



**HYPERTENSION IN PREGNANCY: A COMMUNITY-BASED STUDY PERFORMED IN
FALLUJA CITY- AL ANBAR PROVINCE / IRAQ**

Azhar Khalid Mahmood Al-Hayani*

M. B. Ch. B, Master of Science in Community Medicine,
College of Medicine Baghdad University,
College of Medicine Anbar University.

***Corresponding Author: Azhar Khalid Mahmood Al-Hayani**

M. B. Ch. B, Master of Science in Community Medicine, College of Medicine Baghdad University, College of Medicine Anbar University.

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ABSTRACT

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 conducted to study the prevalence and correlates of hypertension in pregnancy at the primary health care sector in Falluja city- Al Anbar province / Iraq. This cross-sectional study was carried out on (450) pregnant women. All the pregnant women registered at a point of time of visit were included in the study. Appropriate statistical tests were used for analysis. The results showed that the prevalence of hypertension in pregnancy was found to be 7.1%. 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. It can be concluded from our study that nearly 7.1% women in Felloja Al Anbar province 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, pregnancy, prevalence.

INTRODUCTION

The hypertensive disorders of pregnancy (HDPs), chronic (or pre-existing) hypertension, gestational hypertension and, especially, pre-eclampsia, remain the leading causes of maternal and perinatal morbidity and mortality as well as identifying individuals at increased risk for premature cardiovascular disease.^[1,2]

Blood pressure (BP) should be measured at each antenatal visit. Hypertension in pregnancy is defined by a systolic BP (sBP) ≥ 140 mmHg and/or diastolic BP (dBP) ≥ 90 mmHg.^[3] Severe hypertension is defined as sBP ≥ 160 mmHg (instead of 170 mmHg) as that level of sBP reflects stroke risk.^[3,4,5,6,7] Elevated BP should be confirmed by repeated measurements, at least 15 min apart, being measured three times, the first value being disregarded and the average of the second and third taken as the BP value for the visit.^[3] It may complicate about 3-10% of all pregnancies with variable incidence among different hospitals and countries.^[2]

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]

Gestational hypertension, formerly known as pregnancy-induced hypertension or PIH, is the new onset of hypertension after 20 weeks of gestation. The diagnosis requires that the patients have elevated blood pressure (systolic ≥ 140 or diastolic ≥ 90 mm Hg, the latter measured using the fifth Korotkoff sound), previously normal blood pressures, no protein in the urine, no manifestations of preeclampsia eclampsia.^[3]

Also known as transient hypertension, gestational hypertension is actually diagnosed retrospectively when the patient does not develop preeclampsia and if blood pressure returns to normal by the 12-week postpartum visit. Fifty percent of women diagnosed with gestational hypertension between 24 and 35 weeks develop preeclampsia.^[8] The diagnosis of gestational hypertension mandates increased surveillance. Women who progress to severe gestational hypertension based on the degree of blood pressure elevation have worse perinatal outcomes than do women with mild preeclampsia, and require management similar to those with severe preeclampsia.^[9]

Preeclampsia is the hypertension developing after 20 weeks' gestation with proteinuria and/or edema.

Chronic hypertension is the hypertension before 20 weeks' gestation in the absence of neoplastic trophoblastic disease.

MATERIALS AND METHODS

This cross-sectional study was carried out during the period from July 2018 to June 2019 at the primary health care center (PHCC) / Falluja city / Al- Anbar province.

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

A pretested, semi-structured schedule was used for interviewing the study subjects. One day prior to the first visit to each sub-center, 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. The health worker 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 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 the study.

Two blood pressure readings were taken using a mercury sphygmomanometer and average of both readings were taken. Those who had hypertension during pregnancy were referred to nearby CHC, General Hospital as per treatment required.

A pregnant woman having an average reading of systolic blood pressure (SBP) of ≥ 140 mmHg and/or diastolic

blood pressure (DBP) of ≥ 90 mmHg was considered as hypertensive (DBP ≥ 90 mmHg and/or SBP ≥ 140 mmHg).

Statistical analysis

Data 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 non-hypertensive groups. 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 500 antenatal women were registered at the subcenters. Out of them, 450 antenatal women attended the subcenters and 50 pregnant women were contacted and examined by home visit. Fifty women who could not be contacted even after two home visits, were excluded from the study. Therefore, a total of 450 pregnant women were included in the present study. So, the overall response rate was 90.0% (450/500).

