

Is This A Fact? Hypertensive Disorder in 1st Pregnancy Recurs in 2nd Pregnancy

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Abstract

Background: Hypertensive disorder of pregnancy (HDP) entails a risk of recurrence in a subsequent pregnancy. Several risk factors have been associated with recurrence of hypertensive disorder in pregnancy. There is also evidence that the different clinical forms of HDP may be related to each other. Therefore, in HDP studies, it may be preferable to include all clinical forms of the hypertensive disorder not only in the 1st pregnancy, but also in later pregnancies.

Aim: To study recurrence of Hypertensive Disorder of Pregnancy in 2nd Pregnancy with regard to the type and time of onset of hypertensive disorder in 1st pregnancy.

Methodology: The study was conducted at department of obstetrics & gynecology Lalla Ded Hospital GMC Srinagar. 250 patients with history and maternity records of hypertensive disorder of pregnancy (HDP) in first pregnancy were followed on OPD basis till final outcome of second pregnancy to observe the recurrence of hypertensive disorder in second pregnancy with regard to type of hypertensive disorder and time of onset of hypertensive disorder in first pregnancy. Paired t-test & Chi-square test was used. Recurrence rate of HDP was reported as percentage along with its 95% confidence interval. Two sided p-values were reported and a p-value of <0.05 was considered statistically significant.

Results: Out of 250 patients, 142 (56.8%) had gestational hypertension in 1st pregnancy with recurrence of different types of HDP of 101(71.12%) in present pregnancy. 43(17.2%) patients having preeclampsia/eclampsia in 1st pregnancy had recurrence of 25(58.13%) in present pregnancy. 55(22%) patients having Chronic hypertension in 1st pregnancy had recurrence of 49(89.09%) in present pregnancy. 7(2.8%) patients diagnosed as having superimposed preeclampsia in 1st pregnancy had recurrence of 6(85.7%). Out of 3(1.2%) patients diagnosed as having HELLP syndrome in 1st pregnancy, the recurrence was 3(100%). Women who had HDP in their 1st pregnancy had a high risk of repeated HDP in the 2nd pregnancy, but not necessarily the same type. This risk was higher if the onset of hypertension in the 1st pregnancy was early (<34 weeks) of gestation and was associated independently with higher age of pregnant women (> 30 years), women belonging to urban areas and family history of HDP.

Conclusion: Women who had HDP in their 1st pregnancy had a high risk of repeated HDP in the 2nd pregnancy, but not necessarily the same type. This risk was higher if the onset of hypertension in the 1st pregnancy was early (<34 weeks) of gestation and was associated independently with higher age of pregnant women (> 30 years), women belonging to urban areas, women with family history of HDP and also associated with higher cases of preterm and caesarean section deliveries.

Keywords: Hypertension; 1st pregnancy; Recurrence; 2nd pregnancy.

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Introduction

How pregnancy incites or aggravates hypertension remains unsolved despite decades of intensive research. Indeed, hypertensive disorders remains among the most significant and intriguing unsolved problems in obstetrics.

Hypertensive disorders complicate 5 to 10 percent of all pregnancies, and together they are one member of the deadly triad—along with

haemorrhage and infection—that contributes greatly to maternal morbidity and mortality. Of these disorders, the preeclampsia syndrome, either alone or superimposed on chronic hypertension, is the most dangerous. As subsequently discussed, new-onset hypertension during pregnancy—termed gestational hypertension—is followed by signs and symptoms of preeclampsia almost half the time, and preeclampsia is identified in 3.9 percent of all pregnancies.¹

The World Health Organization (WHO) systematically reviews maternal mortality worldwide, and in developed countries, 16 percent of maternal deaths were reported to be due to hypertensive disorders.² This proportion is greater than three other leading causes that include hemorrhage—13 percent, abortion—8 percent, and sepsis—2 percent.

Hypertensive disorder in pregnancy (HDP) entails a risk of recurrence in a subsequent pregnancy.³⁻⁶ There is also evidence that the different clinical forms of HDP (gestational hypertension, preeclampsia, eclampsia, and even chronic

hypertension in first and in later pregnancies) may be related to each other.⁷⁻¹² Therefore, in HDP studies, it may be preferable to include all clinical forms of the hypertensive disorder not only in the first pregnancy, but also in later pregnancies.

