

ORIGINAL ARTICLE

Prevalence, Risk Factors, and Fetal and Maternal Outcomes of Hypertensive Disorders of Pregnancy: A Retrospective Study in Qazi Hussain Ahmed Medical Complex, Nowshera

JAVERIA SALEEM¹, SHAHZADI NEELUM², SUMAYYA³, NOOR UL AMINA⁴, SALMA NAZ⁵, YASMEEN FAZAL⁶

¹Senior Registrar, Qazi Hussain Ahmed Medical Complex, Nowshera.

²Chair person Gynae Department, Qazi Hussain Ahmed Medical Complex, Nowshera.

³Assistant Professor, Qazi Hussain Ahmed Medical Complex, Nowshera.

⁴Senior Registrar, Qazi Hussain Ahmed Medical Complex, Nowshera.

⁵Trainee Medical Officer, Qazi Hussain Ahmed Medical Complex, Nowshera.

⁶Trainee Medical Officer, Qazi Hussain Ahmed Medical Complex, Nowshera.

Corresponding author: Shahzadi Neelum, Email: drshahzadi_neelum@yahoo.com, Cell: +92 333 9164216

ABSTRACT:

Objectives: To determine the prevalence, risk factors with maternal and fetal outcomes of hypertension in pregnancy.

Type of Study: Retrospective cross-sectional study.

Place of Study: Gynae A ward, Qazi Hussain Ahmed Medical Complex, Nowshera.

Duration of Study: 1 year from 1st Jan, 2019 to 31st Dec, 2019.

Methodology: 552 patients who had hypertensive disorders in pregnancy were recruited. Self-administered and structured questionnaire was used for data collection. The risk factors in patients and the fetomaternal outcomes were manually extracted from the history sheets and evaluated. SPSS version 22.0 was used for data analysis.

Results: The prevalence of hypertensive disorders in pregnancy was 13.9% in this study. Pregnancy induced hypertension was the most frequent hypertensive disorder with a prevalence of 57.97%. 61% of the total hypertensive patients had no antenatal booking making it the most common risk factors in pregnant hypertensive patients. 38% of patients had high blood pressure in previous pregnancies as well. 56.5% of patients admitted had normal vaginal delivery, 4.5% of patients had instrumental delivery and 39% had lower segment caesarean section. 17.75% of the total patients developed maternal complications and among them the most frequent maternal complication was post-partum hemorrhage (7.4%). 49.3% newborns developed neonatal complications where the most common neonatal complication was preterm deliveries (21.9%).

Conclusion: The prevalence of hypertensive disorders was relatively high in our cohort. However, to reduce the fetomaternal morbidities and mortalities, awareness regarding hypertensive disorders should be increased at the community and hospital level and screening of this disorder should be proposed at early gestation.

Keywords: Hypertension, Pregnancy induced hypertension, Pre-eclampsia, Eclampsia, maternal complications, fetal complications.

INTRODUCTION

Every hour, 3 women die in Pakistan due to pregnancy and childbirth related morbidities¹. Pregnancy related hypertensive disorders are frequently experienced all over the world having a prevalence of 8-10% of all pregnancies^{2,3}. They are observed to be the striking cause of adverse maternal and fetal outcomes⁴. In UK, hypertensive disorders in pregnancy are considered as 2nd largest cause of both direct maternal death and perinatal loss⁵. Hypertension in pregnancy is defined as systolic blood pressure of >140 mmHg and diastolic blood pressure of >90 mmHg⁶. It includes a wide spectrum of diseases ranging from slightly raised blood pressure to multiorgan dysfunction. RCOG has classified the pregnancy related disorders into 4 categories; pregnancy induced hypertension, pre-eclampsia, chronic hypertension and chronic hypertension with superimposed pre-eclampsia. The estimated prevalence of pregnancy induced hypertension is 1.8-4.4% while that of pre-eclampsia is 0.2-9.2%⁷. Pre-eclampsia may complicate into eclampsia and HELLP (hemolysis, elevated liver enzymes, low platelets) if left untreated and can also give rise to severe multisystem dysfunctions including cerebral hemorrhage, hepatic and respiratory dysfunction⁸. The development of strategies to

prevent and treat the disorder has been challenging due to incomplete understanding of the underlying pathology, therefore, the prevalence of hypertensive disorders in pregnancy varies by region and health care facility type⁹.

