

A Study On Incidence and Management of Preeclampsia In a Tertiary Care Hospital

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ABSTRACT

Background: Preeclampsia is a syndrome characterized by hypertension and proteinuria that occurs during the second and third trimester of pregnancy. It is a life threatening, multi-organ involvement disease and remains the leading cause of maternal death.

Aim: The aim is to evaluate the prevalence and management of preeclampsia. **Methods:** A prospective Observational study was conducted over a period of six months at obstetrics and gynecology Department of Bharti hospital and Research centre, Pune. All pregnant women attending the antenatal clinic were screened for preeclampsia. Data were collected in Pregnancy Hypertension Patient Proforma & Patient Medication History Form. **Results:** The incidence of preeclampsia in our study was 4.4%. Majority of patients were in age group of 18-22 years (43.2%) with gestational age of 31-36 weeks (43.2%). In mild preeclampsia after the use of methyldopa with nifedipine, the systolic BP has reduced from 149.4 ± 10.7 mmHg (mean \pm SD) to 131.4 ± 10.6 mmHg and the diastolic BP before and after treatment were 98.5 ± 14.6 mmHg and 85.7 ± 9.7 mmHg respectively. In severe preeclampsia after the use of methyldopa with nifedipine, the systolic BP has reduced from 169.2 ± 23.9 mmHg (mean \pm SD) to 146.9 ± 14.3 mmHg and diastolic BP before and after treatment were 106.1 ± 13.2 mmHg and 95.3 ± 7.7 mmHg respectively. By examining the neonatal outcome, it is observed that 50.0% of preterm delivery, low birth weight (LBW) babies (52.3%) and one neonatal death occurred. **Conclusion:** In our study, the incidence of preeclampsia in pregnancy is high and antihypertensives are much effective in controlling systolic and diastolic blood pressure. Among antihypertensives used, methyldopa with nifedipine combination is much effective in controlling blood pressure in preeclamptic patients.

Keywords: preeclampsia, incidence, antihypertensive.

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INTRODUCTION

Hypertensive disorder is a common medical problem encountered during pregnancy, complicating 12-22 percent of pregnancies.¹ It ranges from preeclampsia/eclampsia (PE/E), gestational hypertension, chronic hypertension (CH) and chronic hypertension superimposed preeclampsia. Each category has a different

pathophysiology and fetomaternal consequences. Preeclampsia is a pregnancy-specific multisystem disorder of unknown etiology. It occurs in approximately 3 to 14 percent of all pregnancies worldwide. Preeclampsia refers to the new onset of hypertension (SBP \geq 140 mmHg or DBP \geq 90 mmHg) and proteinuria ($>$ 0.3 g protein in a 24-hour urine specimen or



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1+ on dipstick) after 20 weeks of gestation in previously normotensive women.¹

Early diagnosis, close medical supervision and timely delivery are the cardinal requirements of the management of pre-eclampsia. Once the diagnosis is established, subsequent management should be based on the initial evaluation of maternal and foetal well-being. On the basis of the results of this evaluation a decision is then made regarding hospitalization, expectant management, or delivery with the following factors taken into account: the severity of the disease process, the status of mother and fetus, and the period of gestation.² Irrespective of the management strategy chosen, the ultimate goal should be the safety of the mother and the safe delivery of the fetus with minimum need of intervention (requirement of intensive and prolonged neonatal care).

Even though delivery is the ultimate cure for pre-eclampsia, management aimed at benefiting the mother may be detrimental to the fetus because premature birth is a significant cause of infant morbidity and mortality.³⁻⁵ Hence the management of pre-eclampsia should be based on a stepwise protocol: Pregnant women should be screened; those at risk should be monitored once a diagnosis is made; the maternal condition should be stabilized; monitoring should be continued and delivery should be initiated at the best time for the mother and the baby.³ During labour, the management goals should be to prevent seizures and control Blood pressure. The predominant mode for treating pre-eclampsia includes anti-hypertensive drugs, anticonvulsive measures and timely termination of pregnancy. Anti-hypertensive treatment benefits the mother with mild to moderated pregnancy induced hypertension. Anti-convulsants drugs like magnesium sulphate have been used to prevent eclampsia.⁵

The present study focused on the prevalence and management of preeclampsia. From the public health perspective, the condition complicates 2–10% of pregnancies.⁶ Worldwide, 10 – 15% of the half million maternal deaths that occur every year are associated with hypertensive disorders of pregnancy. 99% of these occur in low-resource countries.⁶ Preeclampsia also takes a massive toll on perinatal health and is responsible for a significant proportion of preterm births (iatrogenic and spontaneous), growth restriction and mortality. Treatment of this disorder still remains a challenge to even the most experienced obstetricians, mainly because exact aetiology is unknown. Preventing preeclampsia would therefore be a highly desirable goal.

