

Hypertension as a Risk Factor for Adverse Neonatal and Maternal Outcome

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Abstract

Introduction: During the period of pregnancy, many physical and social activities can become of great risk to the fetal and maternal outcome. Among the many physical ailments that have an effect on maternal and fetal outcome, hypertension and diabetes are the most common cause, and effects. During diabetes, maternal hypertension and gestational diabetes can occur, and can cause great changes to the outcome of pregnancy. The present study was conducted among all hypertension patients to see the different types of hypertension and their incidence rate among pregnant women, and their maternal and fetal outcomes at pregnancy. **Methods:** This descriptive cross-sectional study was conducted at the Department of Gynecology, Kushtia 250 bed General Hospital, Kushtia, Bangladesh. The study duration was 1 year, from January 2020 to January 2021. During this period, a total of 100 cases of hypertensive pregnancies visiting the study place were admitted following the inclusion and exclusion criteria. **Result:** Majority of the hypertensive mothers had been between the ages of 21-25 years, while mean birth weight was below normal range among the neonates. Moderate preeclampsia had the highest prevalence among the mothers, and anemia and nulliparity were observed in 67% and 44% respectively as risk factors among the participants. Adverse perinatal outcome had a significantly high prevalence among neonates of preeclampsia groups. **Conclusion:** The study observed higher incidence of preeclampsia among pregnant women, and adverse perinatal outcomes had significant rise among preeclampsia cases. Anemia was the most common risk factor for hypertension in the present study, followed by Nulliparity. Adverse maternal outcomes did not have a significant association with type of hypertension, but seizure and oliguria were more common among preeclampsia cases.

Keywords: Hypertension, Preeclampsia, Blood Pressure, Chronic.

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INTRODUCTION

Pregnancy hypertension complicates around 5-10% of pregnancies, causing maternal, fetal, and neonatal morbidity and mortality [1]. A systolic blood pressure (SBP) of 140 mmHg and/or a diastolic blood pressure (DBP) of 90 mmHg recorded on two different occasions is considered hypertension during pregnancy. During a normal pregnancy, BP gradually lowers in the first trimester due to a decrease in systemic vascular resistance. It hits a nadir at 22-24 weeks, then rises again from 28 weeks to preconception levels by 36 weeks [2]. Several hormonal, vascular, and metabolic variables have been proposed to explain hypertension disorders during pregnancy. Pregnancy hypertension has a deleterious impact on a woman's cardiovascular health later in life. According to a major population

survey, the prevalence of persistent hypertension during pregnancy has increased more than 13-fold during the last four decades [3]. According to the American College of Obstetricians and Gynecologists (ACOG) standards, hypertension in pregnancy is classified into four types [4]. Chronic hypertension is defined as hypertension discovered before conception or prior to 20 weeks' gestation and persisting for more than 42 days postpartum, whereas gestational hypertension is defined as hypertension discovered after 20 weeks' gestation and usually resolving within 2 months of childbirth. Preeclampsia is diagnosed when prenatal hypertension is accompanied by proteinuria or severe end-organ dysfunction with or without proteinuria after 20 weeks of gestation or postpartum in a previously normotensive patient [5-8]. Eclampsia is described as the development of grand seizures in a preeclamptic

lady. Preeclampsia is predicted to impact 4.6% of all pregnancies worldwide [9]. It is a major maternal health issue worldwide, causing maternal and newborn severe morbidity and mortality, as well as significant contributions to fetal preterm and long-term cardiovascular disease (CVD) in the mother [10]. Pregnancy hypertension is also classed as severe or non-severe. Severe hypertension is defined as a blood pressure of 160-170/110 mmHg, while non-severe hypertension is defined as a blood pressure of 140-159/90-109 mmHg. As with all patients, precise blood pressure measurement is crucial. The maternal and fetal outcome can vary substantially depending on the severity of the condition. The current study sought to identify different types of hypertension among participants, as well as the maternal and fetal outcomes of such cases.

OBJECTIVE

General Objective

- To observe the incidence rate of different types of hypertension among pregnant mothers.
- To observe the maternal and fetal outcomes of hypertension during pregnancy.

