

Hypertension in Pregnancy: A Community-Based Study

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ABSTRACT

Background: Hypertensive disorders during pregnancy occur in women with preexisting primary or secondary chronic hypertension, and in women who develop new-onset hypertension in the second half of pregnancy. The present study was undertaken to study the prevalence and correlates of hypertension in pregnancy in a rural block of Haryana. **Materials and Methods:** This cross-sectional study was carried out in the all 20 subcenters under Community Health Center (CHC) Chiri, Block Lakhnamajra. All the pregnant women registered at the particular subcenter at a point of time of visit were included in the study. Appropriate statistical tests were used for analysis. **Results:** A total of 931 pregnant women were included in the present study. Prevalence of hypertension in pregnancy was found to be 6.9%. Maternal age ≥ 25 years, gestational period ≤ 20 weeks, history of cesarean section, history of preterm delivery, and history of hypertension in previous pregnancy were found to be significantly associated with prevalence of hypertension in pregnancy. **Conclusion:** Nearly one in 14 pregnant women in rural areas of Haryana suffers from a hypertensive disorder of pregnancy. Early diagnosis and treatment through regular antenatal checkup is a key factor to prevent hypertensive disorders of pregnancy and its complications.

Keywords: Hypertension, Haryana, pregnancy, prevalence, rural

Introduction

Hypertensive disorders of pregnancy are one of the major causes of maternal morbidity and mortality leading to 10-15% of maternal deaths, especially in developing world.⁽¹⁾ It may complicate about 3-10% of all pregnancies with variable incidence among different hospitals and countries.⁽²⁾ However, the prevalence of hypertension during pregnancy is not well-documented in Indian literature and the studies related to hypertension in pregnancy in India were mostly hospital based. Keeping this in mind, the present study was undertaken to study the prevalence

and correlates of hypertension in pregnancy in a rural block of Haryana.

Classification of hypertension in pregnancy⁽³⁾

Preeclampsia

Hypertension developing after 20 weeks' gestation with proteinuria and/or edema.

Gestational hypertension (also termed transient hypertension of pregnancy)

Hypertension developing after 20 weeks' gestation without other signs of preeclampsia.

Chronic hypertension

Hypertension before 20 weeks' gestation in the absence of neoplastic trophoblastic disease.

Preeclampsia superimposed on chronic hypertension

Preeclampsia developing in a woman with preexisting hypertension.

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Materials and Methods

Study area and study period

This cross-sectional study was carried out during the period of July 2011-June 2012 in all the 20 subcenters under Community Health Center (CHC), Chiri (Block Lakhanmajra), the rural field practice area of Department of Community Medicine, Post Graduate Institute of Medical Sciences (PGIMS), Rohtak. This area includes 24 villages and is served by one CHC (Chiri), three Primary Health Centers (Chiri, Samargopalpur, Lakhanmajra), and 20 subcenters. Ethical approval to conduct the study was taken from Institution Review Board (IRB).

Study population

All the pregnant women registered at the particular subcenter at a point of time and gave informed written consent were included.

Data collection method

A pretested, semistructured schedule was used for interviewing the study subjects. One day prior to the first visit to each subcenter, the health worker was contacted and was asked to prepare a list of all pregnant women registered in the subcenter at that point of time. She was told to inform the pregnant women to come to the subcenter on a prefixed date and time for the check-up. Three to four visits were made at each subcenter in two consecutive weeks, around two subcenters were covered in a month, and all 20 subcenters were covered in 1-year period. The pregnant women who did not come to subcenter were contacted by home visits and the women who could not be contacted even after two home visits were excluded from study.

Two blood pressure readings were taken using a mercury sphygmomanometer and average of both readings were taken.⁽³⁾ Those who had hypertension during pregnancy were referred to nearby CHC, General Hospital, or PGIMS, Rohtak as per treatment required and multipurpose health worker (female) (MPHW (F)) was informed for further follow-up.

Diagnostic criteria

Hypertension in pregnancy

A pregnant women having an average reading of systolic blood pressure (SBP) of more than/equal to 140 mmHg and/or diastolic blood pressure (DBP) of more than/equal to 90 mmHg was considered as hypertensive (DBP ≥ 90 mmHg and/or SBP ≥ 140 mmHg).