Table 1. Maternal characteristics of preeclampsia patients (n=44)

Demographic Data		No. of patients	Percentage
Age (years)	18-22	19	43.2
	23-27	15	34.1
	28-32	9	20.4
	>32	1	2.3
Gestational Age (weeks)	21-24	2	4.5
	25-30	7	15.9
	31-36	19	43.2
Gravida	>36	16	36.4
	Multigravida	22	50.0
Para	Primigravida	22	50.0
	Nulliparous	27	61.4

Material and Methods

A prospective observational study was conducted over a period of six months at Obstetrics and gynecology Department of Bharati hospital and Research centre Pune. All pregnant women attending the antenatal clinic were screened for preeclampsia. Data were collected in Pregnancy Hypertension Patient Performa & Patient Medication History Form. The salient features of proforma included name, age, obstetrical history, presenting complaints, blood pressure on antenatal check-up, decreased foetal movements, past medical history, family history, medication history, laboratory reports etc. Blood pressure readings were measured four hourly and noted in the pregnancy hypertension patient proforma. Fetal parameters such as gender, birth weight, and survival status (liveborn, or neonatal death) were also noted.

Results

During 6 month study a total of 997 pregnant women visited the Obstetrics and Gynecology Department, out of which 44 patients were diagnosed with preeclampsia.

Table 2. Clinical Presentation of patients with preeclampsia (n=44)

Symptoms	No. of Patients	Percentage
Peripheral Edema	10	22.7
Severe Headache	11	25.0
Epigastric Pain	8	18.2
Blurring Vision	2	4.5
Proteinuria	30	68.2
< 300 mg/day	14	31.8
500-2000 mg/day	17	38.6
>2 gm/day	13	29.5

Fig. 1: Subject class according to diagnosis

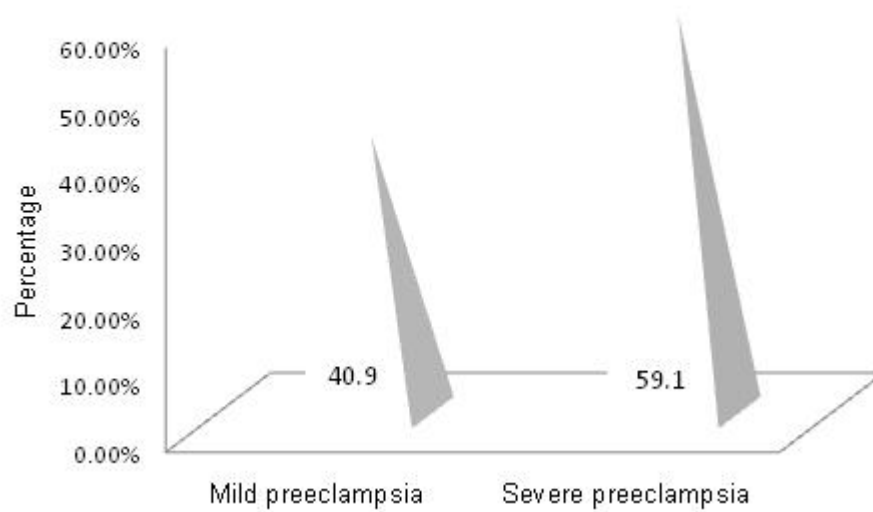


Table 3. Obstetric outcome in preeclampsia patient (n=44)

	Mild preeclampsia (n=18)	Severe preeclampsia (n=26)
Gestational age at delivery (wk)		
< 37 (Pre term)	9	13
Term	5	5
>2500 g	4	4
<2500 g	10	13
Not yet delivered	4	8
C-section	12	15
Normal	2	3
Neonatal death	0	1