METHODS

This descriptive cross-sectional study was conducted at the Department of Gynecology, Kushtia 250 bed General Hospital, Kushtia, Bangladesh. The study duration was 1 year, from January 2020 to January 2021. During this period, a total of 100 cases of hypertensive pregnancies visiting the study place were admitted following the inclusion and exclusion criteria. All patients were informed regarding the objective of the study, and data was collected after ensuring confidentiality of the patients. Informed written consent was obtained from the participants, and ethical approval regarding the study was also collected from the ethical review committee of the study hospital. Data was

collected in a pre-made questionnaire, and all collected data was analyzed using the SPSS software.

Inclusion Criteria

- Any type of hypertensive women
- Gestational age >34 weeks
- Both nulliparous and Primipara women
- Patients who had given consent to participate in the study.

Exclusion Criteria

- Mentally ill.
- Unable to answer the criteria question.
- Exclude those affected with other chronic diseases etc.

RESULTS

Table 1: Distribution of the participants by maternal age

Maternal Age	n	%
21-25	47	47%
26-30	33	33%
31-35	20	20%

Among the participants, 47% had been between the ages of 21-25 years, 33% had been from the age group of 26-30 years, while 20% had been from the oldest age group of 31-35 years.

Table 2: Mean \pm SD birth characteristics of the participants

Mean Birth characteristics	Mean \pm SD
Birth weight in kg	2.48 \pm 0.65
Birth Height in cm	47.31 \pm 2.50
Gestational age in weeks	37.37 \pm 2.25

Mean birth weight of the neonates was 2.48 kg, mean height was 47.31 cm and gestational age was 37.37 weeks.

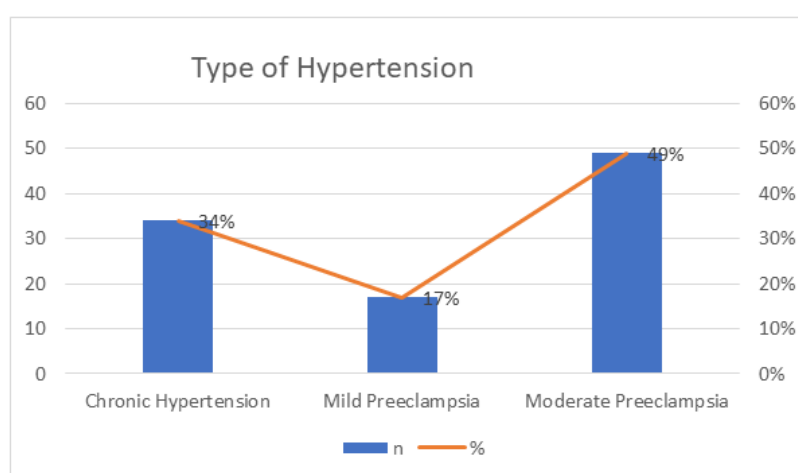


Figure 1: Distribution of the participants by type of hypertension

Among the participants, 34% had chronic hypertension, 17% had mild preeclampsia, and 49% had moderate preeclampsia.

Table 3: Distribution of participants by maternal risk factors

Maternal Risk Factors	n	%
Overweight	24	24%
Obesity	15	15%
Diabetes	18	18%
Nulliparous	44	44%
Proteinuria	39	39%
Anemia	67	67%

67% of the participants of the present study had anemia, while 4% had been nulliparous, 39% had

proteinuria, 24% had been overweight, 15% had been obese, and 18% had diabetes.

Table 4: Distribution of participants by fetal outcome at different types of hypertension

Perinatal Outcome	Chronic Hypertension (n=34)		Mild preeclampsia (n=17)		Moderate Preeclampsia (n=49)		P-Value
	n	%	n	%	n	%	
Low Birth Weight	8	23.53%	11	64.71%	34	69.39%	<0.001
Intrauterine growth restriction	2	5.88%	1	5.88%	13	26.53%	<0.001
Need For NICU	1	2.94%	3	17.65%	9	18.37%	<0.005
APGAR <7 at 1 minute	1	2.94%	4	23.53%	12	24.49%	<0.005
Need for Resuscitation	2	5.88%	3	17.65%	11	22.45%	<0.005