Recurrence: Several risk factors have been associated with recurrence of hypertensive disorder in pregnancy. Among these are positive family history¹³, belonging to high income countries and chronic hypertension¹⁴, Early onset hypertension, Overweight and weight gain between pregnancies¹⁵, history of preterm birth, perinatal death, low birth weight¹⁶, past history of preeclampsia (PE)¹⁷, anti-phospholipids antibodies and Primiparas are known to be at markedly greater risk of recurrence of hypertensive disorder of pregnancy.¹⁸, Elevated blood lead levels¹⁹, exposure to organic solvents²⁰, lack of leisure-time physical activity early in pregnancy²¹, male fetuses low levels²², of calcium intake²³, use of barrier contraceptives²⁴, and young maternal age²⁵, have all been reported to increase the risk of hypertensive disorder of pregnancy, but these observations await corroboration.

Table 1: Simplified classification of hypertensive disorders that is based on National High Blood Pressure Education Programme definitions.

Disorder	Definition
Hypertension	Blood pressure ≥ 140 mmHg systolic and /or 90mmHg diastolic measured 2 times with at least a 6-hr interval.
Proteinuria	Urinary excretion of ≥ 0.3 protein/24hr specimen or $\geq 2+$ on qualitative examination(Dipstick)
Chronic hypertension	Known hypertension before pregnancy or hypertension diagnosed for the first time before 20 weeks of gestation.
Gestational Hypertension	Hypertension diagnosed after 20 week of gestation.
Preeclampsia	Gestational Hypertension+Proteinuria
Eclampsia	Seizures in women with hypertension
Superimposed pre eclampsia	Occurrence of proteinuria in women with chronic hypertension.

Types of Hypertensive Disorders of Pregnancy

Chronic Hypertension in Pregnancy

Chronic hypertension is high blood pressure that precedes pregnancy, is diagnosed within the first 20 weeks of pregnancy, or does not resolve by the 12-week postpartum checkups.²⁷

Gestational Hypertension

Gestational hypertension is the new onset of hypertension after 20 weeks of gestation. The diagnosis requires that the patient have, Elevated blood pressure (systolic ≥ 140 or diastolic ≥ 90 mm Hg, Previously normal blood pressure, No protein

in the urine, No manifestations of preeclampsia eclampsia(27).

Preeclampsia

Preeclampsia is defined as elevated blood pressure after 20 weeks of gestation (≥ 140 mm Hg systolic or ≥ 90 mm Hg diastolic) plus proteinuria (> 0.3 g/24 hours). Preeclampsia is a multiorgan disease process of unknown etiology²⁷ characterized by the development of hypertension and proteinuria after 20 weeks of gestation.

Hellp Syndrome (hemolysis, elevated liver enzymes, and low platelets) used to be classified as a separate syndrome, but current thinking categorizes it as a manifestation of preeclampsia, occurring in about

20% of severe cases with significant maternal and perinatal morbidity.²⁸

Eclampsia

Eclampsia is the development of convulsions in a preexisting pre-eclampsia or it may appear unexpectedly in a patient with minimally elevated blood pressure and no proteinuria.²⁹

Superimposed preeclampsia is defined as occurrence of proteinuria in women with chronic hypertension.³⁰

In conclusion, although many pregnant women with high blood pressure have healthy babies without serious problems, but high blood pressure can be dangerous for both the mother and the fetus. Information on recurrence risk may help clinicians in decision making, for example in counselling women with previous history of preeclampsia who desired to have next pregnancy and in the clinical follow up of these pregnancies.

Aims & Objectives

- To study recurrence of Hypertensive Disorder in Second Pregnancy with regard to the type of hypertensive disorder in first pregnancy.
- To study recurrence of Hypertensive Disorder in Second Pregnancy with regard to the time of onset of hypertensive disorder in first pregnancy.

Materials & Methods

The present study was conducted in the Post-graduate department of obstetrics and gynaecology (L.D. Hospital) Govt. Medical College Srinagar for a period of 11/2 year following approval by institutional ethical committee. Department of obstetrics and gynaecology (L.D. Hospital) caters to patients from whole of the Kashmir valley. This was a prospective observational study. Written informed consent has been obtained in a simple and easily understandable unambiguous language from each patient and patient was given freedom of choice to accept or refuse participation in the study.

Socio demographic profile was assessed by using Modified Kuppaswamy scale. A detailed history, clinical examination and investigations have done. At each antenatal visit blood pressure was checked. Urine was examined for proteinuria. An obstetrical ultrasonography was performed to confirm single viable pregnancy.

All subjects with history and maternity records of hypertensive disorder of pregnancy (HDP) in first pregnancy were followed on OPD basis till final outcome of second pregnancy to observe the recurrence of hypertensive disorder in second pregnancy with regard to type of hypertensive disorder and time of onset of hypertensive disorder in first pregnancy.