Data analysis

Collected data were entered in the Excel spreadsheet and analysis was carried out using Statistical Package for Social Sciences (SPSS) version 20.0. Pearson's chi-square test was used to evaluate differences between

groups for categorized variables. Student's *t*-test for independent samples was used for comparisons between hypertensive and nonhypertensive group. Binary logistic regression analysis (stepwise method) was used to evaluate the independent associations of various factors with prevalence of hypertension in pregnancy.

Results

During the study period, a total of 1,104 antenatal women were registered at the subcenters. Out of them, 804 antenatal women attended the subcenters and 127 pregnant women were contacted and examined by home visit. One hundred and seventy-three pregnant women, who could not be contacted even after two home visits, were excluded from the study. Therefore, a total of 931 pregnant women were included in the present study. So, the overall response rate was 84.3% (931/1104) [Figure 1].

A total of 64 study subjects were found to be hypertensive (SBP ≥ 140 mmHg and/or DBP ≥ 90 mmHg). Thus, prevalence of hypertension among pregnant women was found to be 6.9% (95% confidence interval (CI) = 5.4-8.7).

The prevalence of hypertension in pregnancy was found significantly higher in the age group ≥ 25 years (9.9%) as compared to < 25 years age group (5.9%). However, no statistically significant relationship was found between hypertension in pregnancy with educational status, occupation, and socioeconomic status [Table 1].

The prevalence of hypertension in pregnancy was found to be significantly higher in women with period of gestation < 20 weeks, previous cesarean section, previous preterm delivery, history of hypertension in previous pregnancy, and history of paternal hypertension. However, no statistically significant relationship of hypertension in pregnancy was found with gravida, parity, history of abortions, history of stillbirth, family history, and history of maternal hypertension [Table 2].

It was found that mean age and mean weight were significantly higher in hypertensive pregnant women as compared to nonhypertensive pregnant women. There

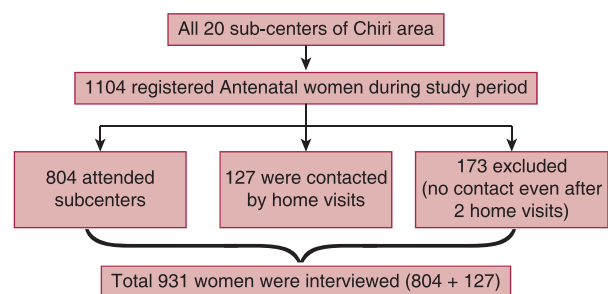


Figure 1: Study subjects

was no significant difference between mean height of hypertensive pregnant women and normotensive pregnant women [Table 3].

A stepwise logistic regression analysis was performed to predict prevalence of hypertension in pregnancy using maternal age ≥ 25 years, history of preterm

Table 1: Association of sociodemographic variables with hypertension in pregnancy (N = 931)

Sociodemographic variables	Hypertension N = 64 (%)	Normotensive N = 867 (%)	Total N = 931 (%)	P-value
Age group				
<25 years	41 (5.9)	658 (94.1)	699 (100)	0.035
≥ 25 years	23 (9.9)	209 (90.1)	232 (100)	
Educational status				
Graduate and above	11 (9.8)	101 (90.2)	112 (100)	0.189
Below graduate	53 (6.5)	766 (93.5)	819 (100)	
Occupation				
Housewife	60 (7.0)	802 (93.0)	862 (100)	0.146
Laborer	2 (4.9)	39 (95.1)	41 (100)	
Business	0 (0)	10 (100.0)	10 (100)	
Agriculture	1 (6.2)	15 (93.8)	16 (100)	
Service	1 (50.0)	1 (50.0)	2 (100)	
Socioeconomic status (Udai Pareek scale)				
Lower+lower middle+middle	54 (6.8)	740 (93.2)	794 (100)	0.831
Upper middle+upper	10 (7.3)	127 (92.7)	137 (100)	

Table 2: Association of independent variables with hypertension in pregnancy (N = 931)