Table 4. Laboratory Results

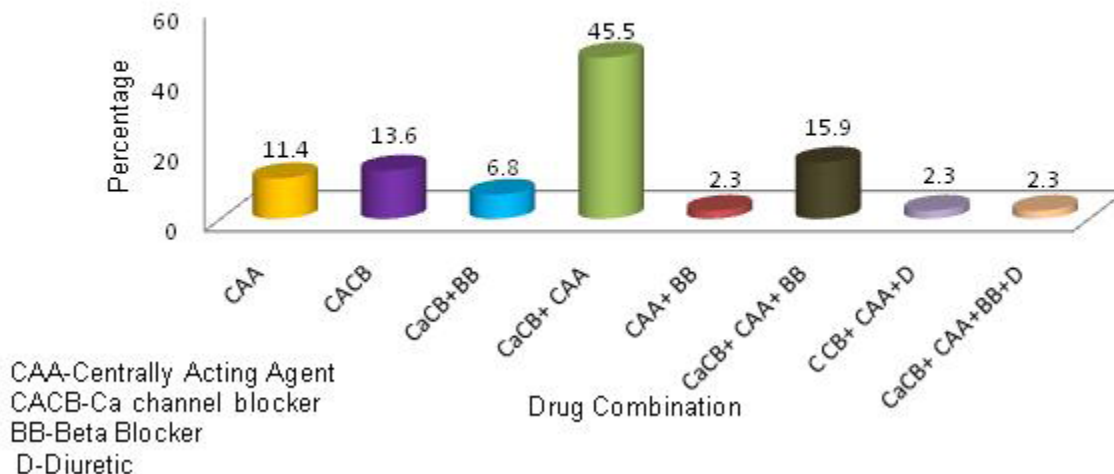
	Mild Preeclampsia	Severe Preeclampsia	Total
Liver Function Test			
LDH (IU/L)			
225-450	2	5	7
> 450	6	12	18
Total	8	17	25
ALT (IU)			
5-40	12	20	32
>40	3	1	4
Total	15	21	36
AST (IU)			
5-40	4	4	8
>40	14	18	32
Total	18	22	40
Uric Acid (mg/dl)			
3.6-7.7	12	15	27
>7.7	2	4	6
Total	14	19	33
Platelet Count			
<1.5x10 ⁵	6	4	10
1.5x4x10 ⁵	12	20	32
Total	18	24	42
Haemoglobin			
<10	6	11	17
>10	12	13	25
Total	18	24	42

The prevalence of preeclampsia was 4.4%. The mean maternal age at delivery was 23.6 years. Total distributions of patients showed that highest number of patients was found in the age group of 18-22 years (43.2%) and least was above 32 years age group (2.2%). 43.2% were with gestational age of 31-36 weeks. (Table 1) showed age, gestational age, gravid and parity distribution in preeclampsia patients respectively.

Of the 44 patients, 40.9% were with Mild Preeclampsia, 59.1% with Severe Preeclampsia (Figure 1).

Headache in 11 (25.0%), peripheral edema in 10 (22.7%), epigastric pain in 8 (18.2%), blurring vision in 2 (4.5%) patients were observed (Table 2). Proteinuria was found in 68.2 % patients (Table 2).

Fig 2: Combination therapy and Monotherapy



(Table 3) presents the overall effects of preeclampsia on pregnancy outcomes. Low birth weight and preterm delivery were higher in preeclampsia patients especially in severe preeclampsia. Preterm delivery occurred in 22 patients (50.0%) and 23 newborns (52.3%) had a low birth weight of less than 2500 gm. From a total of 31 births from the preeclampsia pregnancies, there was one neonatal death.

The laboratory parameters of patients taken were hemoglobin, LDH, ALT, proteinuria, uric acid and platelet

count. LDH was checked in 25 (56.8%) pre-eclamptic women and Eighteen (40.9%) of the 25 pre-eclamptic women had high LDH level. ALT was checked in 36 (81.1%) of the 44 pre-eclamptic women. Four (9.1%) of the pre-eclamptic women had high ALT. AST was checked in 40 (90.9%) of the 44 pre-eclamptic women. Thirty two (72.2%) pre-eclamptic women had high AST. Uric acid level was checked on 33 (75.0%) of the 44 pre-eclamptic women. Uric acid level was high in 6 (13.6%) pre-eclamptic women. Platelet count was checked on 42

Table 5. Drugs prescribed for the management of Mild preeclampsia (n=18)

Drugs	No. of patients (%)	Blood Pressure			
		Before Treatment		After Treatment	
		Systolic	Diastolic	Systolic	Diastolic
Methyldopa	4 (22.2)	137.5±5.00	88.5±5.9	122.5±9.5	77.5±9.5
Nifedipine	4 (22.2)	140.0±0.0	92.5±4.33	132.5±9.57	82.5±9.5
Nifedipine & Labetalol	2 (11.1)	150.0±0.0	95±5.0	130±0.0	85±5.0
Nifedipine & Methyldopa	7 (38.9)	149.4±10.7	98.5±14.6	131.4±10.6	85.7±9.7
Methyldopa & Labetalol	1 (5.6)	140	100	140	80