Statistical analysis: Data was entered in a Microsoft Excel spread sheet. Continuous variables were summarized as mean and standard deviation (S.D). Categorical variables were summarized as frequency and percentage. Paired t-test was used to test the difference between two means. Chi-square test was used to test independence between two categorical variables. Recurrence rate of HDP was reported as percentage along with its 95% confidence interval. Two sided p-values were reported and a p-value of <0.05 was considered statistically significant.

Inclusion criteria

- a. Informed written consent.
- b. Singleton live pregnancy
- c. Hypertensive disorder in first pregnancy.

Exclusion Criteria

- a. Multiple pregnancies.
- b. Secondary hypertension
 - Chronic kidney disease
 - Systemic disease with renal involvement
 - Endocrine disorders.
 - Coarctation of the aorta.

Observations & Results

Our study included a total of 250 patients who had hypertensive disorder in first pregnancy. All the information collected was summarized on the designed proforma containing demography of the patients. Data was stratified on the basis of type of hypertensive disorder in previous and present pregnancy. Data was entered in a Microsoft Excel spread sheet. Continuous variables were summarized as mean and standard deviation (S.D). Categorical variables were summarized as frequency and percentage. Paired t-test was used to test the difference between two means. Chi-square test was used to test independence between two categorical variables. Recurrence rate of HDP was reported as percentage along with its 95% confidence interval. Two sided p-values were reported and a p-value of <0.05 was considered

statistically significant.

Frequency and percentage were calculated for type of HDP in present pregnancy. TAB. 1 gives a summary of the type of HDP in the first pregnancy and the recurrence rate in the second pregnancy.

Our study included a total of 250 patients who have hypertensive disorder in first pregnancy. Data was subjected to data specific statistical methodology. Type of Hypertensive disorder of pregnancy in previous pregnancy was noted. Majority of the patients, 142(56.8%) had gestational hypertension in previous pregnancy. While as 43 (17.2%) patients had pre-eclampsia/eclampsia in previous pregnancy. 55 (22%) patients had chronic hypertension, 7(2.8%) had superimposed preeclampsia and 3(1.2%) had HELLP syndrome in their last pregnancy. Recurrence of hypertensive disorders in current pregnancy was noted regarding all groups of HDP, i.e. Gestational hypertension, Preeclampsia, Eclampsia, Chronic hypertension, superimposed preeclampsia, HELLP Syndrome.

Out of 142 patients having gestational hypertension in previous pregnancy, the overall recurrence with different types of HDP was 101(71.12%) in present pregnancy.

Out of 43(17.2%) patients having preeclampsia/eclampsia in previous pregnancy the overall recurrence was 25(58.13%) in present pregnancy.

Out of 55(22%) patients diagnosed as having Chronic hypertension in previous pregnancy the overall recurrence was 49(89.09%) in present pregnancy.

Out of 7(2.8%) patients diagnosed as having superimposed preeclampsia in previous pregnancy the overall recurrence was 6(85.7%)

Out of 3(1.2%) patients diagnosed as having HELLP syndrome in previous pregnancy the overall recurrence was 3(100%).

Irrespective of the type of disorder in previous pregnancy, total recurrence in present pregnancy was also noted. Thus, out of 250 patients having HDP in previous pregnancy:

103(41.2%) patients had gestational hypertension in second pregnancy, irrespective of the type of disorder in previous pregnancy. 16(6.4%) patients had preeclampsia in second pregnancy, irrespective of the type of disorder in previous pregnancy.

53(21.2%) patients had chronic hypertension in second pregnancy, irrespective of the type of disorder in previous pregnancy.

9(3.6%) patients had superimposed eclampsia

in second pregnancy, irrespective of the type of disorder in previous pregnancy.

3(1.2%) patients had HELLP syndrome in second pregnancy, irrespective of the type of disorder in previous pregnancy.

66(26.4%) patients had no recurrence and total Recurrence is (73.6%) i.e.184 patients.

164 women had age > 30 years and 86 women had age <30years, so it was observed that increased age is a risk factor.

Majority of the patients who had recurrence of HDP, 121 were from urban areas and 63 patients were from rural areas. 43 from urban areas and 23 from rural areas had no recurrence.

Gestational age at which the hypertensive disorder occurred in present and previous pregnancy was also noted.

165(66%) patients in previous pregnancy had HDP at gestational age before 34 weeks, While 85 patients (34%) had HDP in previous pregnancy diagnosed after 34 weeks of gestation.

