

Original Research

Prospective Evaluation Of Pregnancy Induced Hypertension And Neonatal Outcome: An Institutional Based Study

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Abstract:

Background: Hypertensive disorders are present in 3–10% of all pregnancies. They are among the main causes of maternal and perinatal morbidity and mortality. The present study was conducted to assess prevalence of pregnancy induced hypertension and to assess neonatal outcomes.

Materials & Methods: The present retrospective study was done using data from the patient record of pregnant women with hypertension and neonates admitted to the Neonatal Intensive Care Unit of the Hospital. An analysis was performed on 1200 birth records. Of the women, 120 were diagnosed with hypertension in their pregnancies. The data was collected from the medical record and statistical analysis was done using statistical software SPSS version 22. P-value less than 0.05 was considered statistically significant.

Results: The prevalence of hypertension among the pregnant women hospitalized was 10% (120/1200). Maximum women of age group 20-36 years had diastolic blood pressure ≥ 110 mmHg (32.5%) and diastolic blood pressure ≤ 110 mmHg (33.33%). Maximum women had cesarean had diastolic blood pressure ≥ 110 mmHg (30.83%) and diastolic blood pressure ≤ 110 mmHg (31.66%). Maximum women had term pregnancy had diastolic blood pressure ≥ 110 mmHg (39.16%) and diastolic blood pressure ≤ 110 mmHg (49.16%). 95.83% newborns were live born. Maximum newborns had weight ≥ 2500 grams (73.33%). APGAR at the 1st minute was ≥ 7 in 83.47% newborns. APGAR at the 5th minute ≥ 7 in 98.26% newborns. There was a statistical association between DBP and newborn weight. The group of women with DBP ≥ 110 mmHg presented a smaller mean newborn weight compared to the group with DBP ≤ 110 mmHg.

Conclusion: The study concluded that the prevalence of hypertension among the pregnant women hospitalized was 10% (120/1200). Maximum newborns were live born with weight ≥ 2500 grams. There was a statistical association between DBP and newborn weight. The group of women with DBP ≥ 110 mmHg presented a smaller mean newborn weight compared to the group with DBP ≤ 110 mmHg.

Keywords: Pregnancy Induced Hypertension, Neonatal Outcome, Diastolic Blood Pressure.

Introduction:

Pregnancy is a physiological phenomenon for most women. However, some develop problems during its evolution, putting both the mothers and the conceptus health at stake. Pregnancy-induced hypertension is one of the maternal diseases that causes the most detrimental effects to the maternal, fetal, and neonatal organisms.¹ Hypertension is defined as a sustained systolic BP ≥ 140 mmHg or diastolic BP ≥ 90 mmHg based on the average of at least two measurements, using the same arm.² Pregnancy-induced hypertension (PIH) was defined as new hypertension that appears at 20 weeks or more gestational age of pregnancy with or without proteinuria, which includes gestational hypertension, pre-eclampsia, and eclampsia.³⁻⁵ Pregnancy-induced hypertension (PIH) affects approximately 5–10% of pregnancies.⁶ PIH is associated with severe complications such as placental abruption, HELLP (hemolysis, elevated liver enzymes, and low platelet count) syndrome, preterm birth, intrauterine growth retardation, and even fetal or maternal death.⁷⁻¹⁰ The most common consequences associated with pregnancy induced hypertension are intra-uterine fetal growth retardation (IUGR), intrauterine fetal demise, prematurity and low birth weight. Pregnancy induced hypertension predisposes women to acute and chronic utero-placental insufficiency resulting in ante or intrapartum anoxia that may lead to fetal death, IUGR and preterm delivery.¹¹ Perinatal morbidity is increased due to

spontaneous preterm labour or iatrogenic preterm induction. Expectant management with temporizing treatment should be performed, when possible, to lengthen gestation which may be associated with enhanced perinatal survival.¹² The present study was conducted to assess prevalence of pregnancy induced hypertension and to assess neonatal outcomes.

