation of urine protein was done. Obstetric management was done according to standard protocol existing in the department. Anticonvulsant and anti-hypertensive drugs given according to standard protocol, Details of labour whether induced or spontaneous labour, progress of labour and mode of delivery was noted. Maternal and perinatal outcome was noted.

Statistical analysis

Data were entered into Microsoft Excel Sheet and analyzed. Results were expressed in percentages.

RESULTS

In the present study, out of 100 subjects studied, 77 (77%) were between 21-35 years of age. Majority of the subjects were primigravida 65 (65%) and multigravida were 35 (35%). The incidence of preeclampsia/eclampsia is more in primigravida. In this study 50% of the subjects were at 34-36 weeks of gestational age. Out of 100 subjects, 10 (10%) subjects had BMI < 18.5 , 18 (18%) subjects had BMI 18.5-24.9, 40 (40%) subjects had BMI of 25-29.9 and 12 (12%) subjects had BMI of > 30 . It was observed that only few subjects with obesity had preeclampsia and eclampsia. Out of 100 subjects, 17 (17%) subjects had chronic hypertension with super imposed preeclampsia, 10 (10%) subjects had history of diabetes mellitus, 3 (3%) subjects had history of renal disease, 18 (18%) subjects had history of PIH in previous pregnancy and 11 (11%) subjects had family history of hypertensive disorders as illustrated in Table 1.

Table 1: Demographic, maternal details of the study subjects.

| Age (years) | Number (n = 100) | % |
|---------------------------------|------------------|------|
| ≤ 20 | 17 | 17% |
| 21-35 | 77 | 77% |
| > 35 | 6 | 6% |
| Gravidity | | |
| Primigravida | 65 | 65% |
| Multigravida | 35 | 35% |
| Gestational age | | |
| < 28 weeks | 12 | 12% |
| 28-33 weeks 6 days | 20 | 20% |
| 34-36 weeks 6 days | 50 | 50% |
| > 37 weeks | 18 | 18% |
| BMI (kg/m²) | | |
| < 18.5 | 10 | 10% |
| 18.5-24.9 | 38 | 38% |
| 25-29.9 | 40 | 40% |
| > 30 | 12 | 12% |
| Previous medical history | | |
| Chronic hypertension | 17 | 17% |
| Diabetes mellitus | 10 | 10 % |
| renal disease | 3 | 3 % |
| PIH in previous pregnancy | 18 | 18% |
| Family history of hypertension | 11 | 11% |

In the present study, 11 (11%) subjects had systolic blood pressure of $\geq 140-159$ mmHg at admission whereas 89 (89%) subjects had systolic blood pressure of ≥ 160 mmHg. 25 (25%) subjects had diastolic blood pressure of $\geq 90-109$ mmHg and 75 (75%) subjects had diastolic blood pressure of ≥ 110 mmHg. In this, 82 (82%) subjects had warning symptoms. Out of 82 subjects 49 (59.75%) subjects had headache, 11 (13.41%) subjects had blurring of vision, 12 (14.63%) subjects had epigastric pain, 10 (12.20%) subjects had vomiting and 3 (3.66%) subjects had decreased urine output. During fundus examination, it was observed that 14 (14%) subjects showed hypertensive changes and 86 (86%) showed no evidence of hypertensive retinopathy. Unfavourable Bishop Score (≤ 6) was observed in 86 (86%) of the subjects and 14 (14%) subjects showed favourable cervix with Bishop Score of ≥ 6 . Out of 100 subjects, 78 (78%) subjects were induced after controlling blood pressure and 22 (22%) had spontaneous labor. Out of 100 subjects, 73 (73%) had vaginal delivery, 8 (8%) had assisted vaginal delivery and 19 (19%) had caesarean delivery as illustrated in Table 2.