Majority of the patients 125 out of 165 (75.75%) were diagnosed to have HDP in their present pregnancy at gestational age before 34 weeks While 59 out of 85 patients (69.41%) had HDP in present pregnancy diagnosed after 34 week of gestation. 66 (26.4%) patients had no recurrence in second pregnancy. So it is proved that onset of HDP at early G.A. is a risk factor for recurrence.

Out of 250 patients, LSCS was done in 195 patients and 55 patients had normal vaginal delivery (NVD).

Out of 250 patients, 123 patients had family history of HDP and 61 patients had no family history of HDP. 66 had no recurrence. Hence it is proved that women with genetic preloading are again a risk factor.

Perinatal fetal outcome of patients with HDP was also calculated. Out of 250 patients 151 patients had preterm deliveries, 60 patients had term deliveries and 39 patients had IUD.

So it has been observed that women with HDP had adverse effect on perinatal fetal outcome. Women who had HDP in their first pregnancy had a high risk of repeated HDP in the second pregnancy, but not necessarily the same type. This risk was higher if the onset of hypertension in the first pregnancy was early (<34 weeks) of gestation and was associated independently with higher age of pregnant women (> 30 years), women belonging to urban areas and family history of HDP.

Table 1: 250 women with HDP in first pregnancy with Recurrence of HDP in 2nd pregnancy

First Pregnancy	HDP in second pregnancy						
	Normal	Gestational hypertension	Preeclampsia	Chronic Hypertension	Superimposed preeclampsia	HELLP Syndrome	All recurrences
Gestational Hypertension n=142 (56.8%)	41(28.8%)	68 (47.8%)	7 (4.9%)	22 (15.4%)	3 (2.11%)	1(0.70%)	101 (71.12%)
Preeclampsia/ Eclampsia n=43 (17.2%)	18 (41.8%)	15 (34.8%)	5 (11.6%)	4 (9.30%)	1 (2.32%)	0(0%)	25 (58.13%)
Chronic Hypertension n=55 (22%)	6 (10.9%)	18 (32.7)	2 (3.63%)	25 (45.45%)	3 (5.45%)	1(1.88%)	49 (89.09%)
Superimposed Preeclampsia n=7 (2.8%)	1 (14.2%)	2 (28.5%)	1 (14.2%)	2 (28.5%)	1 (14.2%)	0(0%)	6 (85.7%)
HELLP Syndrome n=03 (1.2%)	0 (0%)	0 (0%)	1 (33.3%)	0 (0%)	1 (33.3%)	1 (33.3%)	03 (100%)
Total (n=250)	66 (26.4%)	n=103 (41.2%)	n=16 (6.4%)	n=53 (21.2%)	n=9 (3.6%)	n=3 (1.2%)	n=184 (73.6%)

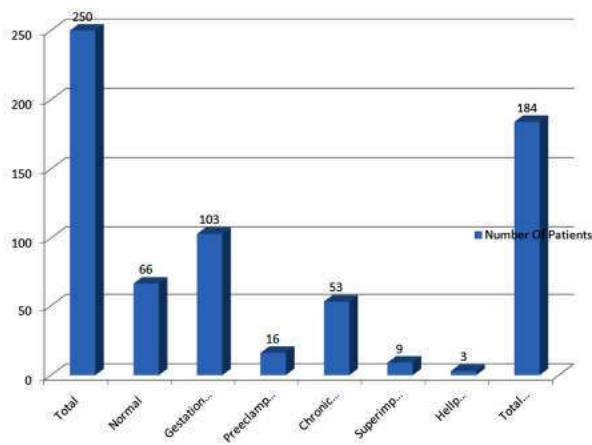


Fig. 1: 250 women with HDP in first pregnancy with recurrence of HDP in 2nd pregnancy.

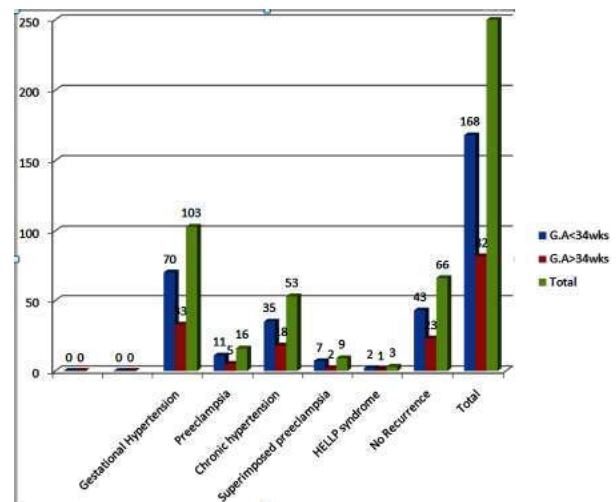


Fig. 3: G.A. at HDP in 2nd pregnancy with respect to G.A. at onset of HDP in previous pregnancy.