A total of 32 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 7.1% (95% confidence interval (CI) = 2.99-7.9).

The prevalence of hypertension in pregnancy was found significantly higher in the age group ≥ 25 years (8.9%) as compared to < 25 years age group (3.9%). However, no statistically significant relationship was found between hypertension in pregnancy with educational status, occupation and socioeconomic status as shown in table (1).

Table 1: Association of sociodemographic variables with hypertension in pregnancy (N = 450).

Sociodemographic variables	Hypertension N=32(%)	Normotensive N=418 (%)	Total/ N=450(%)	P-Value
Age group				
<25years	11(3.9)	270(96.1)	281(100)	0.001
≥ 25 years	21(8.9)	148(91.1)	169(100)	
Educational status				
Graduate and above	5(8.8)	52(91.2)	57(100)	0.805
Below graduate	27(6.8)	366(93.2)	393(100)	
Occupation				
Housewife	29(7.0)	802(93.0)	411(100)	0.267
Laborer	2(4.0)	27(96.0)	29(100)	
Business	0(0)	4(100.0)	4(100)	
Agriculture	1(6.2)	5(93.8)	6(100)	
Socioeconomic status				
Lower+lower+middle	28(6.9)	374(93.1)	402(100)	0.958
Upper middle +upper	4(8.3)	44(91.7)	48(100)	

The prevalence of hypertension in pregnancy was found to be significantly higher in women with the gestation period <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 as shown in table (2).

Table 2: Association of independent variables with hypertension in pregnancy (N = 450).

Variables	Hypertension N=32(%)	Normotensive N=418 (%)	Total/ N=450(%)	P-Value
Period of gestation				
<20 weeks	18(12.4)	127(87.6)	145(100)	0.004
>20 weeks	14(4.6)	291(95.4)	305(100)	
Previous Cesarean section				
Yes	8(20.0)	32(80.0)	40(100)	0.002
No	24(5.8)	386(94.2)	410(100)	
Previous preterm delivery				
Yes	5(23.8)	16(76.2)	21(100)	0.008
No	27(6.3)	402(93.7)	429(100)	
Hypertension in previous pregnancy				
Yes	7(24.1)	22(75.9)	28(100)	0.006
No	24(5.7)	397(94.3)	422(100)	
Hypertension in previous pregnancy				
Yes	1(0.44)	14(66.0)	25(100)	0.001
No	21(4.9)	404(95.1)	425(100)	
History of paternal hypertension				
Yes	3(37.5)	5(62.5)	8 (100)	0.007
No	29 (6.6)	413(93.4)	442 (100)	
Gravida				
>3	19 (6.6)	268 (93.4)	287(100)	0.728
<3	13 (7.8)	150 (92.2)	163 (100)	
Parity				
≤1	22(6.9)	294(93.1)	316(100)	0.991
>=2	10(7.5)	124(92.5)	134(100.0)	
History of abortions				
Yes	11(8.1)	124(91.9)	135(100.0)	0.718
No	21(6.7)	294(93.3)	315(100.0)	
History of still birth				
Yes	1(6.3)	15(93.7)	16(100.0)	0.719
No	31(7.1)	403(92.9)	434(100.0)	
Family history				
Yes	2(5.7)	33(94.3)	35(100.0)	0.994
No	30(7.2)	385(92.8)	415(100.0)	
History of Maternal hypertension				
Yes	1(5.3)	18(94.7)	19(100.0)	0.892
No	31(7.2)	400(92.8)	431(100.0)	

It was found that mean age and mean weight were significantly higher in hypertensive pregnant women as compared to non-hypertensive pregnant women. There was no significant difference between mean height of hypertensive pregnant women and normotensive pregnant women as illustrated in table (3).

Table (3): Quantitative parameters of study participants; comparison of age, weight, height; hypertensive with non-hypertensive women

Quantitative parameters	Subjects with hypertension (N=32)	Subjects without hypertension (N=418)	P-Value
Age (years)	24.5±2.9	22.1±2.5	0.001
Weight (Kg)	61.3±15.1	56.3±6.1	0.001
Height(cm)	151.6±11.4	152.0±10.4	0.429

A stepwise logistic regression analysis was performed to predict prevalence of hypertension in pregnancy using maternal age ≥ 25 years, history of preterm 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 as observed in table (4).