Literature has figured out various risk factors for hypertensive disorders in pregnancy. The risk factors include obesity, personal and family history of hypertension, any cardiac disease, multiple pregnancies, antiphospholipid syndrome, etc.¹⁰⁻¹². Pre-eclampsia is more common at extreme ages and the risk is increased further with IVF treatment particularly with donor sperm. Identifying women at risk will allow increased surveillance and use of prophylactic therapies can be considered. When these high-risk pregnancies were followed till term 22% pregnancies resulted in fetal and maternal complications¹³. The risk of morbidities in the newborns is proportional to the severity of hypertensive disorders in pregnancy e.g. the chances of pre-term deliveries were less in normotensive patients (7.2%), higher in mothers with pregnancy induced hypertension (12.5%) and highest in mothers with pre-eclampsia¹⁴. Although a lot of studies have been done on this topic but still enough data is not available for Pakistan especially in rural areas. My study aims to assess the prevalence, risk factors of hypertensive disorders of pregnancy and the resulting maternal and neonatal

outcomes. The final result of this study will highlight the need for proper awareness campaigns regarding this serious issue.

METHODOLOGY

A retrospective study was conducted at Qazi Hussain Ahmed Medical Complex from 1st January, 2021 till 31st December, 2021. Qazi Hussain Ahmed is a teaching and tertiary health care hospital located in the city of Nowshera. We started our study after taking consent from institutional review board of Qazi Hussain Ahmed Medical Complex. Patients were stratified in 4 groups according to the RCOG guidelines i.e pregnancy induced hypertension, pre-eclampsia, chronic hypertension and chronic hypertension with superimposed pre-eclampsia. All the patients diagnosed with at least one pregnancy related hypertensive disorders in our hospital in the pre-defined time period were eligible for inclusion in the study. Those patients who refused to admit in gynae department and were treated by health professionals in outpatient department were excluded from the study. Data was manually extracted and recorded on a structurally designed proforma. We recorded patient's demographic characteristics, gravidity, parity, gestational age, blood pressure and presenting complaints by reviewing the history sheets of our ward admission charts. Risk-factors during the antenatal period like history of hypertension in previous pregnancy, associated diabetes, family history of hypertension, history of miscarriages and extremes of age was also retrieved from the charts and recorded on the proforma. Determinants of maternal morbidity and mortality included abruption, eclampsia, postpartum hemorrhage, prolonged hospital stay, ICU admission and maternal death respectively. Determinants of fetal outcomes were set down in terms of

apgar score at 5 minutes, intra-uterine growth retardation, pre-maturity, meconium aspiration syndrome, respiratory distress syndrome, low birth weight, nursery admission and fetal expiry. The values of categorical variables were reported as frequencies and absolute numbers. Data was analyzed on IBM SPSS statistics for windows version 22.0

RESULTS

Total 3960 patients were delivered in the year 2019 in our hospital from 1st January, 2019 till 31st December, 2019. Among these patients, 552 were having hypertensive disorders of pregnancy, making a prevalence of 13.9%. Pregnancy induced hypertension was found to be the most prevalent hypertensive disorder (57.97%) f/b pre-eclampsia (30.9%), eclampsia (4.1%) and chronic hypertension (4.1%). Chronic hypertension with superimposed pre-eclampsia was the least prevalent (2.7%) among all the hypertensive disorders of pregnancy. The results are shown in table-I. The mean age of patients was 30 +/- 5 years and the average parity was found to be 3. 194 women (35%) were primigravida, 262 women (47%) were multigravida and 96 women (17%) were grand multigravida as seen in table-II.