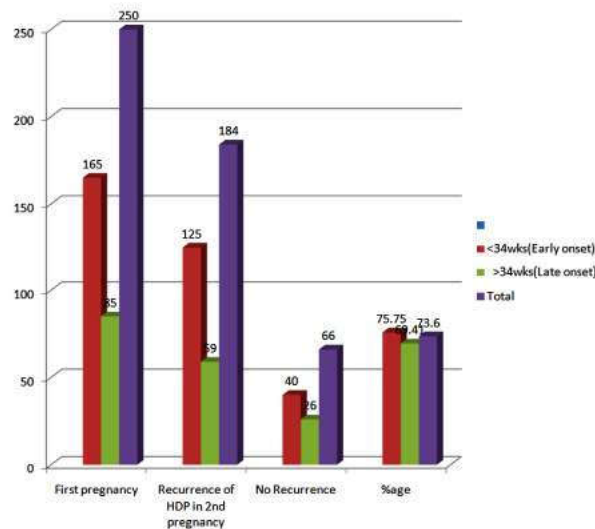


Fig. 2: Gestational age at the time of diagnosis of HDP in previous pregnancy and recurrence in 2nd pregnancy. (n=250)

Discussion

This was hospital based study that was conducted in pregnant women with history of HDP in previous pregnancy. The aim is to study recurrence of Hypertensive Disorder in Second Pregnancy with regard to the type of hypertensive disorder in first pregnancy and to study recurrence of Hypertensive Disorder in Second Pregnancy with regard to the time of onset of hypertension in first pregnancy. So that, women having such high risk pregnancy can be counselled about the importance of frequent antenatal visits. Prophylactic measures can be taken to reduce the maternal and fetal morbidity and mortality associated with this serious obstetrical problem.

Hypertensive disorders of pregnancy continue

to affect 8% of all pregnancies, the incidence of preeclampsia has seen a 40% increase in recent years.³¹ HDP, with pre-eclampsia/eclampsia is accompanied by an increase in fetal and maternal morbidity and mortality.³² In our study, the population of women with HDP, the risk of recurrent disorder was 58% to 100%, depending on the type in first pregnancy.

According to our study, out of 142 (56.8%) with gestational hypertension in their previous pregnancy most of the patients 68 (47.8%) had gestational hypertension in second pregnancy. While 41 (28.8%) had normal pregnancy and 7 (4.9%) patients had pre-eclampsia.²² (15.4%) patients had chronic hypertension, 3 (2.11%) patients had superimposed preeclampsia while as 1 (0.70%) patient had HELLP syndrome. The all recurrences in patients with Gestational hypertension in previous pregnancy are 101(71.12%).

Our results are similar to many studies done in past by Campbell DM et al³³ all in 1985. In his study the overall recurrence in gestational hypertension was about 70% which is in accordance to our study.

Hargood JL³⁴ et al in 1991, Zhang J³⁵ et al in 2001, and Trogstad L³⁶ et al in 2004 conducted many studies on recurrence of hypertensive disorder of pregnancy. The results in these are in accordance to our study.

Out of 250 patients with different types of HDP in first pregnancy, the Total recurrence of Gestational hypertension is 41.2% (103 patients) irrespective of HDP in previous pregnancy. This is in accordance with the study conducted by Sigrun Hjartardottir, MD, et al in 2005 where the Total recurrence of Gestational hypertension was 41.3%.³⁷

Interestingly, a few studies had reported a very low recurrence rate of HDP in second pregnancy. A study conducted by HAFIZA SAIMA et al³⁸ reported that the recurrence of Gestational hypertension in second pregnancy occurred in 24.5. The apparent reason for this gross difference in the recurrence rate of HDP in the two studies seem to be the gestational age at the time of onset of hypertension in previous pregnancy. In our study, majority of the patients 66% had early onset HDP i.e., hypertension developed before 34 weeks of gestation while as in study conducted by HAFIZA SAIMA most of the women developed HDP late in pregnancy i.e. after 32 weeks.

It has also been found in our study that women with gestational hypertension in first pregnancy i.e. 142 patients (56.8%) were more likely to develop gestational hypertension again (68 patients, 47.8%)

rather than pre-eclampsia (7 patients, 4.9%) in their next pregnancy ($P < 0.001$). Our findings are supported by findings of Brown et al³⁹ with gestational hypertension of 40% and Preeclampsia 5% in subsequent pregnancy.