Materials & Methods:

The present retrospective study was done using data from the patient record of pregnant women with hypertension and their association with the type of delivery included preterm infants, with gestational age (GA) between 24 and 33 weeks and 6 days, born alive in the hospital and admitted to the Neonatal Intensive Care Unit of the Hospital. Before the commencement of the study ethical approval was taken from the ethical committee of the institute. Since this study used patient records as the source for the data, patients' anonymity would be preserved. An analysis was performed on 1200 birth records. Of the women, 120 were diagnosed with hypertension in their pregnancies. Exclusion criteria were premature infants transferred directly from the delivery room to another service, as well as deaths found in the delivery room, twins, newborns from other services and patients with severe malformations, diabetics mothers. Hypertension was identified based on the definition by the Australian Society of the Study of Hypertension in Pregnancy¹³ and that of the Working Group Report on High Blood Pressure in Pregnancy¹⁴, which establish blood pressure levels > 140/90 mmHg or hypertension diagnosis marked on the record. The records were initially identified by referring to the birth book of the obstetric unit, which holds information about the hospital record, the notes on the pregnant women's blood pressure and the type of delivery. The data was collected from the medical record and statistical analysis was done using statistical software SPSS version 22. P-value less than 0.05 was considered statically significant.

Results:

The prevalence of hypertension among the pregnant women hospitalized was 10% (120/1200). Maximum women of age group 20-36 years had diastolic blood pressure ≥ 110 mmHg (32.5%) and diastolic blood pressure ≤ 110 mmHg (33.33%). Maximum women had cesarean had diastolic blood pressure ≥ 110 mmHg (30.83%) and diastolic blood pressure ≤ 110 mmHg (31.66%). Maximum women had term pregnancy had diastolic blood pressure ≥ 110 mmHg (39.16%) and diastolic blood pressure ≤ 110 mmHg (49.16%). p value was non-significant. 95.83% of newborns were live born. Maximum newborns had weight ≥ 2500 grams (73.33%). APGAR at the 1st minute was ≥ 7 in 83.47% newborns. APGAR at the 5th minute ≥ 7 in 98.26% newborns. There was a statistical association between DBP and newborn weight. The group of women with DBP ≥ 110 mmHg presented a smaller mean newborn weight compared to the group with DBP ≤ 110 mmHg.

Table 1: Age of mother, type of delivery and gestational age according to the levels of diastolic blood pressure

Variables	Diastolic blood pressure (mmHg)			p-value
	≥ 110 n(%)	≤ 110 n(%)	Total n(%)	
Age of mothers (years)				0.667
≤ 19	8(6.66%)	10(8.33%)	18(15%)	
20-36	39(32.5%)	40(33.33%)	79(65.83%)	
≥ 36	11(9.11%)	12(10%)	23(19.16%)	
Type of delivery				0.789
Cesarean	37(30.83%)	38(31.66%)	75(62.5%)	
Natural	15(12.5%)	17(14.16%)	32(26.66%)	
Forceps	6(5%)	7(5.83%)	13(10.83%)	
Gestational age				0.014
Pre-term	11(9.16%)	3(2.5%)	14(11.66%)	
Term	47(39.16%)	59(49.16%)	106(88.33%)	

Table 2: Newborn's conditions

Newborn's conditions	n(%)
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Vitality	
Live born	115(95.83%)
Still born	5(4.16%)
Weight (grams)	
≥2500	88(73.33%)
2500-1500	15(12.5%)
1500-1000	7(5.83%)
<1000	5(4.16%)
APGAR at the 1st minute(n=115)	
≥7	96(83.47%)
<7	19(16.52%)
APGAR at the 5th minute(n=115)	
≥7	113(98.26%)
<7	2(1.73%)

Table 3: Mean birth weight values(grams) according to the classification of diastolic blood pressure (DBP)

DBP	N	Birth weight Mean±SD	p-value
≥110mmHg	58	2814±885	0.002
≤110mmHg	62	3312±805	

Discussion

According to the Health Ministry, hypertension during pregnancy, depending on the severity level, is considered a risk factor, which, associated with individual characteristics, unfavorable socioeconomic conditions, certain obstetric histories and clinical problems could trigger harms to the maternal-fetal binomial.¹⁵