Variables	Hypertension N = 64 (%)	Normotensive N = 867 (%)	Total N = 931 (%)	P-value
Period of gestation				
≤ 20 weeks	31 (10.0)	280 (90.0)	311 (100)	0.008
> 20 weeks	33 (5.3)	587 (94.7)	620 (100)	
Previous cesarean section				
Yes	6 (17.6)	28 (82.4)	34 (100)	0.011
No	58 (6.5)	839 (93.5)	897 (100)	
Previous preterm delivery				
Yes	7 (24.1)	22 (75.9)	29 (100)	0.001
No	57 (6.3)	845 (93.7)	902 (100)	
Hypertension in previous pregnancy				
Yes	15 (40.5)	22 (59.5)	37 (100)	0.001
No	49 (5.5)	845 (94.5)	894 (100)	
History of paternal hypertension				
Yes	3 (30.0)	7 (70.0)	10 (100)	0.004
No	61 (6.6)	860 (93.4)	921 (100)	
Gravida				
> 3	36 (6.2)	549 (93.8)	585 (100)	0.259
< 3	28 (8.1)	318 (91.9)	346 (100)	
Parity				
≤ 1	44 (6.2)	663 (93.8)	707 (100.0)	0.163
≥ 2	20 (8.9)	204 (91.9)	224 (100.0)	
History of abortions				
Yes	21 (8.2)	236 (91.8)	257 (100.0)	0.334
No	43 (6.4)	631 (93.6)	674 (100.0)	
History of still birth				
Yes	3 (10.3)	26 (89.7)	29 (100.0)	0.453
No	61 (6.8)	841 (93.2)	902 (100.0)	
Family history				
Yes	3 (4.6)	62 (95.4)	65 (100.0)	0.455
No	61 (7.0)	805 (93.0)	866 (100.0)	
History of maternal hypertension				
Yes	1 (1.8)	55 (98.2)	56 (100.0)	0.170
No	63 (7.2)	812 (92.8)	875 (100.0)	

birth, history of cesarean section, family history of hypertension, and history of hypertension in previous pregnancy as predictors. In our study population, history of hypertension in previous pregnancy, history of paternal hypertension, and history of preterm birth were found to have independent association with prevalence of hypertension in pregnancy [Table 4].

Discussion

Over the study period of 1 year from July 2011 to June 2012, 931 registered pregnancies were screened for hypertension. The prevalence of hypertension during pregnancy was found to be 6.9% in this study. Sachdeva *et al.*,⁽⁴⁾ in Gujarat, reported incidence of pregnancy-induced hypertension (PIH) to be 15% among women of rural background. This percentage is very high as compared to our study which may be because of the fact that it was a hospital-based study and usually, women from rural background attend hospital mostly when they are at high risk or have some complications. Hypertensive disorders of pregnancy were reported to be 7.49, 15.5, 5.38, and 8.96%, respectively, in other various hospital-based studies in India.⁽⁵⁻⁸⁾ In a population-based study carried out by Sayeed *et al.*,⁽⁹⁾ in a rural community of Bangladesh, prevalence of systolic and diastolic hypertension was reported as 6.8 and 5.4%, respectively, which is in accordance with our study (6.9%). But Ganguly and Begum⁽¹⁰⁾ who conducted a hospital-based study in Dhaka, Bangladesh, documented an overall incidence of hypertensive disorders of pregnancy to be 13.9%. This clearly depicts the difference of prevalence between a community- and hospital-based study, and the same can be applied to our study and other hospital-based studies conducted in India.

Table 3: Quantitative parameters of study participants; comparison of age, weight, height; hypertensive women with nonhypertensive (N = 931)

Quantitative parameters	Subjects with hypertension (N = 64)	Subjects without hypertension (N = 867)	P-value
Age (years)	23.6±3.5	22.7±3.1	0.032
Weight (kg)	58.0±14.3	52.1±8.4	0.001
Height (cm)	152.9±6.3	153.0±6.1	0.946

Table 4: Independent association of variables with hypertension in pregnancy (logistic regression analysis; N = 931)

Variables	AOR	Confidence interval	P-value
History of hypertension in previous pregnancy	11.48	5.51-23.92	0.001
History of paternal hypertension	8.38	2.09-33.55	0.003
History of preterm birth	3.95	1.48-10.57	0.006

AOR: Adjusted odds ratio

In our study, prevalence in the age group ≥ 25 years was found to be significantly higher (9.9%) as compared to age group < 25 (5.9%). In accordance with our study, Parazzini *et al.*,⁽¹¹⁾ identified that the risk of developing PIH tends to increase with maternal age. In comparison with women aged 20-25 years, the odds ratio (OR) was 3.5 in women aged 26-30 years and 4.2 in those aged > 30 years. Owiredu *et al.*,⁽¹²⁾ had also reported similar findings.

Sachdeva *et al.*,⁽⁴⁾ findings were congruent with our findings of higher incidence of PIH among literates, though the difference was not significant in our study. Higher incidence observed in literate women correlates with a report which states that those with college education had a 19% great chance of having preeclampsia and PIH.⁽¹³⁾ Owiredu *et al.*,⁽¹²⁾ also reported no significant relationship of PIH and educational status.