In our study 16 patients (6.4%) out of 250 patients have total recurrence of preeclampsia in second pregnancy which is in agreement with the findings of Sigrun Hjartardottir, MD, et al in 2005³⁷ with the recurrence of preeclampsia of 5.8%.

In the large and comprehensive study by Campbell et al,³³ the recurrence of preeclampsia with preeclampsia in first pregnancy was 7.5%. We found a higher recurrence rate of preeclampsia (11.6%). The finding approaches the 14.1% recurrence rate of preeclampsia that was found in a recent Norwegian study.³⁶ One third (15 out of 43 patients) of the women with preeclampsia in our study had gestational hypertension in the second pregnancy, which is close to what other investigators have observed.³³⁻³⁵

Several studies have addressed the risk of recurrence of PE in a subsequent pregnancy. Overall, the risk of recurrence is (5% to 10%) with prior PE as reported by Hargood JL, and Dukler D, Porath A et al.^{34,40} Furthermore, in a large retrospective study, women with prior GHTN were more likely to experience GHTN (26%) than PE (6%) in a subsequent pregnancy, whereas women with previous PE had a similar 6% risk of recurrence of either PE or GHTN.³⁹ The results are close to our study with recurrence of preeclampsia 4.9% in patients with gestational hypertension in first pregnancy. The recurrence of preeclampsia (11.6%) in patients with Preeclampsia in first pregnancy is close to study of Hargood JL, and Dukler D, Porath A et al.^{34,40} with recurrence of 10%.

Hernandez-Diaz et al. included a cohort of pregnancies from the first antenatal visit (usually at 8 to 12 weeks' gestation) with diagnosis of pre-eclampsia or eclampsia in previous pregnancy.⁴² The study reports a 13.1% risk of recurrent preeclampsia, which is close to our results of 11.6% for patients with preeclampsia in first pregnancy. For preeclampsia the risk of total recurrence in their study was 5-7% (42, 33) which almost equals to our findings of total recurrence of preeclampsia of 6.4%.

A number of features of preeclampsia are recognized to significantly increase the risk of adverse maternal and fetal outcomes.⁴³⁻⁴⁶ The natural history of preeclampsia is to progress at an unpredictable rate, at least until delivery, and therefore all women with preeclampsia should be closely monitored.

In an Australian study, only 3% of 140 women with gestational hypertension or preeclampsia in the first pregnancy were noted to have chronic hypertension by the second pregnancy; in our study, this figure was 15%. The difference may simply be the result of the small sample size in the Australian study. Alternatively, this difference may reflect a failure to identify chronic hypertension in the first pregnancy in our study, which we believe is unlikely, considering that early pregnancy blood pressure was available for all women in the study. Furthermore, this difference could be the result of a higher susceptibility for chronic hypertension in our study population, which is possible because of higher number of obese patients in my study. Less than one half 25 (45.45%) of the women in our study with chronic hypertension in the first pregnancy were noted still to have chronic hypertension by their second pregnancy. One third 18 (32.7%) of the women had gestational hypertension, but very few of the women experienced more severe forms of HDP. It was interesting to note that 10.9% of the women who were classified as having chronic hypertension in their first pregnancy were found to be normotensive throughout the second pregnancy. The term chronic hypertension used in this study as defined by National High Blood Pressure Education Program.³³ It is not implied in this definition that there is a recurrence in subsequent pregnancies, even though hypertension might arise at some point in later life. The group with chronic hypertension might also include women with "white coat hypertension" in early pregnancy.⁴⁷

P Rachael James, Catherine Nelson-Piercy et al reported that the risk of superimposed preeclampsia is 15–26% (48) but this risk is influenced by the gestation at which the hypertension develops. When HDP is diagnosed after 34 weeks of pregnancy, the risk falls to 5%.(48) which is in accordance to our findings of total recurrence of superimposed preeclampsia of 4%.

Surprisingly, we did not find a single case of recurrence of eclampsia in our study. The most logical justification in this regard is the fact that the widely reported incidence of eclampsia is 1:2000.⁴⁹

Out of 250 patients 7 women had superimposed preeclampsia in first pregnancy with recurrence of 28.5% of gestational hypertension and superimposed preeclampsia each and 14.2% of preeclampsia and HELLP syndrome each, with all recurrence of 85.7% and total recurrence of 3.6%. The results are almost equal to findings of Hjartardottir S, Leifsson BG et al.³⁷

Total recurrence of HDP in our study is

73.6%, with Gestational hypertension, 41.2%, Preeclampsia, 6.4%, Chronic hypertension, 21.2% and superimposed preeclampsia 3.6% which is in accordance with the results of study done by Hjartardottir S, Leifsson BG et al.³⁷

Lowe SA, Bowyer L et al reported Women who have experienced hypertension in a previous pregnancy are at increased risk in any future pregnancies.^{50,51,52} They should receive appropriate counselling and prophylaxis if the risk is considered significant.