Table 1:

S.no	Hypertensive disorders	Frequency	Percentage
1	Pregnancy induced hypertension	320	57.97%
2	Pre-eclampsia	171	30.97%
3	Eclampsia	23	4.16%
4	Chronic hypertension	23	4.16%
5	Chronic hypertension with super-imposed pre-eclampsia	15	2.71%
	Total:	552	100%

Table 2:

Type	Pih	Pre-eclampsia	Eclampsia	Chronic Hypertension	Chronic hypertension+pre-eclampsia	Total
Primigravida	126	54	10	4	0	194 (35.1%)
Multi gravida	151	79	10	15	7	262 (47.5%)
Grand multigravida	43	38	3	4	8	96 (17.4%)
Total	320	171	23	23	15	552 (100%)

Table 3:

RISK FACTORS	PIH	PE	ECLAMPSIA	C-HTN	C-HTN +PE	TOTAL
No ante-natal booking	181	115	18	14	9	337 (61%)
Previous history of HTN	91	77	9	21	13	211 (38.2%)
Family history	91	78	10	18	11	208 (37.6%)
Associated diabetes	12	6	0	4	2	24 (4.3%)
Abortions	71	47	4	6	5	133 (24.1%)
Age < 20 years	47	25	10	3	0	85 (15.4)
Age >35 years	55	28	4	12	6	105 (19.0%)
Chronic renal disorders	0	0	0	0	1	1 (0.18%)

337 women (61%) of the total 552 hypertensive patients had not done antenatal booking in any hospital concluding it to be an important risk factor contributing in the maternal and fetal adverse outcomes. 38% of pregnant women had history of raised blood pressure in the previous pregnancies as well, making it the second most common risk factor in our study. Extremes of age also showed as a contributing factor in this study. 10 out of 23 women (43%)

having eclampsia were <20 years of age and 55 out of 320 women (17%) having pregnancy induced hypertension were >35 years of age concluding that women with gestational hypertension were older and those with eclampsia were mostly of very young age. Diabetes was also found to be associated with hypertension in pregnancy. 24 patients (4.3%) in our study who were suffering from diabetes had also hypertension during

pregnancy. 133 hypertensive patients (24%) had previous history of abortions, assuming it to be a significant risk factor in pregnant patients. The frequency of the risk factors is shown in table-III.

Among the 552 women, 547 (99%) delivered after the age of viability, 5 women (0.9%) could not reach the age of viability and had missed abortions. These 5 women had

chronic hypertension. Out of 547 women, 312 women (56.5%) had normal vaginal delivery and 25 women (4.5%) had instrumental vaginal delivery. 150 women (27%) had undergone cesarean section in emergency and 60 women (10.8%)

had elective LSC/section. The percentages of mode of delivery can be seen in table-IV.

Table 4:

Mode of Delivery	Pih	Pre-eclampsia	Chronic Htn	Chronic htn + pe	Eclampsia	Total
Nvd	171	106	13	9	13	312 (56.5%)
Instrumental delivery	21	4	0	0	0	25 (4.5%)
Elective c/section	47	12	1	0	0	60 (10.8%)
Emergency C/section	81	49	4	6	10	150 (27%)
E&c after Misoprostol Protocol	0	0	5	0	0	5 (0.9%)

Among 552 women 454 (82.2%) were having no complications. 98 women (17.7%) developed maternal complications. Among women who developed one or more complications during antenatal, intrapartum or postnatal period, postpartum hemorrhage was the most frequent one (41/552; 7.4%). After post-partum hemorrhage, ICU

admissions were found more frequent (39/552; 7%) and most of the women who were admitted in ICU had eclamptic fits (19/23; 82.6%). All the details of maternal complications are shown in the table-V. There was no maternal mortality during the study period.

Table 5:

Pregnancy related HTN Disorders	MATERNAL COMPLICATIONS									
	HELLP	Placental abruption	PPH	ICU admission	DIC	ARF	Pull. edema	CVA	Mortality	No Complication
PIH	1	4	20	4	0	0	0	0	0	291 (52.7%)
Pre-eclampsia	2	6	12	15	1	0	1	0	0	134 (24.2%)
Chronic HTN	0	0	1	0	0	0	0	1	0	21 (3.8%)
Chronic HTN + Superimposed PE	0	2	3	2	0	0	0	0	0	8 (1.4%)
Eclampsia	0	0	5	18	0	0	0	0	0	0
TOTAL	3 (0.54%)	12 (2.1%)	41 (7.4%)	39 (7%)	1 (0.18%)	0	1 (0.18%)	1 (0.18%)	0	454 (82.2%)

Table 6:

Pregnancy related HTN disorders	Neonatal complications									
	Decrease A/S	IUGR	Pre-term	IUD	Intra-partum death	LBW	MAS	RDS	NND	No Complications
PIH	26	8	47	14	5	0	26	2	9	183 (33.1%)
Pre -eclampsia	12	8	49	11	0	2	8	2	4	75 (13.5%)
Chronic HTN	1	0	9	0	0	0	0	0	0	13 (2.3%)
Chronic HTN+ PE	2	2	7	0	0	1	0	1	0	2 (0.36%)
Eclampsia	3	0	9	0	0	0	0	3	1	7 (1.26%)
TOTAL	44 (7.9%)	18 (3.2%)	121 (21.9%)	25 (4.5%)	5 (0.9%)	3 (0.5%)	34 (6.1%)	8 (1.4%)	14 (2.5%)	280 (50.7%)

When neonatal outcomes were evaluated 280 newborns (50.7%) were born without complications and 49.3% newborns developed complications. In this study, 5 stillbirths, 25 intra uterine deaths and 14 neonatal deaths were observed. Among the remaining 505 alive newborns, 121 (21.9%) were preterm, reporting it to be the most common neonatal complication. 44 (7.9%) neonates were born with decrease apgar score which was considered as the second common neonatal complication in our study. 34 babies out of total had meconium aspiration

syndrome, 18 had intra uterine growth retardation, 3 had low birthweight and 8 had respiratory distress syndrome. All the details are shown in the table-VI.

DISCUSSION

The prevalence of hypertensive disorders, risk factors related to them and the resulted feto-maternal morbidities and mortalities were estimated in a group of 552 mothers at Qazi Hussain Ahmed Medical Complex. The overall prevalence of hypertensive disorders in this study was

13.9%. This is slightly raised than the previous estimates of prevalence of hypertensive disorders in a study done in tertiary care hospital of Sukhar, Pakistan that showed prevalence of 5.56%¹⁵. Another study in the tertiary care hospital of Saudi Arabia showed a prevalence of 2.24%¹⁶. In our study pregnancy induced hypertension was found to be the most frequent hypertensive disorder (57.9%) f/b pre-eclampsia and chronic hypertension with super-imposed eclampsia had the least prevalence (2.7%) where as another study in Saudi Arabia signifies pre-eclampsia to be a major contributor in prevalence of gestational hypertension (54.9%)¹⁶. Hypertensive disorders were found to be in high ratio in multigravida than in primigravida patient in this study. The results were parallel to a study done in Saudi Arabia in 2017 showing that 56.9% of patients were multigravida¹⁶. Pre-eclampsia was concluded to be more frequent in multigravida. The result disagrees with the result of another prospective randomized study done in India that highlighted that pre-eclampsia was more common in Primigravida patients¹⁷.

In this study mostly, patients were middle aged 30 years (+/- 5 years) which was same as seen in studies in Turkey¹⁸ and UAE¹⁹ where with the increase of maternal age the frequency of hypertensive disorders was found to increase²⁰. Previously reported risk factors that increased the likelihood of hypertension in pregnancy included history of increased blood pressure in previous pregnancies, family history of raised blood pressure, associated diabetes, previous abortion history, multiple gestation, extremes of age, race, increased BMI and smoking. Due to certain limitations that were likely to come across in retrospective study, certain risk factors could not be retrieved from the record files but still among all the risk factors "no antenatal visit or previous record" has a major contributing role, accounting for 61 % of patients. 38.2% of patients had a history of increased blood pressure in previous pregnancies and 37.6% patients had a positive family history. 15% of patients with pregnancy induced hypertension had age > 35 years. Almost similar results were found in a study done in Saudi Arabia in 2017 showing that frequency of pregnancy induced hypertension increases with the increase in age¹⁶. 24 out of 552 women (4.3%) had associated diabetes. A significant association of diabetes and occurrence of gestational hypertension has been reported in the past in multiple studies^{21,22}. Among 552 women, 98 women (7.75%) developed maternal complications and among all the complications post-partum hemorrhage was on the top giving a percentage of 7.4%. ICU admissions were second most common maternal morbidity (7%). The results had similarity to a study done in 2019 showing that placental abruption and postpartum hemorrhage were the most common complications in pregnant women with pre-eclampsia and eclampsia¹⁵. In our study 12 patients had placental abruption (2.2%) which is somehow relatable to a study conducted in India reporting placental abruption as a concerning issue²³. 82.2% of women had no maternal complications. The percentage is a bit low as compare to other studies. A study done in Saudi Arabia reported that 96% of hypertensive pregnant women had no maternal complications¹⁶.