Table 4: Independent association of variables with hypertension in pregnancy (logistic regression analysis; N = 450).

Variables	AOR	Confidence interval	P-Value
History of hypertension in previous pregnancy	10.32	2.49-23.18	0.009
History of paternal hypertension	7.43	6.25-21.15	0.010
History of preterm birth	2.61	1.96-13.31	0.023

DISCUSSION

The prevalence of hypertension during pregnancy was found to be 7.1% in this study. Sachdeva et al.,^[12] in India, 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.^[13,14,15,16] In a population-based study carried out by Sayeed et al.,^[17] 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 (7.1%). But Ganguly and Begum^[10] who conducted a hospital-based study in 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.

In our study, prevalence in the age group ≥ 25 years was found to be significantly higher (8.9%) as compared to age group < 25 (3.9%). In accordance with our study, Parazzini et al.,^[9] 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.,^[20] had also reported similar findings.

Sachdeva et al.,^[4] findings were congruent with our findings of higher incidence of PIH among literates, as 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.^[21] Owiredu et al.,^[20] also reported no significant relationship between PIH and educational status.

Our study revealed no significant association between occupation and hypertension in pregnancy ($P = 0.267$). Few other studies also reported a non significant association between occupation and hypertension.^[1,22] However, Tebeu et al.,^[23] reported greater risk of having hypertension during pregnancy for housewives (OR: 2.8; 95% CI: 1.1-6.9; $P = 0.0167$).

Similar to our study findings, Sachdeva et al.,^[4] revealed no significant association between socioeconomic status and PIH.^[23] 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.

Our study indicated that the prevalence of hypertension in pregnancy was significantly higher in pregnant women with gestational period ≤ 20 weeks (12.4%) than women with gestational period > 20 weeks (4.6%).

However, in various hospital-based studies, frequency of preeclampsia and eclampsia was found to be higher which manifests after 20 weeks of gestation.^[13,14,16] 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 by,^[24]

it was found that 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 (20.0 vs 5.8%) than women with no history of Cesarean section. A hospital-based study conducted by Nirmalan^[25] who 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 (23.8 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.,^[20] 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 our present study, prevalence of hypertension in pregnancy was found significantly higher in women with history of hypertension in previous pregnancy (44.0%) compared to those with no history of hypertension in previous pregnancy (4.9%). 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.,^[26] and Tebeu et al.,^[23] 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.,^[23] 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.