Family history of preeclampsia has been shown to be associated with a 4-fold increased risk of preeclampsia in prim gravid women.⁵³ The presence of a familial factor in different forms of HDP has been suggested-preeclampsia,^{54,55} superimposed preeclampsia, gestational hypertension⁵⁶ and chronic hypertension.⁵⁷ From our analysis of the study, it seems that, on close inspection, most HDP cases have a family history of the disorder because >65% (TAB.11) of the women who were identified initially with HDP had family history of HDP. The women who were studied here all had a number of relatives with some form of HDP, which may explain the high recurrence rate found in this study.

Lowe SA, Bowyer L et al also reported that 59% of women with HDP in previous pregnancy had family history of HDP⁵⁸, which is in accordance with the results of our study.

Roes EM, Sieben R, et al also reported that women with HDP in previous pregnancy had family history of HDP¹³ which again is in accordance with the results of our study.

Early onset of hypertension increased the risk of recurrent HDP in women. We evaluated the effect of an early diagnosis of hypertension on the recurrence risk. Onset of hypertension at <34 weeks of gestation in the first pregnancy increases the risk for recurrent HDP in women with gestational hypertension. When a woman also experienced proteinuria (and thus preeclampsia), the risk was more than 3-fold. Early diagnosis of hypertension is therefore a marker of the severity, also in women who will not proceed to preeclampsia. This suggests, at least in part, a common mechanism underlying these conditions. In our study (125/165) 75.75% of women had onset at <34 weeks of gestation in second pregnancy and(59/85)69.41% of patients had after 34 weeks of gestation. Our results are supported by results seen in the study done by Hjartardottir S, Leifsson BG et al.³⁷

HDP is not a uniformly benign condition. The risk of complications is dependent on the gestational

age at which it develops. This rate being higher the earlier the presentation.

Gestational hypertension near term is associated with little increase in the risk of adverse pregnancy outcomes.⁵⁹ The earlier the gestation at presentation and the more severe the hypertension, the higher is the likelihood that the woman with gestational hypertension will progress to develop preeclampsia or an adverse pregnancy outcome.^{60,61}

Women with early disease are at greater risk of recurrence (25–65%)⁶² as compared to women who had late disease during first pregnancy. Dildy and colleagues¹⁷ suggested that recurrence rate following pre-eclampsia in initial pregnancy approaches around 50% in subsequent pregnancy. Zhang J and colleague³⁵ also reported that the risk of recurrence of pre-eclampsia in subsequent pregnancy bears a significant association with gestational age at which HDP developed in first pregnancy i.e., 10–25% if the disease occurred in third trimester and as high as 60–70% if the disease occurred in second trimester. Another study in this regard is of Mustello et al.⁶³ He observed that risk of recurrence of pre-eclampsia in the second pregnancy bears an inverse relation to the gestational age at the time of diagnosis. Gestational age had a significant association with subsequent recurrence of HDP. Above mentioned findings are in accordance to findings of our study.

In our study the perinatal fetal outcome in women with recurrent HDP in 2nd pregnancy shows that most of the women (151) had preterm deliveries, 39 had IUD while as 60 women had term deliveries.

In a large multicentre study by Nir Melamed, MD, MSc, Joel G. Ray, et al involving 2413 nulliparous women,⁶⁴ the outcome of pregnancies complicated by either PE or GHTN was compared with that of uncomplicated pregnancies. Overall, the rate of perinatal complications including prematurity, low birth weight, intrauterine growth restriction, placental abruption, and perinatal mortality was higher only in the PE group, while the rate of these complications in the GHTN group was similar to that observed in uncomplicated pregnancies. Similarly, in another recent retrospective study of nulliparous women with GHTN or mild PE,⁶⁵ the rates of intrauterine growth restriction, placental abruption, and low five-minute Apgar score were higher only in the mild PE group and not in the GHTN group. These studies defend the findings of our study where we have seen that women with PE have more complicated births than Gestational hypertension.