The prevalence of hypertension among the pregnant women hospitalized was 10% (120/1200). Maximum women of age group 20-36 years had diastolic blood pressure ≥ 110 mmHg (32.5%) and diastolic blood pressure ≤ 110 mmHg (33.33%). Maximum women had cesarean had diastolic blood pressure ≥ 110 mmHg (30.83%) and diastolic blood pressure ≤ 110 mmHg (31.66%). Maximum women had term pregnancy had diastolic blood pressure ≥ 110 mmHg (39.16%) and diastolic blood pressure ≤ 110 mmHg (49.16%). 95.83% newborns were live born. Maximum newborns had weight ≥ 2500 grams (73.33%). APGAR at the 1st minute was ≥ 7 in 83.47% newborns. APGAR at the 5th minute ≥ 7 in 98.26% newborns. There was a statistical association between DBP and newborn weight. The group of women with DBP ≥ 110 mmHg presented a smaller mean newborn weight compared to the group with DBP ≤ 110 mmHg.

The prevalence of hypertension found in the United States, where approximately 10% of the 75,000 deliveries occurred in Parkland Hospital were diagnosed with pregnancy-induced or aggravated hypertension.¹⁶ In Brazil, it was also found a 10.3% frequency in the Teaching Maternity of the Rio de Janeiro Federal University.¹⁷

Rocha de Moura MD et al (2021) assessed the impact of gestational hypertensive disorders on premature newborns below 34 weeks and to establish the main morbidities and mortality in the neonatal period and at 18 months. The study concluded that among the analyzed outcomes, arterial hypertension during pregnancy can increase the risk of low weight, small babies for gestational age (SGA), deaths in the neonatal period and enterocolitis, with no differences in weight and survival at 18 months of chronological age. Arterial hypertension presents a high risk of prematurity in the neonatal period, with no difference at 18 months of age.¹⁸

Razak A et al (2018) concluded that PIH was associated with reduced odds of mortality and ROP (all infants), but higher odds for BPD (<29 weeks' gestation).¹⁹

Habli M et al (2007) compared neonatal outcomes of pregnancies with preeclampsia or gestational hypertension with those of normotensive pregnancies that delivered at 35, 36, or 37 weeks of gestation separately. The results showed that as compared with normotensive pregnancies, hypertensive pregnancies that delivered at 35 and 36 weeks of gestation had higher rates of small for gestational age births (17.9% vs 1.7% [$P < .05$] and 33.3% vs 12.2% [$P < .01$], respectively) and neonatal intensive care unit admission (57.1% vs 34.5% [$P < .05$] and 33.3% vs 10.7% [$P < .001$]). The rate of neonatal intensive care unit admission (25.6% vs 8.7%; $P < .001$) and duration of neonatal stay (3.9 vs 2.0 days; $P < .001$) were greater in hypertensive pregnancies that delivered at 37 weeks of gestation. These differences were observed largely in women whose condition required labor induction, regardless of the severity of the hypertensive disease.²⁰

Conclusion

The study concluded that the prevalence of hypertension among the pregnant women hospitalized was 10% (120/1200). Maximum newborns were live born with weight ≥ 2500 grams. There was a statistical association between DBP and newborn weight. The group of women with DBP ≥ 110 mmHg presented a smaller mean newborn weight compared to the group with DBP ≤ 110 mmHg.