REFERENCES

- Vigil-De Gracia P, Montufar-Rueda C, Ruiz J. Expectant management of severe preeclampsia and preeclampsia superimposed on chronic hypertension between 24- and 34-weeks' gestation. *Eur J Obstet Gynecol Reprod Biol*, 2003; 107: 24-7.
- Barron WM, Murphy MB, Lindheimer MD. Management of hypertension during pregnancy. In: Laragh GH, Brenner BM, editors. *New York: Hypertension pathophysiology, diagnosis and management*, 1990; 2: 1809-27.
- Magee L.A., Pels A., Helewa M. Diagnosis, evaluation, and management of the hypertensive disorders of pregnancy. *Pregnancy Hypertens*, 2014; 4(2):105–145.
- Martin J.N., Jr., Thigpen B.D., Moore R.C. Stroke and severe preeclampsia and eclampsia: a paradigm shift focusing on systolic blood pressure. *Obstet Gynecol*, 2005; 105(2): 246–254.
- Schutte J.M., Schuitemaker N.W., van Roosmalen J. Substandard care in maternal mortality due to hypertensive disease in pregnancy in the Netherlands. *BJOG*, 2008; 115(6): 732–736.
- Lewis G. Confidential Enquiry into Maternal and Child Health; London: Saving mothers' lives: reviewing maternal deaths to make motherhood safer. The 7th report of the Confidential Enquiries into Maternal Deaths in the United Kingdom, 2007.
- Cantwell R., Clutton-Brock T., Cooper G. Saving mothers' lives: reviewing maternal deaths to make motherhood safer: 2006-2008. The eighth report of the confidential enquiries into maternal deaths in the United Kingdom. *BJOG*, 2011; 118(1): 1–203.
- Report of the National High Blood Pressure Education Program Working Group on High Blood Pressure in Pregnancy. *Am J Obstet Gynecol*, 07; 183(1): S1–S22.
- Buchbinder A, Sibai BM, Caritis S, et al. for the National Institute of Child Health and Human Development Network of Maternal-Fetal Medicine Units. Adverse perinatal outcomes are significantly higher in severe gestational hypertension than in mild preeclampsia. Adverse perinatal outcomes are significantly higher in severe gestational hypertension than in mild preeclampsia. *Am J Obstet Gynecol*, 2002; 186(1): 66–71.
- Magee L.A., Pels A., Helewa M. Diagnosis, evaluation, and management of the hypertensive disorders of pregnancy. *Pregnancy Hypertens*, 2014; 4(2): 105–145.
- Chobanian AV, Barkris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, et al. Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertensio*, 2003; 42: 1206-52.
- Sachdeva PD, Patel BG, Bhatt MV. A study of incidence and management of pregnancy induced hypertension in central Gujarat, India. *Int J Univ Pharm Life Sci*, 2011; 1: 61-70.
- Nadkarni J, Bahl J, Parekh P. Perinatal outcome in pregnancy associated hypertension. *Indian Pediatr*, 2001; 38: 174-8.
- Mohan BS. Pregnancy induced hypertension and prior trophoblastic exposure. *J Obstet Gynecol Ind*, 2004; 54: 568-70.
- Prakash J, Pandey LK, Singh AK, Kar B. Hypertension in pregnancy: Hospital based study. *J Assoc Physicians India*, 2006; 54: 273-8.
- Bangal VB, Giri PA, Mahajan AS. Maternal and foetal outcome in pregnancy induced hypertension:

- A study from rural tertiary care teaching hospital in India. *Int J Biomed Res*, 2011; 2: 595-9.
17. Sayeed MA, Mahtab H, Khanam PA, Begum R, Banu A, Azad Khan AK. Diabetes and hypertension in pregnancy in a rural community of Bangladesh: A population-based study. *Diabet Med*, 2005; 22: 1267-71.
 18. Ganguly S, Begum A. Rate of caesarean operation and complications in hypertensive disorders of pregnancy. *ORION Med J.*, 2007; 27: 463-6.
 19. Parazzini F, Bortolus R, Chatenoud L, Restelli S, Ricci E, Marozio L, et al. Risk factors for pregnancy-induced hypertension in women at high risk for the condition. Italian Study of Aspirin in Pregnancy Group. *Epidemiology*, 1996; 7: 306-8.
 20. Owiredu WK, Ahenkorah L, Turpin CA, Amidu N, Laing EF. Putative risk factors of pregnancy-induced hypertension among Ghanaian pregnant women. *J Med Biomed Sci*, 2012; 1: 62-76.
 21. McKeever K. Pregnant rural women more at risk. *Am Soc Nephrol*, 2008; 8.
 22. Fang R, Dawson A, Lohsoonthorn V, Williams MA. Risk factors of early and late onset preeclampsia among Thai women. *Asian Biomed*, 2009; 3: 477-86.
 23. Tebeu PM, Foumane P, Mbu R, Fosso G, Biyaga PT, Fomulu JN. Risk factors for hypertensive disorders in pregnancy: A report from the maroua regional hospital, Cameroon. *J Reprod Infertil*, 2011; 12: 227-34.
 24. Matthys LA, Coppage KH, Lambers DS, Barton JR, Sibai BM. Delayed postpartum preclampsia: An experience of 151 cases. *Am J Obstet Gynecol*, 2004; 190: 1464-6 .
 25. Nirmalan P. Health Research at Fernandez Hospital. Chronic Hypertension in Pregnancy- Outcomes (Document on the internet) Fernandez Hospital-Hyderabad; 2012. Available from: <http://fernandezresearch.com/2012/12/16/chronic-hypertension-in-pregnancy-outcomes/> [Last accessed on 2014 March 10].
 26. Nisar N, Memon A, Sohoo NA, Ahmed M. Hypertensive disorders of pregnancy: Frequency, maternal and fetal outcomes. *Pak Armed Forces Med J*, 2010; 1: 113-8.