Fetal mortality and morbidity is strongly associated with gestational age at delivery. Prolongation of pregnancy in the presence of preeclampsia carries no benefit for the mother but is desirable at early gestations to improve the fetal prognosis.⁶⁶⁻⁶⁸ When the onset of preeclampsia occurs at a pre-viable gestation (i.e. < 24 weeks' gestation) there is little to be gained from prolonging the pregnancy with serious maternal morbidity rates of 65-71% and high perinatal mortality rates of greater than 80%.⁶⁹⁻⁷¹ The onus remains on the clinician to advise termination of pregnancy, particularly in resource poor settings.⁷² The management of women with preeclampsia below 32-34 weeks gestation should be restricted to those centres with appropriate experience and expertise and appropriate neonatal intensive care facilities. In many cases, the timing of delivery will be based upon a number of factors, maternal and/or fetal rather than a single absolute indication for delivery. Continuation of pregnancy carries fetal risk and some stillbirths will occur despite careful monitoring.⁷³ These trials have excluded women with the HELLP variant of preeclampsia and with other evidence of severe morbidity. In the presence of HELLP syndrome, expectant management is harmful with a 6.3% incidence of maternal death and an increased risk of placental abruption.⁷⁴ In such cases, delivery should be planned as soon as feasible. Preeclampsia presenting in the late preterm period, 34-36 weeks gestation, is associated with increasing risk of SGA neonates with a higher risk of delivery via Caesarean section, respiratory distress syndrome and longer neonatal intensive care admissions.^{75,76} Therefore, antenatal steroid prophylaxes may be beneficial in this group. At mature gestational age, delivery should not be delayed in the case of severe preeclampsia. Even so, it is important to control severe hypertension and other maternal derangements before subjecting the woman to the stresses of delivery.

Fetuses of women with preeclampsia are at increased risk of spontaneous or iatrogenic preterm delivery.

Adverse perinatal outcome is increased in women with all subcategories of hypertensive disease in pregnancy as compared to normotensive women.^{77,78} This increase in adverse outcomes is greatest in those with early gestation at onset of disease, severe hypertension and/or chronic hypertension with superimposed preeclampsia and is predominantly related to an increase in the rate of FGR.^{79,80}

Balancing the fetal risks of FGR with the neonatal

risks of prematurity is particularly important in early onset disease.⁸¹

So above mentioned details defend the findings of our study that women with HDP have adverse effect on fetal outcome.

65% of women in our study have advanced age i.e. more than 30 years with recurrence of HDP while as 35% have age less than 30 years. Lowe SA, Bowyer L, et al supported our findings and reported that the prevalence is likely to increase due to the advancing age of the prospective mother at conception and the rising tide of obesity.⁸²⁻⁸⁴

Most of our patients (111 patients) belong to Middle/Lower middle class; none of the patient belongs to upper class, Van Rijn BB, Hoeks LB et al in his study supported our results.¹⁴

Most of the women 195 in our study had history of LSCS delivery in previous pregnancy while as 55 had NVD in previous pregnancy. Neilson J, Munnur U, Russell R, Wallace DH and Dyer RA, Els I, in their studies also reported that patients with HDP have most commonly undergone LSCS and hence supports the findings of our study.⁸⁵⁻⁸⁹

Area wise distribution of patients having the recurrence of hypertensive disorder of pregnancy in present pregnancy was also noted. Majority of the patients 121 were from urban areas and 63 patients were from rural areas. 43 from urban areas and 23 from rural areas had no recurrence. Lo, Jamie O.; Mission et al reported that patients of HDP are more commonly from urban industrialised areas, which supports the findings of our study. Also important to mention that the hospital where our study was done is located in urban area and most of the HDP patients visiting to this hospital are from urban areas.

So it has been observed that recurrence of hypertensive disorders in pregnancy is common, but not specified by type of disorder in first pregnancy and early onset of hypertension in first pregnancy is a risk factor.

Conclusion

Women who had HDP in their first pregnancy had a high risk of repeated HDP in the second pregnancy, but not necessarily the same type. This risk was higher if the onset of hypertension in the first pregnancy was early (<34 weeks) of gestation and was associated independently with higher age of pregnant women (> 30 years), women belonging to urban areas, women with family history of HDP and also associated with higher cases of preterm

and caesarean section deliveries. Women who meet these criteria should be informed about this after a first affected pregnancy, and if the woman is overweight, she should be offered advice on life style adjustment. How high are the chances of getting the same problem in next pregnancy? Is a frequently asked question of women having HDP. This can be answered on the basis of this study. Women having such high risk pregnancy should be counselled about the importance of frequent antenatal visits. In the second pregnancy, increased surveillance would be appropriate.

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