In neonatal outcomes among the 34 chronic hypertension patients, 23.53% had low birth weight, 5.88% had intrauterine growth restriction, and another 5.88% had need for resuscitation. 1 patient had APGAR score of <7 at 1 minute, and another 1 had need for NICU admission. Among the 17 mild preeclampsia patients, 64.71% had low birth weight, 23.53% had APGAR score of <7 at 1 minute, and 17.65% each had

need for resuscitation and NICU. Among the 49 moderate preeclampsia cases, 69.39% of neonates had been of low birth weight, 26.53% had intrauterine growth restriction, 24.49% had <7 APGAR score at 1 minute, 22.45% had needed resuscitation, and 18.37% had needed NICU admission. There were significant differences between the perinatal outcomes according to the mother's hypertension status.

Table 5: Distribution of the participants by maternal outcomes at different types of hypertension

Maternal Outcome	Chronic Hypertension (n=34)		Mild preeclampsia (n=17)		Moderate Preeclampsia (n=49)	
	n	%	n	%	n	%
Cesarean Section	13	38.24%	7	41.18%	23	46.94%
Placental Detachment	5	14.71%	1	5.88%	3	6.12%
Seizure	1	2.94%	2	11.76%	4	8.16%
Oliguria	0	0.00%	1	5.88%	2	4.08%

In regards to maternal outcome, cesarean section was done for 38.24% of the chronic hypertension patients, 41.18% of mild hypertension cases and 46.94% of moderate hypertension cases. Placental detachment had a higher frequency among those of chronic hypertension group. Seizure was highest among mild preeclampsia cases.

DISCUSSION

The present study was conducted with a focus on the different types of hypertension among pregnant women and the outcome of such pregnancies. By design, the present study had a total 100 hypertensive pregnancy case as the sample size. Among the mothers, 47% had been between the ages of 21-25 years, while

33% had been between the ages of 26-30 years, and the remaining 20% had been between the ages of 31-35 years. This high prevalence of pregnancy cases among the present study population is not an uncommon sight for Bangladesh, as many women get married early, and have children early as well, due to various factors including social pressure [11-13]. Mean birth weight of the neonates was 2.48 ± 0.65 kg, which was lower compared to the WHO guidelines of baby weight [14]. Mean birth weight, however, was within the normal range. Among the participating mothers, majority (49%) had moderate preeclampsia, while and 17% had mild preeclampsia. The remaining 34% had chronic hypertension. This high prevalence of preeclampsia was not in line with the findings of other studies, as many

studies have observed that preeclampsia and eclampsia have a significant higher incidence compared to chronic hypertension among pregnant women [15-19]. Various factors, both pregnancy related and unrelated, have an influence on this pregnancy rate. The maternal risk factors most commonly observed among our study participants were anemia, nulliparity, proteinuria and overweight and obesity. 67% of the participants had anemia in the present study population. Anemia alone is a significant risk factor for various cardiovascular diseases, including hypertension [20]. Many studies have found direct link between anemia and hypertension, both in pregnant and non-pregnant patients [21, 22]. 44% of the present study participants had been nulliparous, which was understandable given the young age of majority of the patients. Nulliparity has also been recognized as a risk factor for hypertension in multiple studies, which supports the findings of our study [23-25]. Nulliparity and obesity have been recognized as the biggest risk factors for preeclampsia [26, 27]. Among the present study participants, 15% had been obese, while 24% had been overweight. The incidence of obesity was low among our study participants compared to other studies [28-30]. Perinatal outcome of the participants was divided by their mothers type of hypertension. It was observed that low birth weight had a higher prevalence among mild and moderate preeclampsia cases compared to chronic hypertension patients, which was statistically significant. Intrauterine growth restriction had similar incidence rate in both chronic hypertension patients and mild preeclampsia patients, but had a much higher incidence rate moderate preeclampsia cases. Only 1 neonate of the chronic hypertension group needed NICU care, compared to 17.65% of mild preeclampsia and 18.37% of moderate preeclampsia cases. Overall, perinatal adverse outcomes had a much higher frequency among mild and moderate preeclampsia cases, compared to those with chronic hypertension. However, maternal adverse outcomes did not have such clear prevalence on any one type of hypertension cases, but seizure had higher frequency among preeclampsia women, and oliguria was not observed in any of the chronic hypertension patients of the present study.