References

1. Chaim SR, Oliveira SM, Kimura AF. Pregnancy-induced hypertension and the neonatal outcome. *Acta Paulista de Enfermagem*. 2008;21:53-8.
2. Magee LA, von Dadelszen P, Peter V, William S, Matthews M. *The FIGO Textbook of Pregnancy Hypertension: An evidence-based guide to monitoring, prevention and management*. The Global Library of Women's Medicine, London. "Retrieved August 19,2017, from https://www.glowm.com/resource_type/resource/textbook/title/the-figo-textbook-of-pregnancy-hypertension/resource_doc/2768 "2016.
3. Zhang J, Zeisler J, Hatch MC, Berkowitz G. Epidemiology of pregnancy-induced hypertension. *Epidemiol Rev*. 1997;19(2):218–32
4. Xiong X, Fraser WD. Impact of pregnancy-induced hypertension on birthweight by gestational age. *Paediatr Perinat Epidemiol*. 2004;18(3):186–91.
5. Chen X-K, Wen SW, Smith G, Yang Q, Walker M. Pregnancy-induced hypertension and infant mortality: roles of birthweight centiles and gestational age. *BJOG Int J Obstet Gynaecol*. 2007;114(1):24–31.
6. Toohar, J. et al. All hypertensive disorders of pregnancy increase the risk of future cardiovascular disease. *Hypertension* 70, 798–803 (2017).
7. Sibai, B. M. Diagnosis and management of gestational hypertension and preeclampsia. *Obstet. Gynecol*. 102, 181–192 (2003).
8. Schutte, J. M., Schuitemaker, N. W., van Roosmalen, J., Steegers, E. A. & Committee, D. M. M. Substandard care in maternal mortality due to hypertensive disease in pregnancy in the Netherlands. *BJOG* 115, 732–736 (2008)
9. Bakker, R., Steegers, E. A., Hofman, A. & Jaddoe, V. W. Blood pressure in different gestational trimesters, fetal growth, and the risk of adverse birth outcomes: The generation R study. *Am. J. Epidemiol*. 174, 797–806 (2011).
10. ACOG Practice Bulletin No. 222. Gestational hypertension and preeclampsia. *Obstet. Gynecol*. 135, 1492–1495 (2020).
11. Nadkarni J, Bahl J, Parekh P. Perinatal outcome in pregnancy associated hypertension. *Indian Paediatrics*. 2001 Feb; 38(2):174-8.
12. Hassan M, Choudhury F, Begum M, Rahman H, Akhter S. Immediate Perinatal Outcome of Neonates with Maternal Hypertensive Disorders in Pregnancy. *J Nepal Paediatr Soc*. 2013;33(3):190-5.
13. Brown MA, Hague WM, Higgins J, Lowe S, McCowan L, Oats J, Peek MJ, Rowan JA, Walters BN; Australasian Society of the Study of Hypertension in Pregnancy. The detection, investigation and management of hypertension in pregnancy: full consensus statement. *Aust N Z J Obstet Gynaecol*. 2000; 40(2):139-55.
14. Working Group Report on High Blood Pressure in Pregnancy. National High Blood Pressure Education Program. Bethesda (MD): National Institutes of Health; 2000. (NIH Publication No.00-3029)
15. Brasil. Ministério da Saúde. Secretaria de Assistência à Saúde. Gestação de alto risco. 4TM ed. Brasília: Divisão Nacional de Saúde Materno-Infantil; 2000.
16. Cunningham FG, MacDonald PC, Gant NF, Leveno KJ, Gilstrap LC, Hankins GDV, Clark SL. Distúrbios hipertensivos na gravidez. In: Cunningham FG, MacDonald PC, Gant NF, Leveno KJ, Gilstrap LC, Hankins GDV, Clark SL. *Williams obstetrícia*. 20^ª ed. Rio de Janeiro: Guanabara Koogan; 2000. cap. 10, p. 607-52.
17. Oliveira CA, Lins CP, Sá RAM, Netto HC, Bornia RG, Silva NR, Amim Junior J. Síndromes hipertensivas da gestação e repercussões perinatais. *Rev Bras Saúde Matern Infant*. 2006; 6(1):93-8.
18. Rocha de Moura MD, Margotto PR, Nascimento Costa K, Carvalho Garbi Novaes MR. Hypertension induced by pregnancy and neonatal outcome: Results from a retrospective cohort study in preterm under 34 weeks. *PLoS One*. 2021 Aug 18;16(8):e0255783. doi: 10.1371/journal.pone.0255783. PMID: 34407091; PMCID: PMC8372928.
19. Razak A, Florendo-Chin A, Banfield L, Abdul Wahab MG, McDonald S, Shah PS, Mukerji A. Pregnancy-induced hypertension and neonatal outcomes: a systematic review and meta-analysis. *J Perinatol*. 2018 Jan;38(1):46-53. doi: 10.1038/jp.2017.162. Epub 2017 Nov 2. PMID: 29095432.

20. Habli M, Levine RJ, Qian C, Sibai B. Neonatal outcomes in pregnancies with preeclampsia or gestational hypertension and in normotensive pregnancies that delivered at 35, 36, or 37 weeks of gestation. *American journal of obstetrics and gynecology*. 2007 Oct 1;197(4):406-e1.