Our study revealed no significant association between occupation and hypertension in pregnancy ($P = 0.146$).⁽⁵⁾ Few other studies also reported a nonsignificant association between occupation and hypertension.^(1,14) However, Tebeu *et al.*,⁽¹⁵⁾ reported greater risk of having hypertension during pregnancy for housewives (OR: 2.8; 95% CI: 1.1-6.9; $P = 0.0167$).

Analogous to our study findings, Sachdeva *et al.*,⁽⁴⁾ revealed no significant association between socioeconomic status and PIH.⁽¹⁵⁾ However, another study found a significant association between lower socioeconomic status and hypertension in pregnancy. This may be attributed to assessment of socioeconomic status by a different scale. In our study, socioeconomic status of study population was assessed using "Udai Pareek scale" for rural areas.

Our study indicated that the prevalence of hypertension in pregnancy was significantly higher in pregnant women with gestational period ≤ 20 weeks (10.0%) than women with gestational period > 20 weeks (5.3%). However in various hospital-based studies, frequency of preeclampsia and eclampsia was found to be higher which manifests after 20 weeks of gestation.^(5,7,8) This may be explained by the fact that hypertensive status is usually not known to the pregnant women, especially ones belonging to rural background and most of pregnant women of rural areas visit hospital only after 20 weeks when definitive symptoms appear. This reason might lead to misclassification of hypertension in pregnancy as PIH in hospital-based study. In a multicenter study,⁽¹⁶⁾ approximately 30% of hypertensive disorders of pregnancy were due to chronic hypertension, while 70% of the cases were diagnosed as gestational hypertension/preeclampsia.

Hypertension in pregnancy prevalence was significantly higher in women with previous history of cesarean section (17.6 vs 6.5%) than women with no history of cesarean section. A hospital-based study conducted by Nirmalan⁽¹⁷⁾ in Hyderabad, India also reported significant higher rate of prior cesarean section in women with chronic hypertension as compared to normotensive women.

The prevalence of hypertension in pregnancy was significantly higher in women with history of preterm delivery (24.1 vs 6.3%) compared to those without history of preterm delivery. Logistic regression analysis also showed that history of preterm birth had positive relation with hypertension in pregnancy. However, Owiredu *et al.*,⁽¹²⁾ reported no significant association of prior preterm delivery with PIH. The reason given by author was limited power to detect associations between previous preterm delivery and PIH, due to low number of subjects in their study.

In present study, prevalence of hypertension in pregnancy was found significantly higher in women with history of hypertension in previous pregnancy (40.5%) compared to those with no history of hypertension in previous pregnancy (5.5%). Logistic regression analysis showed that hypertension in pregnancy was about 11 times more likely to occur in women with history of hypertension in previous pregnancy. Similarly, Nisar *et al.*,⁽¹⁸⁾ and Tebeu *et al.*,⁽¹⁵⁾ found significant association between history of hypertension during previous pregnancy and hypertension in current pregnancy.

This study revealed significant association of hypertension in pregnancy with history of paternal hypertension, but no association with history of maternal hypertension. Logistic regression analysis showed paternal hypertension is a very important predictor of hypertension in pregnancy with adjusted OR of about eight times. Similarly, Tebeu *et al.*,⁽¹⁵⁾ revealed a greater risk of having hypertension during pregnancy for women with history of paternal hypertension and also reported no significant difference between history of maternal hypertension and hypertension in pregnancy.

Limitations of the study

As, this was a cross-sectional study; the study subjects were not followed-up after a single visit. The possibility that some of the subjects might have developed hypertension at a later stage of their pregnancy cannot be refuted. This study also had limitations in classifying hypertension in pregnancy into further chronic, gestational, pre-eclampsia, eclampsia, or chronic with superimposed preeclampsia.

Conclusion

Our study shows that nearly one in 14 pregnant women in rural areas of Haryana suffer from a hypertensive disorder of pregnancy. The knowledge of risk factors for hypertensive disorders in pregnancy may give tracks for prevention in this population. Early diagnosis and treatment through regular antenatal check-up is a key factor to prevent hypertensive disorders of pregnancy and its complications. Therefore, it is the need of hour to devise a sound screening strategy to find out hypertension in pregnancy cases and comprehensive strategy for management of hypertension in pregnancy as well as maternal and child complications.

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