In the present study, haemoglobin levels < 6 g/dL is observed in 17 (17%). Deranged liver function was observed in 61 (61%) subjects, 13 (13%) subjects had deranged RFTs, 39 (39%) subjects had deranged LDH, 19 (19%) subjects had platelet count < 1 lakhs, 16 (16%) subjects had evidence of hemolysis on peripheral smear, 21 (21%) subjects had 24 hours urinary proteins of > 5

grams/24 hours, 4 (4%) subjects had deranged coagulation profile. Liver function test were deranged in maximum number of subjects (61%). Out of 100 subjects 65 (65%) subjects had clear liquor, 30 (30%) had meconium stained liquor and 5 (5%) had blood stained liquor as illustrated in Table 3.

Table 2: Maternal symptoms and mode delivery of study subjects.

| | Number (n = 100) | % |
|------------------------------------|------------------|--------|
| Blood pressure at admission | | |
| Systolic blood pressure | | |
| $\geq 140-159$ mmHg | 11 | 11% |
| ≥ 160 mmHg | 89 | 89% |
| Diastolic blood pressure | | |
| $\geq 90-109$ mmHg | 25 | 25% |
| ≥ 110 mmHg | 75 | 75% |
| Warning symptoms | | |
| Headache | 49 | 59.75% |
| Blurring of vision | 11 | 13.41% |
| Epigastric pain | 12 | 14.63% |
| Vomiting | 10 | 12.20% |
| Decreased urine output | 3 | 3.66% |
| Fundoscopy at admission | | |
| Normal | 86 | 86% |
| Hypertensive changes | 14 | 14% |
| Bishop score at admission | | |
| ≤ 6 | 86 | 86% |
| ≥ 6 | 14 | 14% |
| Type of labour | | |
| Spontaneous labour | 22 | 22% |
| Induced labour | 78 | 78% |
| Mode of delivery | | |
| Vaginal delivery | 73 | 73% |
| Assisted vaginal delivery | 8 | 8% |
| Caesarean delivery | 19 | 19% |

In this study, 10 (10%) subjects had PPH, 8 (8%) subjects had pulmonary edema, 3 (3%) subjects had ARF, 2 (2%) subjects had ICH and 1 (1%) subject had DIC, 4 (4%) subjects had HELLP syndrome, 12 (12%) subjects had abruptio placenta. Mortality was reported in 5 subjects, 1 (1%) subject had intracranial hemorrhage, 1 (1%) subject had disseminated intravascular coagulation with PRES, 1 (1%) subject had PPH, 1 (1%) subject had septicemia and 1 (1%) subject had status eclampticus.

Maternal morbidity was reported in 54 (54%) subjects. Uncontrolled hypertension contributes to highest maternal morbidity with 22 (23.16%), 12 (12.63%) subjects had puerperal pyrexia, 8 (8.42%) subjects required ICU admission and 12 (12.63%) subjects had severe anemia who required blood transfusion post-partum as illustrated in Table 4.

Table 3: Deranged laboratory parameters and color of liquor in study subjects.

| Deranged laboratory parameters | Number (n = 100) | % |
|---|------------------|-----|
| Haemoglobin < 6.0 g /dl | 17 | 17% |
| Deranged LFTs | 61 | 61% |
| Deranged RFTs | 13 | 13% |
| Deranged LDH | 39 | 39% |
| Platelets (< 1 lakhs) | 19 | 19% |
| Evidence of hemolysis on peripheral smear | 16 | 16% |
| 24 hours urine protein (> 5 grams/24 hours) | 21 | 21% |
| Deranged coagulation profile | 4 | 4% |
| Color of liquor | | |
| Clear | 65 | 65% |
| Meconium stained | 30 | 30% |
| Blood stained | 5 | 5% |

Table 4: Maternal complications of the study subjects.