Table 6. Drugs prescribed for the management of Severe preeclampsia (n=26)

Drugs	No. of patients (%)	Blood Pressure			
		Before Treatment		After Treatment	
		Systolic	Diastolic	Systolic	Diastolic
Methyldopa	1 (3.8)	160	100	150	100
Nifedipine	2 (7.7)	155±5.0	105±7.1	135±7.1	90±0.0
Nifedipine & Labetalol	1 (3.8)	160	100	130	90
Nifedipine & Methyldopa	13 (50.0)	169.2±23.9	106.1±13.2	146.9±14.3	95.3±7.7
Nifedipine, Methyldopa & Labetalol	7 (26.9)	165.7±13.9	104.2±9.7	140±12.90	92.8±7.5
Nifedipine, Methyldopa & Furosemide	1 (3.8)	170	100	160	90

(95.4%) pre-eclamptic women. The count was less in 10 (22.7 %) patients. Haemoglobin was checked in 42(95.4 %) of the pre-eclamptic women of the study group. Normal HB during pregnancy ranges 11-16gm/dl. The level of HB was less in 25 (56.8%) patients (Table 4).

Overall 11 (25.0%) patients were treated with a single anti-hypertensive drug and 33 (75.0%) patients were treated with antihypertensive drug combinations as represented in (Figure 2). In preeclampsia the calcium channel blockers and centrally acting antiadrenergics drugs (38.6%) were the most frequently prescribed two-drug combinations. Calcium channel blocker, β -blocker agent and centrally acting agent (15.9%) were the most frequently prescribed three drug combinations (Figure 2).

Among all antihypertensives, 45.5% patients were prescribed with methyldopa and nifedipine combination. In mild preeclampsia after the use of methyldopa with nifedipine, the systolic BP has reduced from 149.4 ± 10.75 mmHg (mean \pm SD) to 131.42 ± 10.62 mmHg. And the diastolic BP before and after treatment were 98.57 ± 14.63 mmHg and 85.19 ± 9.75 mmHg respectively (Table 5). In severe preeclampsia after the use of methyldopa with nifedipine, the systolic BP has reduced from 169.23 ± 23.96 mmHg (mean \pm SD) to 146.92 ± 14.36 mmHg and diastolic BP before and after treatment were 106.71 ± 13.97 mmHg and 95.38 ± 7.76 mmHg respectively (Table 5)

Table 6: Drugs prescribed for the management of Severe preeclampsia (n=26). The magnesium sulphate was prescribed as prophylactic agents in 23 (52.3%) patients.

Discussion

Hypertensive disorders of pregnancy are considered to be a major worldwide health problem running an increased risk of perinatal and maternal mortality. The prevalence of Hypertensive Disorder in Pregnancy varies according to geographic regions - world and ranges from 1.5% in Sweden to 7.5% in Brazil.⁷ Some studies from Saudi Arabia reported prevalence between 2.6% and 3.7%.⁸ while Venture determines a prevalence of 3.8% in USA in 2000.⁹ The incidence reported from Turkey was 8.49%.¹⁰ According to our study the frequency of hypertensive disorders of pregnancy was 7.8%. The variations may be attributed to racial differences, socioeconomic status and some other parameters like parity and age. In India the incidence of preeclampsia is reported to be 8-10% of the pregnancies.¹¹ We observed preeclampsia in 4.4% of our study population. Age has an important influence on the incidence of Hypertension. Preeclampsia is more frequent in patients younger than 21 years of age and in older than 35 years.¹² In our study highest incidence of the preeclampsia disorder

occurred among those aged 18 to 22. This could be because the majority of conceptions take place in this age group in our country.

Preeclampsia (including eclampsia) generally occurred in the 3rd trimester especially between 30th and 36th weeks of gestation.¹³ In our study 43.2% of the preeclampsia women were at 31-36 weeks of gestation period, 16 (36.4%) were at >36 and 9 (20.5%) were at < 31 weeks.