In this study most of the patients had normal vaginal delivery (56.7%). 27% of patients had undergone LS C/sec

in emergency and 10.8% had elective LS C/sec. The results were found opposite to the result of another study reporting that mostly patient (79%) were operated through emergency LS C/section¹⁶.

Pregnancy related hypertensive disorders are known to affect the outcomes of babies as well. In this study 49.3% babies developed neonatal complications and 50.7% of babies delivered as healthy with no complication. 21.9% babies were born pre-term in our study concluding it to be the most common neonatal morbidity. Pre-maturity was considered as a common neonatal complication in patients having hypertension in pregnancy in another study done in Tehran²⁴. 7.9% of babies in our study were delivered with low apgar score, but still most of the babies (92%) delivered with a satisfactory apgar score. A similar study showed that 66% of babies born to hypertensive mothers were having good Apgar score¹⁹. 3.2% babies in our study had growth retardation, 4.5% of babies died in-utero and 2.5% of babies had early neonatal death. The results were similar to a study done in China that showed that gestational hypertension was associated with increased risk of intra uterine deaths and intra uterine growth retardation in babies²⁵.

CONCLUSION

The prevalence of hypertensive disorders of pregnancy at Qazi Hussain Ahmed Complex is 13.9% which was relatively higher than the previous studies done in different countries. The most prevalent hypertensive disorder was pregnancy induced hypertension f/b pre-eclampsia. Most of the patients were delivered vaginally. The most frequent maternal complication was postpartum hemorrhage and preterm deliveries was the most prevalent neonatal complication resulting from the hypertensive disorders. Awareness program should be introduced at the community level to fight against the hypertensive disorders in pregnancy. Early screening and close monitoring of pregnant women having risk factors for hypertension is required to reduce the fetomaternal morbidity and mortality.

REFERENCES

1. National High Blood Pressure Education Program Working Group: Report of the National High Blood Pressure Program Working Group on high blood pressure in pregnancy. *Am J Obstet Gynaecol*. 2000;183: S1-S22. 10.1067/mob.2000.107928
2. Lippincott W&Wilkins. Hypertensive disorders in pregnancy. In: Evan AT, DeFranco E, editors. *Manual of Obstetrics*. 8th ed. Philadelphia, USA: Wolters Kluwer Health; 2014 p.183-195
3. Lai C, Coulter SA, Woodruff A. Hypertension and pregnancy. *Tex Heart Inst J* 2017 Oct ;44 (5): 350-351
4. Vigil-De Gracia P, Montufar-Rueda, C Ruez J: Expectant management of severe Pre-eclampsia and Pre-eclampsia super-imposed on Chronic Hypertension between 24 and 34 weeks' gestation. *Eur J Obstet Gynecol Reprod Biol*. 2003; 107:24-27. 10.1016/S0301-2115(02) 00269-5
5. Centre for Maternal and Child Enquiries. *Saving Mothers Lives: Reviewing Maternal Deaths to Make Motherhood Safer: 2006-2008. The Eight Report on Confidential Enquiries into Maternal Deaths in United Kingdom*. *BJOG* 2011;118 (Suppl 1)1-203
6. Daskalopoulou SS, Khan NA, Quinn RR, Ruzicka M, McKay DW, Hackam DG, et al; Canadian Hypertension Education