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

The study observed higher incidence of preeclampsia among pregnant women, and adverse perinatal outcomes had significant rise among preeclampsia cases. Anemia was the most common risk factor for hypertension in the present study, followed by Nulliparity. Adverse maternal outcomes did not have a significant association with type of hypertension, but seizure and oliguria were more common among preeclampsia cases.

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Conflict of interest: None declared.

Ethical approval: The study was approved by the Institutional Ethics Committee.

REFERENCES

- 1 Regitz-Zagrosek, V. (2018). "2018 ESC Guidelines for the management of cardiovascular diseases during pregnancy: The Task Force for the Management of Cardiovascular Diseases during Pregnancy of the European Society of Cardiology (ESC)," *European Heart Journal*, 39(34), pp. 3165–3241. doi: 10.1093/eurheartj/ehy340.
- 2 Shen, M., Tan, H., Zhou, S., Smith, G. N., Walker, M. C., & Wen, S. W. (2017). Trajectory of blood pressure change during pregnancy and the role of pre-gravid blood pressure: a functional data analysis approach. *Scientific reports*, 7(1), 1-6. doi:10.1038/s41598-017-06606-0.
- 3 Ananth, C. V., Duzyj, C. M., Yadava, S., Schwebel, M., Tita, A. T., & Joseph, K. S. (2019). Changes in the prevalence of chronic hypertension in pregnancy, United States, 1970 to 2010. *Hypertension*, 74(5), 1089-1095. doi:10.1161/HYPERTENSIONAHA.119.12968.
- 4 Roberts, J. M., August, P. A., Bakris, G., Barton, J. R., Bernstein, I. M., Druzin, M., ... & Ngaiza, K. (2013). Hypertension in pregnancy: executive summary. *Obstetrics and Gynecology*, 122(5), 1122-1131. doi:10.1097/01.aog.0000437382.03963.88.
- 5 American College of Obstetricians and Gynecologists. (2020). Gestational hypertension and preeclampsia: ACOG Practice Bulletin, number 222. *Obstet Gynecol*, 135(6), pp.e237-e260.
- 6 Payne, B., Magee, L. A., & von Dadelszen, P. (2011). Assessment, surveillance and prognosis in pre-eclampsia. *Best practice & research Clinical obstetrics & gynaecology*, 25(4), 449-462.
- 7 Visintin, C., Muggleston, M. A., Almerie, M. Q., Nherera, L. M., James, D., Walkinshaw, S., & Guideline Development Group. (2011). Management of Hypertensive Disorders During Pregnancy: Summary of NICE Guidance. *Obstetric Anesthesia Digest*, 31(3), p.143.
- 8 Magee, L. A., Pels, A., Helewa, M., Rey, E., von Dadelszen, P., Audibert, F., ... & Sebbag, I. (2014). Diagnosis, evaluation, and management of the hypertensive disorders of pregnancy: executive summary. *Journal of Obstetrics and Gynaecology Canada*, 36(5), 416-438.
- 9 Abalos, E., Cuesta, C., Grosso, A. L., Chou, D., & Say, L. (2013). Global and regional estimates of preeclampsia and eclampsia: a systematic review. *European journal of obstetrics & gynecology and reproductive biology*, 170(1), 1-7.