| Maternal complications | Number (n = 100) | % |
|---|------------------|--------|
| PPH | 10 | 10% |
| Pulmonary edema | 8 | 8% |
| ARF | 3 | 3% |
| ICH | 2 | 2% |
| DIC | 1 | 1% |
| HELLP syndrome | 4 | 4% |
| Abruptionplacenta | 12 | 12% |
| Maternal mortality | | |
| ICH | 1 | 1% |
| DIC+ PRES | 1 | 1% |
| PPH | 1 | 1% |
| Septicaemia | 1 | 1% |
| Status eclampticus | 1 | 1% |
| Maternal morbidity | | |
| Uncontrolled hypertension post-partum | 22 | 23.16% |
| Puerperal pyrexia | 12 | 12.63% |
| Required ICU admission for MODS | 8 | 8.42% |
| Severe anemia requiring blood transfusion | 12 | 12.63% |

In the present study, 86 subjects had live fetus in utero and 14 subjects presented with intrauterine death. Out of 14, 5 (35.71%) subjects who had intrauterine death presented with eclampsia. Birth weight < 1 kg was observed in 20 (20%), 1-1.5 kg was in 27 (27%), > 1.5-2.5 kg was in 43 (43%), > 2.5 kg was observed in 10 (10%) babies born to preeclamptic mothers. It was observed that out of 86 subjects who had live fetus in utero at the time of admission, 12 (13.95%) subjects had intra partum intrauterine death while remaining 74 (86.06%) had live birth and 14 subjects presented with

absent fetal heart rate at the time of admission. It was observed that out of 74 live births, 53 (71.62%) neonates required admission in NICU and 21 (28.38%) neonates did not require NICU admission. It was observed that out of 53 neonates admitted to NICU, 16 (30.18%) neonates died in NICU and 37 (69.81%) neonates recovered and were discharged uneventfully. It was observed that 10 (18.6%) neonates required NICU admission due to respiratory distress syndrome, 15 (28.30%) due to sepsis, 20 (37.73%) due to prematurity and low birth weight and 8 (15.09%) neonates required admission due to neonatal jaundice as illustrated in Table 5.

Table 5: Fetal outcome and complications.

| | Number (n = 100) | % |
|--|------------------|--------|
| FHR at admission | | |
| Present | 86 | 86% |
| Absent | 14 | 14% |
| Birth weight (kg) | | |
| < 1 kgs | 20 | 20% |
| 1-1.5 kgs | 27 | 27% |
| > 1.5-2.5 kgs | 43 | 43% |
| > 2.5 kgs | 10 | 10% |
| Fetal outcome | | |
| Live births | 74 | 74% |
| Total Still births | 26 | 26% |
| NICU admission | | |
| Required, NICU admission | 53 | 71.62% |
| Did not require NICU admission | 21 | 28.38% |
| Neonates requiring NICU admission | | |
| ARDS | 10 | 18.6% |
| Sepsis | 15 | 28.30% |
| Prematurity and low birth weight | 20 | 37.73% |
| Neonatal jaundice | 8 | 15.09% |

DISCUSSION

Pre-eclampsia and eclampsia are two hypertensive disorders of pregnancy, considered major causes of maternal and perinatal death worldwide. There is a high prevalence of preeclampsia and eclampsia in our setting, and the consequences of preeclampsia on maternal and fetal health are alarmingly high. There is a need to identify risk factors in these patients, which are to be addressed timely. Timely intervention can reduce the maternal, perinatal morbidity and mortality to great extent. Health education in recognizing the warning symptoms of severe preeclampsia before patient deteriorates and progress to eclampsia, various complications.

In the present study, 77 (77%) preeclamptic subjects were in the age group of 21-35 years, during this age fertility peaks in this age group, which were supported by Singal SR et al and Bilano VL et al.^{14,15} In this 65% preeclamptic subjects were primigravida and 35% were

multigravida. Studies conducted by Ganesh KS et al, Reddy PVS et al, and Acharya S et al, reported that preeclampsia/eclampsia were more prevalent in primigravida, almost twice as compared to multigravida.¹⁶⁻¹⁸ Majority of the subjects (70%) were in the gestational age between 28-36.6 weeks. This study findings were supported by Reddy VSP et al., reported that beyond 28 weeks of gestations severity of disease increases and as the term approached the incidence was at the peak.¹⁷ Majority of the preeclamptic subjects having BMI between 18.5-29.9 kg/m². In this study, very few subjects with obesity had preeclampsia. This finding was supported by Bilano VL et al, reported there was least association of BMI with preeclampsia and eclampsia.¹⁵ It was observed that 17% of the subjects were suffering from chronic hypertension who had super imposed preeclampsia, 10% of subjects had diabetes (gestational glucose intolerance, gestational diabetes or overt diabetes). 3% had renal disease, 18% of subjects had PIH in previous pregnancy and 11% had family history of hypertension which was comparable to study conducted by Ganesh KS et al and Bej P et al.^{16,19} So previous medical history was of great help in identifying the subjects at risk in present pregnancy developing PIH.

In the present study majority of the subjects were severe preeclamptic, increased levels of both systolic and diastolic blood pressure which was comparable to the study conducted by Trivedi K et al, and Jadav P et al.^{20,21} It was concluded that levels of both systolic and diastolic blood pressure was one of the very important criteria which determine the severity of condition and prognosis of the mother and fetus.

It was observed that headache was main warning symptom which was seen in 49% of the subjects studied in present study. Vomiting was noticed as warning symptom in 10% of the subjects, which was not noticed in any other study. Epigastric pain was noticed in 12% of the subjects which was also noticed in study by Sultana et al.²² Headache, blurring of vision and epigastric pain were the predominant warning symptoms which were noticed in almost all studies of preeclampsia and eclampsia. Abnormal fundoscopy and deranged RFT's were comparable to the study conducted by Sultana et al, and Singhal SR et al.^{14,22}

In the present study, majority of the subjects were having unfavorable Bishop Score (≤ 6) was observed in 86 (86%) of the subjects. Majority of the patients, 78 (78%) subjects were induced after controlling blood pressure and majority of the subjects, 73 (73%) had vaginal delivery.

In this study, deranged LFT's were seen in very high percentage of the subjects which was also noticed in study conducted by Singhal SR et al.¹⁴ Deranged RFT's in this were comparable to the study conducted by sultana et al, and Singhal SR et al.^{14,22} Besides this, severe

anemia, evidence of hemolysis, low platelet count were noticed in our subjects.

Main complications noticed in mother were post-partum hemorrhage (PPH), pulmonary edema, acute renal failure, intra cranial hemorrhage, DIC, HELLP syndrome, septicemia and abruptio placenta. These findings were supported by Douglas KA et al, Gawde A et al, and Singhal SR et al.^{14,23,24} Maternal mortality in this study was 5 patients, which was comparable with the study conducted by Jadav P et al.²¹ Among the maternal morbid conditions, uncontrolled hypertension postpartum was reported in 22 (23.16%) patients. In the present, low birth weight was reported to be 90 (90%) i. e birth weight ≤ 2.5 kg and only 10 (10%) babies were with birth weight ≥ 2.5 kgs. Low birth weight in this study is consistent with several other studies.^{25,26}

It was observed in present study that 26% of subjects had still birth including (antepartum and intrapartum) which was observed in 18% of subjects in study conducted by Akhtar R et al, and 17.4% in the study conducted by Doddamani GB et al.^{27,28} In present study 58% of the neonates were discharged from hospital alive and 16% had early neonatal deaths which were comparable to the study conducted by Akhtar R et al.²⁷

CONCLUSION

Pre-eclampsia and eclampsia are major cause of maternal and perinatal morbidity and mortality. It is a multisystem disease of unknown etiology. It has maternal syndrome and fetal syndrome. Research addressing this disorder has been extensive during past years but has not resulted in substantial improvement in method of prediction or prevention of this disorder.

In general, maternal and perinatal outcome are usually favourable in women with mild pre-eclampsia developing beyond 36 weeks of gestation. properly supervised antenatal care with facilities of pregnancy care at the door steps of the subjects, early identification of risk factors and their proper readdressal at good centre with timely intervention is the hall mark in preventing the maternal and perinatal morbidity and mortality.

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