Preeclampsia is primarily regarded as a disease of first pregnancy. Study showed primigravidae and multigravidae were equally affected & nulliparity was associated with a significantly increased risk of preeclampsia. This was consistent with previous studies. It is believed that this is related to the maternal first exposure to trophoblasts, which are of fetal origin.¹⁴

Though delivery is the ultimate cure of pre-eclampsia, neonatal outcome should also be considered in the absence of maternal complications. Almost 87.0% of the women in this study were delivered by means of Caesarean section This rate of caesarean delivery is higher than that reported by Mashiloane and Moodley and similar to that of Hall et al.¹⁵ where 81.5% the pre-eclamptic gave birth by means of caesarean section. There were no maternal deaths in this report in contradistinction to many reports from the developing countries. Twenty three (52.2%) neonates had a birth weight of less than 2500gm with pre-eclampsia. Mild preeclampsia having higher birth weight than the more severe categories. The effect of decreased birth weight is found mostly among preterm births. The lower birth weight among the severe pre-eclampsia cases which was observed in this study corresponds to that of Xiong X and Fraser WD's study where the birth weights were significantly lower in women with severe preeclampsia.¹⁶ Pre-eclampsia is responsible for the occurrence of more than 40% of premature deliveries around the globe. This was also observed in this study where 22 (68.75 %)(out of 32 deliveries) neonates were delivered prematurely.

Hypertensive disorders in pregnancy, particularly gestational hypertension with or without proteinuria may produce changes in the hematologic, renal and hepatic profiles that may adversely affect prognosis and both neonatal and maternal outcomes Proteinuria is the major sign of preeclampsia. Proteinuria in preeclampsia is above the upper limits of normal pregnancy i.e. >300 mg/day but in 31.8% of patients proteinuria was found to be less than 300 mg/day and 38.6% of patients had moderate (500-2000 mg/day) degree of proteinuria. Proteinuria >2 gm/day was seen in 29.5% of patients. Platelet level should be less than 100,000mm³ in order to be considered as an indicator for the severity of pre-eclampsia.¹⁷ Only 10 (22.7 %) of the women whose platelet count was less than 100,000mm.³

The utilization of antihypertensives prevents the progress of mild preeclampsia to severe preeclampsia. This study agrees with Aslam *et al.*,¹⁸ who reported good fetomaternal outcome after the antihypertensive therapy. Majority of preeclamptic patients were on combination therapy (75.0%) and only 25.0% were on monotherapy of antihypertensive drugs. The combination antihypertensive pharmacotherapy was because; target BP level was not achieved on monotherapy. Nifedipine and Methyldopa combinations were most commonly prescribed in mild (35.2%) and severe (30.0%) preeclampsia. In present study, it was found that the use of anti-hypertensive drugs had reduced the systolic and diastolic blood pressure markedly. Among the antihypertensives used, Methyldopa with Nifedipine combination cause marked decrease in the systolic and diastolic blood pressure. Similarly, significant reductions in systolic and diastolic BP after the use of methyl dopa with nifedipine combination have been reported by Jayasutha et al.¹⁹ In a study by El-Hassan²⁰ shows the use of methyldopa prevents the progress of mild preeclampsia to severe preeclampsia and there was no change in the mortality, birth weight and neonatal outcome

Magnesium sulphate reduces the risk of eclampsia and it is likely reduces the risk of maternal death.²¹ Magnesium sulphate was given to only 23% of the severe preeclamptic women in this study, which was very low compared to other studies.^{21,22} In their study on maternal and perinatal outcomes of eclampsia in Nova Scotia, Lee W, O'Connell CM and Baskett TF reported that 97% of pre-eclamptics had received magnesium sulphate.²¹ Recent reviews indicate that it reduces the rate of convulsions from 2% to 0.6% in women with severe preeclampsia. In our study magnesium sulphate was prescribed as prophylactic agents in 23 patients.

Pharmacological therapy to prevent preeclampsia is usually empirical, of unproven value and often speculative.²³ Low dose Aspirin (75 mg) was prescribed in 6.8 % patients. Ruano et al., 2004²³ studied about the role of low-dose aspirin in prevention of preeclampsia & evaluated the effectiveness. It was found that low-dose aspirin is beneficial in terms of reducing the incidence of preeclampsia in women at high risk of developing preeclampsia. Research on the use of antioxidants in the prevention of preeclampsia is promising. However, further studies are needed.

Conclusion

Preeclampsia continues to present as one of leading causes of maternal morbidity and mortality.

The incidence of preeclampsia in pregnancy is high, they account for significant maternal and fetal complications as well as neonatal morbidities. This study

concludes that antihypertensives are much effective in controlling systolic and diastolic blood pressure in preeclamptic patients. Among the antihypertensives used, methyldopa with nifedipine combination cause marked decrease in the systolic and diastolic blood pressure.

Nifedipine and methyldopa drugs were mostly preferred drugs whereas seizure prevention and fetal well-being assessment are also crucial elements in the prevention of preeclampsia-related complication.

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