- 10 Kuklina, E. V., Ayala, C., & Callaghan, W. M. (2009). Hypertensive disorders and severe obstetric morbidity in the United States. *Obstetrics & Gynecology*, 113(6), 1299-1306.
- 11 Sayem, A. M., & Nury, A. T. (2011). Factors associated with teenage marital pregnancy among Bangladeshi women. *Reproductive health*, 8(1), 1-6.
- 12 Story, W. T., Burgard, S. A., Lori, J. R., Taleb, F., Ali, N. A., & Hoque, D. M. (2012). Husbands' involvement in delivery care utilization in rural Bangladesh: A qualitative study. *BMC pregnancy and childbirth*, 12(1), 1-12.
- 13 Shahabuddin, A., Nöstlinger, C., Delvaux, T., Sarker, M., Delamou, A., Bardají, A., ... & De Brouwere, V. (2017). Exploring maternal health care-seeking behavior of married adolescent girls in Bangladesh: a social-ecological approach. *PloS one*, 12(1), e0169109.
- 14 MaryAnn De Pietro CRT. Average baby weight: Chart and development [Internet]. Medicalnewstoday.com. 2021 [cited 2022 Nov 25]. Available from: <https://www.medicalnewstoday.com/articles/325630>
- 15 Sibai, B. M., El-Nazer, A., & Gonzalez-Ruiz, A. (1986). Severe preeclampsia-eclampsia in young primigravid women: subsequent pregnancy outcome and remote prognosis. *American journal of obstetrics and gynecology*, 155(5), 1011-1016.
- 16 de Vries, M. J., Dekker, G. A., & Schoemaker, J. (1998). Higher risk of preeclampsia in the polycystic ovary syndrome: a case control study. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 76(1), 91-95.
- 17 Sibai, B. M., Caritis, S., & Hauth, J. (2003). National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. What we have learned about preeclampsia. In *Seminars in perinatology*, (Vol. 27, No. 3, pp. 239-246). WB Saunders.
- 18 Marín, R., Gorostidi, M., Portal, C. G., Sánchez, M., Sánchez, E., & Alvarez, J. (2000). Long-term prognosis of hypertension in pregnancy. *Hypertension in pregnancy*, 19(2), 199-209.
- 19 Bramham, K., Parnell, B., Nelson-Piercy, C., Seed, P. T., Poston, L., & Chappell, L. C. (2014). Chronic hypertension and pregnancy outcomes: systematic review and meta-analysis. *Bmj*, 348.
- 20 Kim-Mitsuyama, S., Soejima, H., Yasuda, O., Node, K., Jinnouchi, H., Yamamoto, E., ... & Matsui, K. (2019). Anemia is an independent risk factor for cardiovascular and renal events in hypertensive outpatients with well-controlled blood pressure: a subgroup analysis of the ATTEMPT-CVD randomized trial. *Hypertension research*, 42(6), 883-891.
- 21 Chen, C., Grewal, J., Betran, A. P., Vogel, J. P., Souza, J. P., & Zhang, J. (2018). Severe anemia, sickle cell disease, and thalassemia as risk factors for hypertensive disorders in pregnancy in developing countries. *Pregnancy Hypertension*, 13, 141-147.
- 22 Yu, C. W., Waisberg, E., Kwok, J. M., Micieli, J. A., Fraser, C., & Mollan, S. (2022). Anemia and idiopathic intracranial hypertension: a systematic review and meta-analysis. *Journal of Neuro-Ophthalmology*, 42(1), e78-e86.
- 23 Dalmáz, C. A., dos Santos, K. G., Botton, M. R., & Roisenberg, I. (2011). Risk factors for hypertensive disorders of pregnancy in southern Brazil. *Revista da Associação Médica Brasileira (English Edition)*, 57(6), 678-682.
- 24 Jacobs, D. J., Vreeburg, S. A., Dekker, G. A., Heard, A. R., Priest, K. R., & Chan, A. (2003). Risk factors for hypertension during pregnancy in South Australia. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 43(6), 421-428.
- 25 Tebeu, P. M., Foumane, P., Mbu, R., Fosso, G., Biyaga, P. T., & Fomulu, J. N. (2011). Risk factors for hypertensive disorders in pregnancy: a report from the maroua regional hospital, cameroon. *Journal of reproduction & infertility*, 12(3), 227.
- 26 Myers, J. E. (2017). What are the metabolic precursors which increase the risk of pre-eclampsia and how could these be investigated further. *Placenta*, 60, 110-114.
- 27 Bartsch, E., Medcalf, K. E., Park, A. L., & Ray, J. G. (2016). Clinical risk factors for pre-eclampsia determined in early pregnancy: systematic review and meta-analysis of large cohort studies. *Bmj*, 353.
- 28 Sirimi, N., & Goulis, D. G. (2010). Obesity in pregnancy. *Hormones*, 9(4), 299-306.
- 29 Nguyen, T., & Lau, D. C. (2012). The obesity epidemic and its impact on hypertension. *Canadian Journal of Cardiology*, 28(3), 326-333.
- 30 Aneja, A., El-Atat, F., McFarlane, S. I., & Sowers, J. R. (2004). Hypertension and obesity. *Recent progress in hormone research*, 59(1), 169-205.