- Program. The 2012 Canadian hypertension education program recommendations for management of hypertension: blood pressure measurement, diagnosis, assessment risk, and therapy. *Can J Cardiol* 2012 May ;28(3):270-287.
7. Umesawa M, Kobashi G. Epidemiology of hypertensive disorders in pregnancy: prevalence, risk factors, predictors and prognosis. *Hypertens Res* 2017 Mar;40 (3) :213-220.
 8. Yucesoy G, Ozkan S, Bodur H, Tan T, Caliskan E, Vural B , Corakci A: Maternal and Perinatal Outcome in Pregnancies complicated with hypertensive disorder of pregnancy : A seven year experience of a tertiary care center. *Arch GynecolObstet* .2005, 273:43-49. 10.1007/ s00404-005-0741-3
 9. Bramham K, Parnell B, Nelson-Piercy C, Seed PT, Poston L, Chappell LC. Chronic hypertension and pregnancy outcomes: systemic review and meta-analysis. *BMJ* 2014 Apr;348:g2301.
 10. SheyWiysonge CU, Ngu Blackett K, Mbuagbaw JN: Risk factors and complications of hypertension in Yaounde, Cameroon. *Cardiovasc J S Afr*. 2004, 15 :215-219.
 11. Pridjian G, Puschett JB: Preeclampsia. Part 1: clinical and pathophysiological considerations. *Obstet Gynecol Surv*. 2002, 57:598-618.
 12. Leeners B, Rath W, Kuse S, Irawan C, Imthurn B, Neumaier- Wagner P: BMI: new aspects of a classical risk factor for hypertensive disorders in pregnancy. *Clin Sci (Lond)*. 2006, 111:81-86. 10.1042/C20060015
 13. Singhal SR, Deepika A, Nanda S: Maternal and perinatal outcome in severe pre-eclampsia and eclampsia. *J South Asian Fed Obstet Gynecol*.2009, 1:25-28.
 14. Shen M, Smith GN, Rodger M, White RR, Walker MC, Wen SW: Comparison of Risk factors and outcomes of gestational hypertension and pre-eclampsia. *PLoS One*. 2017, 12:0175914.
 15. Soomro S, Shaikh AA, Kumar R (August 28,2019) Maternal and Fetal Outcomes of Pregnancy -related Hypertensive Disorders in a Tertiary Care Hospital in Sukkhar Pakistan. *Cureus* 11(8):e5507. DOI 10.7759/cureus.5507
 16. Ahmed HussainSubki, Mohammad RidhaAlgethami, Prevalence, Risk Factors, and Fetal and Maternal Outcomes of Hypertensive Disorders of Pregnancy:A retrospective study in Western Saudi Arabia. *Oman Medical Journal* [2018], Vol.33, No.5:409-415.
 17. Sajith M, Nimbargi V, ModiA, Sumariya R, Pawar A. Incidence of pregnancy induced hypertension and prescription pattern of antihypertensive drugs in pregnancy. *Int J PharmaSci Res* 2014;4(4):163-170.
 18. Yucesoy G, Ozkan S, Bodur H, Tan T, Caliskan E, Vural B, et al. Maternal and perinatal outcome in pregnancies complicated with hypertensive disorders of pregnancy: a seven years experience of a tertiary care center. *Arch GynecolObstet* 2005Nov;273(1):43-49
 19. Jijiwa H, Sabitu, Danbello Z, Jumba F, Haruna H, Al Sharbatti S. Hypertension among pregnant women attending GMC Hospital, Ajman UAE. *GMJ, ASM* 2015;4(S2):S47-S53.
 20. TrogstadL, Magnus P, StolenBerg C. Pre-eclampsia: Risk factors and casual models. *BestPract Res ClinObstetGynaecol* 2011 Jun ;25(3):329-342.
 21. Bryson CL, Ionnou GN, Rulyak SJ, Critchlow C. Association between gestational diabetes and pregnancy induced hypertension. *Am J Epidemiol* 2003 Dec; 158(12) :1148-1153.
 22. Gasim T. Gestational diabetes mellitus : Maternal and perinatal outcomes in 220 Saudi women. *Oman Med J* 2012. March ;27 (2):140-144
 23. NankaliA ,Malek -Khosravi SH, Zangeneh M ,Rezaei M, Hemati Z, Kohzadi M: Maternal complications associated with severe preeclampsia. *JObstetGynaecol India* 2013,63:112-115. 10.1007/s 13224-012-0823-0
 24. HalimiAsl AA, Safari S, ParvareshiHamrah M: Epidemiology and related risk factors of pre-term labour as an obstetrics emergency. *Emerg (Tehran)*. 2017, 5: e3.
 25. Lu CQ, Lin J, Yuan L, Zhou JG, Liang K, Zhong QH, Huang JH, Xu LP, Wu H, Zheng Z, Ping LL, Sun Y, Li ZK, Liu L, Lyu Q, Chen C. Pregnancy induced Hypertension and outcomes in early and moderate preterm infants. *Pregnancy Hypertens*.2018 Oct;14:68-71.doi: