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Maternal and Perinatal Outcome of Gestational Hypertension

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Abstract:
Background*: Hypertensive disorders represent one of the most common medical complications of pregnancy. Based on a nationwide inpatient sample examining more than 36 million deliveries in the United States, the prevalence of associated hypertensive disorders increased from 67.2 per 1,000 deliveries in 1998 to 83.4 per 1,000 deliveries in 2006. Women who develop severe hypertension during pregnancy may experience adverse effects similar to those associated with mild preeclampsia.*
Materials and Methods*: In this Prospective Analytical hospital based study, 35 patients in group 1 and 70 patients in group 2 were included. Booked pregnant females with already diagnosed gestational hypertension on treatment or newly diagnosed gestational hypertension at 34 weeks 0 days and above was taken as the study group (Group I). Age, gestation, and parity matched booked pregnant females with normal blood pressure were taken as the comparator group (Group II). Known chronic hypertension, previous LSCS, multiple pregnancies, known medical or surgical disorders, and patients wanting LSCS on request were excluded.*
Results*: The majority of patients with Gestational HTN (group I), (37.1%) belonged to the age group of >35 Years while the majority of patients in group II (51.4%) belonged to the age group of 21-30 years. Majority of the group I patients belonged to the lower middle class (34.3%) and upper lower class (34.3%) as compared to group II patients who belonged to the upper lower class (48.6%). Majority (48.6%) of patients in group I belonged to the mild hypertensive group. In patients with Gestational HTN, the most common reason for Induction of labor was patients with oligohydramnios and in group II the most common indication was postdatism. **F**etal distress was the main indication for instrumental delivery in patients with gestational hypertension while prolonged 2nd stage of labor was the common indication for instrumental delivery in the normal group. Most common Indication for Caesarean section in the present study, in patient with gestational hypertension (Group I) is Meconium stained liquor (38.5%) and in Group II, the most common indication for cesarean section is Cephalopelvic disproportion (36.4%). NICU Admission was seen in 54.3% of babies in group I and 17.1% in group II.*
Conclusion: *The gestational hypertension in pregnancy is more seen among the extreme of age group, multiparity, and in an economically backward class of the population. The complications like oligohydramnios, IUGR, cesarean section rate, Meconium stained liquor, vaginal/ cervical lacerations, and postpartum hemorrhage occurring more in gestational hypertension pregnancies. The neonatal complications leading to NICU admission are also high in neonates born to hypertensive mothers.*
Key Word*s: Gestational Hypertension; BMI; Induction; Antepartum; Intrapartum; Postpartum; NICU.*

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I. Introduction

Hypertension is the most common medical disorder of pregnancy and is reported to complicate up to 1 in 10 gestations and affects an estimated 240,000 women in the United States every year. Although physicians for millennia have recognized preeclampsia, relatively little is known about its pathogenesis and prevention. The primary concern about elevated blood pressure relates to the adverse effects on both mother and fetus. These potential adverse effects range in severity from trivial to life threatening.[1]

Hypertensive disorders represent one of the most common medical complications of pregnancy.[2,3] Based on a nationwide inpatient sample examining more than 36 million deliveries in the United States, the prevalence of associated hypertensive disorders increased from 67.2 per 1,000 deliveries in 1998 to 83.4 per 1,000 deliveries in 2006.[4] Pregnancy-induced hypertension (also referred to as gestational hypertension or hypertensive disorder of pregnancy)[5-7] is estimated to affect 6% to 8% of US pregnancies.[2,3] Women who develop severe hypertension during pregnancy may experience adverse effects similar to those associated with

mild preeclampsia.[3,7,9] In the mother, these may range from elevated liver enzymes to renal dysfunction; and in the fetus, from preterm delivery to intrauterine restriction of fetal growth.[8,9]

Hypertensive disorders of pregnancy (HDP) remain among the most significant and intriguing unsolved problems in obstetrics. HDP are common and complicate obstetric practice in India. The incidence of pre-eclampsia in hospital practice in India varies from 5% to 15% and that of eclampsia about 1.5%.[10,11]

The most recent revised classification for hypertensive disorders in pregnancy is by the International Society for the Study of Hypertension in Pregnancy (ISSHP)[11] in 2014:

1. Chronic hypertension
2. Gestational hypertension
3. Pre-eclampsia – de novo or superimposed on chronic hypertension
4. White coat hypertension.

The American College of Obstetricians and Gynaecologists task force continues to use the more practical classification proposed by it in 1972 and modified by the National High Blood Pressure Education Program and the American Society of Hypertension guidelines.[12] This also considers hypertension during pregnancy in four categories:

1. Pre-eclampsia–eclampsia
2. Chronic hypertension (of any cause)
3. Chronic hypertension with superimposed pre-eclampsia
4. Gestational hypertension.

Some of the risk factors increasing the likelihood of HDPs are: nulliparous women[13] (in about 7.6% of nulliparae, severe in 3.3%), wide variation between ethnic groups/populations (3 times × as common in Negroid as Caucasians), parity (incidence about 5% in singleton and 13% in twin gestations), chronic hypertension, multi-fetal gestation, high maternal age (>35 years) and obesity. Maternal weight and the risk of pre-eclampsia are progressive. The morbidity in percentage is about 4.3 with a body mass index (BMI) <19.8 and 13.3 with BMI >35 kg/m^2.[11] Smoking during pregnancy reduced the risk of hypertension during pregnancy;[14] placenta previa also reduced the risk of hypertension.

HDP can be graded into mild or severe based on clinical abnormalities. Mild HDP shows diastolic BP <100 mmHg, trace to 1+ proteinuria, and minimal (if any) hepatic enzyme elevation. Severe HDP exhibits diastolic BP ≥110 mmHg, persistent severe proteinuria, clinical symptoms of eclampsia including convulsions and pulmonary edema, elevated serum creatinine and hepatic enzymes with thrombocytopenia, and fetal growth restriction.[15]

The primary concern about elevated blood pressure relates to the potential harmful effects on both mother and fetus. These potential adverse effects range in severity from trivial to life threatening. Hence the present study is intended to analyze the maternal and perinatal outcome of gestational hypertension in Nazareth hospital, Shillong.

II. Material and Methods

The present study was done in the Department of Obstetrics and Gynaecology, Nazareth Hospital, Shillong. The hospital provides services to both urban and rural patients belonging to the districts in proximity to Shillong from 8th September 2017 to 7th September 2018.

Study Design: Prospective Analytical hospital based study (cohort)

Study Location: Nazareth Hospital, Shillong

Study Duration: September 2017 to September 2018.

Sample size: We included 35 patients in group 1 and 70 patients in group 2.

Sample size calculation: Sample size has been calculated by using OpenEpi version 3, open source calculator—SSPropor For two-sided significance level of 95%, power (% chance of detecting) of 80%, ratio of sample size, unexposed/exposed – 2, percent of unexposed with outcome – 18, percent of exposed with outcome – 48 and odds ratio 4.2, total sample size is calculated to be 96, with number of cases 32 and number of controls 64, according to Fleiss, Statistical Methods for Rates and Proportions, formulas 3.18 &3.19 for Fleiss with CC (continuity correction). This revealed that we needed to enroll 32 patients in group 1 and 64 patients in group 2. We included 35 patients in group 1 and 70 patients in group 2 to compensate for 10% dropouts.

Sample Size:X-Sectional, Cohort, & Randomized Clinical Trials

Two-sided significance level(1-alpha):	95
Power(1-beta, % chance of detecting):	80
Ratio of sample size, Unexposed/Exposed:	2
Percent of Unexposed with Outcome:	18
Percent of Exposed with Outcome:	48
Odds Ratio:	4.2
Risk/Prevalence Ratio:	2.7
Risk/Prevalence difference:	30

	Kelsey	Fleiss	Fleiss with CC
Sample Size - Exposed	27	27	32
Sample Size-Nonexposed	53	54	64
Total sample size:	80	81	96

References

Kelsey et al., Methods in Observational Epidemiology 2nd Edition, Table 12-15
Fleiss, Statistical Methods for Rates and Proportions, formulas 3.18 &3.19
CC = continuity correction
Results are rounded up to the nearest integer.
Print from the browser menu or select, copy, and paste to other programs.

Results from OpenEpi, Version 3, open source calculator--SSCohort

Inclusion criteria: Booked pregnant females with already diagnosed gestational hypertension on treatment or newly diagnosed gestational hypertension at 34 weeks 0 days and above was taken as the study group (Group I). Age, gestation, and parity matched booked pregnant females with normal blood pressure were taken as the comparator group (Group II).

Exclusion criteria: Known chronic hypertension, previous LSCS, multiple pregnancies, known any medical or surgical disorders, and patients wanting LSCS on request.

Procedure methodology

Booked antenatal patients with the gestational age of 34 weeks 0 days and above admitted in the Department of Obstetrics and Gynaecology, Nazareth Hospital for safe delivery who fulfill the inclusion and exclusion criteria were taken as group 1 (gestational hypertension) and group 2 (normotensive).

Group 1 patients were selected by consecutive sampling and group 2 patients were randomly selected by a person not associated with the study.

All the patients enrolled in the study were examined and were included in the study after taking informed consent from the patient.

The study was conducted after approval from the hospital's ethics committee.

Thereafter a detailed clinical history was taken and a complete physical examination was done in all the cases. This included the patients reporting directly to the labor room in various stages of labor as well as those who were admitted in the wards.

Detailed antenatal history including last menstrual period and presence of high risk factors like previous obstetric history of pregnancy induced hypertension, pre-eclampsia, eclampsia, gestational age at which hypertension developed in the present pregnancy, and treatment received by the patients was noted.

Relevant investigation results like Blood pressure recording, ANC screening, ultrasound, Doppler, the non-stress test which are done as per standard protocol for the management of gestational hypertension was recorded in the proforma.

Maternal blood pressure monitoring was done according to standard protocol and fetal surveillance was done.

Blood pressure recording procedure- The mercury sphygmomanometer remains the 'gold standard' for blood pressure measurement in pregnancy. A standard cuff was used for arms with a circumference of ≤33 cm while the large cuff (15×33 cm bladder) was used for arms with a circumference of >33 cm. The patient was seated, with feet supported, for 2–3 minutes before blood pressure is measured. The right arm was used thereafter if there is no significant difference between the arms. When measuring blood pressure, SBP was palpated at the brachial artery before inflating the cuff to 20 mmHg above the recorded level. The cuff was then deflated slowly. DBP was recorded as Korotkoff phase V (K5) and if (K5) is not present, then it was recorded as Korotkoff phase IV (K4).[8] On average of at least two readings were taken at an interval of at least one minute to represent the patient's blood pressure.

All the cases were examined and assessed. The Decision regarding the mode of delivery was made based on an evaluation of the progress of labor, fetal indications, and maternal indications. Partograph was maintained for all enrolled subjects.
All cases were followed up till the seventh day of post-delivery.
Gestational age at delivery, mode of delivery, and maternal and perinatal complications was noted. All this information was recorded in a predesigned structured proforma.
Data was compiled and analyzed at the end of the study period.

OUTCOME PARAMETERS
The following outcome parameters were studied -

Maternal outcome parameters studied were onset of labor- spontaneous/induced; mode of delivery- vaginal/instrumental/cesarean section indication; preeclampsia/eclampsia; any other complications; postpartum hemorrhage and maternal mortality.

Perinatal outcome parameters studied were live born/ still born/ intrauterine fetal death; perinatal asphyxia- APGAR score at 1 min and 5 min of birth; birth weight (SFD/AFD/LFD); early neonatal morbidities – need & reason for NICU admission, seizures, hypoglycemia, and perinatal mortality

Statistical analysis

The data were entered in Microsoft Excel 2016. The analysis was done using Statistical Package for Social Sciences Version 21.0 for Windows (SPSS 21.0). The variables were summarized and expressed as mean and standard deviation. Chi Square test was used as a test of significance for categorical data. Significance was considered if the 'p' value is <0.05.

III. Results

Table no 1: Distribution of patients based on age, SES, Obstetric history & BMI

			GROUP		P Value
			Gestational HTN (Group I)	Normal (Group II)	
AGE CATEGORY	</=20 Years	N	10	7	0.01
		%	28.6%	10.0%	
	21-30 Years	N	5	36	
		%	14.3%	51.4%	
	31-35 Years	N	7	13	
		%	20.0%	18.6%	
	>35 Years	N	13	14	
		%	37.1%	20.0%	
SOCIO-ECONOMIC STATUS	Upper	N	0	1	0.01
		%	0.0%	1.4%	
	Upper Middle	N	5	1	
		%	14.3%	1.4%	
	Lower Middle	N	12	12	
		%	34.3%	17.1%	
	Upper Lower	N	12	34	
		%	34.3%	48.6%	
	Lower	N	6	22	
		%	17.1%	31.4%	
OBSTETRIC HISTORY	Primi	N	11	20	0.13
		%	31.4%	28.6%	
	P1-P3	N	8	29	
		%	22.9%	41.4%	
	>/=P4	N	16	21	
		%	45.7%	30.0%	
BMI AT 1ST ANC VISIT	<18.5(Underweight)	N	1	1	0.55
		%	2.9%	1.4%	
	18.6-22.9(Normal)	N	34	69	
		%	97.1%	98.6%	

Among patients with Gestational Hypertension, the majority (48.6%) developed hypertension at the gestational age of >/=37+0 Weeks followed by 34+0 to 36+6 Weeks (37.1%) and 28+0 to 33+6 Weeks (14.3%); 48.6% of patients belonged to the mild hypertensive group and 51.4% patients belonged to the moderate hypertensive group. 51.4% patients received treatment for gestational hypertension in which 16.7% patients

(3/18) started treatment in between 28+0 to 33+6 Weeks, 61.1% patients (11/18) started treatment in between 34+0 to 36+6 Weeks, 22.2% patients (4/18) started treatment in >/=37+0 Weeks. Labetalol was given in 33.3% of patients (6/18) and amlodipine was given in 66.7% of patients (12/18).

Urine analysis revealed Trace/Negative in 82.9% of patients.

Table no 2: Distribution of patients based on the onset of labor, indication for induction & mode of delivery

			GROUP		P Value
			Gestational HTN (Group I)	Normal (Group II)	
ONSET OF LABOUR	Spontaneous	N	19	57	0.004
		%	54.3%	81.4%	
	Induced	N	16	13	
		%	45.7%	18.6%	
INDICATION FOR INDUCTION	Oligohydramnios	N	8	4	0.01
		%	66.7%	33.3%	
	IUGR	N	5	0	
		%	100.0%	0.0%	
	Post Datism	N	2	9	
		%	18.2%	81.8%	
	Others	N	1	0	
		%	100.0%	0.0%	
MODE OF DELIVERY	Normal delivery	N	18	56	0.01
		%	51.4%	80.0%	
	Instrumental delivery	N	4	3	
		%	11.4%	4.3%	
	Cesarean section	N	13	11	
		%	37.1%	15.7%	

Fetal distress was the main indication for instrumental delivery in patients with gestational hypertension while prolonged 2nd stage of labor was the common indication for instrumental delivery in the normal group.

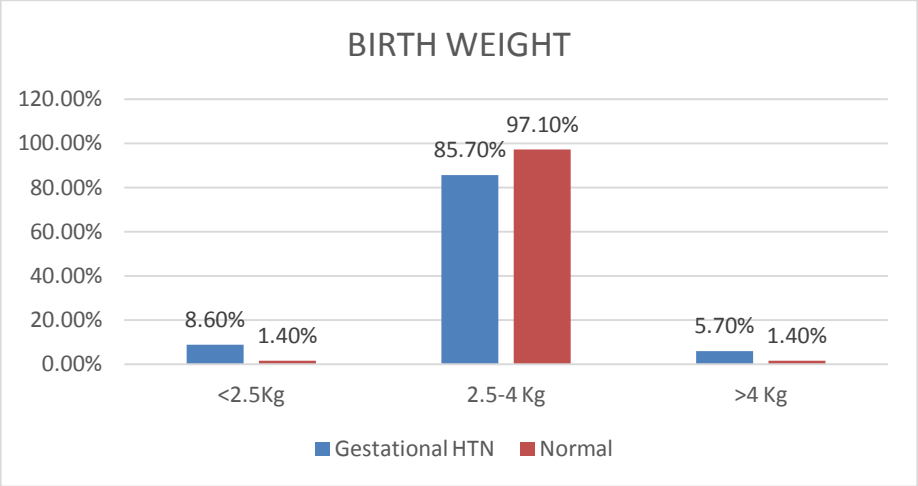
The most common Indication for Caesarean section in patients with gestational hypertension (Group I) is Meconium stained liquor and in Group II, the most common indication for cesarean section is Cephalopelvic disproportion. The association between the two groups was found to be Statistically not Significant

Table no 3: Complications

			GROUP		P Value
			Gestational HTN (Group I)	Normal (Group II)	
ANTEPARTUM COMPLICATIONS	Oligohydramnios	N	10	7	0.001
		%	28.6%	10.0%	
	IUGR	N	4	0	
		%	11.4%	0.0%	
	Anaemia	N	12	8	
		%	34.3%	11.4%	
	Nil	N	9	55	
		%	25.7%	78.6%	
INTRAPARTUM COMPLICATIONS	MSL	N	6	2	0.001
		%	17.1%	2.9%	
	Fetal Distress	N	2	3	
		%	5.7%	4.3%	
	Uterine Wound Extension	N	1	0	
		%	2.9%	0.0%	
	Vaginal/Cervical Lacerations/Oasis	N	4	0	
		%	11.4%	0.0%	
	Others	N	2	0	
		%	5.7%	0.0%	
	Nil	N	20	65	
		%	57.1%	92.9%	
POST PARTUM COMPLICATIONS	Puerperal Pyrexia	N	3	1	0.001
		%	8.6%	1.4%	
	PPH	N	7	2	

		%	20.0%	2.9%	
	Wound Infection	N	2	0	
		%	5.7%	0.0%	
	UTI	N	3	2	
		%	8.6%	2.9%	
	Nil	N	20	65	
		%	57.1%	92.9%	

In the Gestational HTN group, APGAR Score at 1 Min of 4-6 was seen in 8.6% of babies. The association between the two groups was found to be Statistically Significant.



Graph 1: Distribution of study subjects based on birth weight and gestational hypertension

In the present study the Birth Weight of <2.5 kg was seen in 11.4% of babies in group I and 1.4% in group II. The association between the two groups was found to be Statistically Significant.

IV. Discussion

Hypertension is one of the common problems associated with pregnancy that may be followed by eclampsia, acute renal failure, maternal death, premature delivery, intrauterine growth restriction, and others. Maternal and fetal complications increase with an increase in PIH, but appropriate maternal and perinatal care can prevent dangerous outcomes such as eclampsia and maternal death.[16]

AGE DISTRIBUTION OF THE STUDY POPULATION: In this present study majority of patients with Gestational HTN (group I), (37.1%) belonged to the age group of >35 Years while the majority of patients in group II (51.4%) belonged to the age group of 21-30 years. The association between the two groups was found to be Statistically Significant.

Comparing with other similar studies: In a study conducted by Gudeta TA et al.,[17] out of 33 PIH patients who delivered, the majority (37.3%) belonged to the age group of 20-24years. Also, in studies conducted by Patel R et al.,[18], Sharma C et al.,[19] , Gandhi MR et al.,[20], and Meshram DP et al.,[21] showed that the majority of patients were in the age group of 18-25 years. While in another study conducted by Kolluru V et al.,[22] out of 234 PIH patients the majority belong to the age group of 18-26 years (73.9%) and 25.6% patients belonged to the age group of 27-30 years. In a study conducted by Khosravi S et al.,[16] majorities of the study subjects belong to the age group of 21-30 years (55.6%) and 32.3% of the study subjects belonged to the age group of >30 years which is comparable to the present study.

Table no 4: Various studies showing the most common age group in the Study subjects

	Most Common Age Group	Percentage
Present study (Group I)	>35years	37.1%
Gudeta TA et al.,[17]	20-24 years	37.3%
Ahmed SS et al.,[23]	24-30 years	56.5%
Patel R et al.,[18]	18-22 years	51.5%
Sharma C et al.,[19]	18-27 years	70.5%
Kolluru V et al.,[22]	18-26 years	73.9%
Gandhi MR et al.,[20]	21-25 years	48.4%

Meshram DP et al.,[21]	21-25 years	57.5%
Khosravi S et al.,[16]	21-30 years	55.6%
Ugwu E et al.,[24]	20-29 years	50.6%
Joshi P et al.,[25]	21-25 years	40%

SOCIOECONOMIC STATUS: In the analysis of the socio-economic status, this study showed that the majority of the group I patients belonged to the lower middle class (34.3%) and upper lower class (34.3%) as compared to group II patients who belonged to the upper lower class (48.6%). The association between the two groups was found to be Statistically Significant. Out of 105 patients, 46 patients (43.8%) in the present study belonged to the upper lower class as the majority of patients can afford antenatal care and delivery in Nazareth hospital due to Megha Health Insurance Scheme (MHIS). In the study conducted by Kolluru V et al.,[22] titled "Maternal and perinatal outcome associated with pregnancy induced hypertension" at Department of Obstetrics and Gynaecology, Kamineni Institute of Medical Sciences, Nalgonda, Telangana, India showed that majority of the study subjects (76%) belong to Lower class followed by middle class (23%), Upper class (1%). In other studies, like Patel R et al.,[18], and Joshi P et al.,[25] majority (82.81% and 59%) of patients who participated in the study were residing in rural areas.

OBSTETRIC HISTORY: The present study showed that patients with gestational hypertension, the majority (45.7%) belonged to the para 4 & above similar to the studies conducted by Sharma C et al.,[19] , Kolluru V et al.,[22],Tiwari A et al.,[26] and Gandhi MR et al.,[20] majority belonged to multigravida group. While in the studies conducted by Subki AH et al.,[27] , Meshram DP et al.,[21] and Joshi P et al.,[25] majority of the patients were primigravidas. In a study conducted by Khosravi S et al.,[16] titled "Study of the Prevalence of Hypertension and Complications of Hypertensive Disorders in Pregnancy" majority of the study subjects (36.4%) belong to 3rd to 5th gravida.

Table no 5: Various studies showing the Percentage of Primigravidas

Study	Percentage
Present study	29.5%
Subki AH et al.,[27]	43.3%
Sharma C et al.,[19]	46.8%
Kolluru V et al.,[22]	48.3%
Tiwari A et al.,[26]	42.8%
Gandhi MR et al.,[20]	43.2%
Meshram DP et al.,[21]	66.5%
Ugwu E et al.,[24]	49.4%
Joshi P et al.,[25]	61.7%

Table no 6: Various studies showing the Percentage of Multigravidas

Study	Percentage
Sharma C et al.,[19]	53.1%
Kolluru V et al.,[22]	50.9%
Tiwari A et al.,[26]	57.2%
Gandhi MR et al.,[20]	56.8%
Khosravi S et al.,[16]	36.4%

BMI AT 1ST ANC VISIT: In patients of gestational hypertension (Group I), the majority (97.1%) belonged to body mass index of 18.6-22.9 in the present study. In a study conducted by Shen M et al.,[28] titled "Comparison of risk factors and outcomes of gestational hypertension and pre-eclampsia" 33.2% of gestational hypertension patients belonged to body mass index of 18.5-24.9.

PERIOD OF GESTATION AT WHICH HYPERTENSION DEVELOPED: The present study showed that in patients with Gestational Hypertension (Group I), the majority (48.6%) developed hypertension at the gestational age of >/=37+0 Weeks, which was statistically significant. Also, in the studies conducted by Hassan M et al.,[29] and Joshi P et al.,[25] showed that 26.7% and 40.8% of the study subjects belonged to the gestational age of >36 weeks. In contrast, in the study conducted by Gandhi MR et al.,[20]majority of the study subjects (60%) belong to the gestational age of <36 Weeks. Also, in the study conducted by Khosravi S et al.,[16] majorities of the study subjects (57.4%) belong to the gestational age of 30-36 Weeks.

DEGREE OF HYPERTENSION: This study showed that in patients with Gestational HTN, the majority (51.4%) received treatment for Hypertension, while 48.6% of patients belonged to the mild hypertensive group, so antihypertensive medicine was not given. In the study conducted by Patel R et al.,[18] titled "A study on pregnancy induced hypertension and foetal outcome among patient with PIH at tertiary care hospital, Valsad"

showed that out of 64 PIH patients, 85.93% and 98.43% of patients had mild PIH with systolic B.P. 140-160 mmHg and diastolic B.P. 90-110mmHg respectively. In comparison to the present study, 48.6% of patients belonged to the mild PIH group.

MEDICATION: The present study showed that in patients with Gestational Hypertension, the majority (34.3%) received Amlodipine and 17.1% received labetalol. While in a study conducted by Subki AH et al.,[27] 6.3% of patients received labetalol, 22.8% of patients received methyldopa, and 8.5% of patients received nifedipine.

ONSET OF LABOUR: The most common onset of labor was spontaneous labor (54.3%) seen in the gestational hypertension group in the present study. Induction of labor was seen in 45.7% of the patients in group I.
The most common indication for the induction of labor was (50%) oligohydramnios in group I. In group I the indication for induction of labor, postdatism was seen in two patients as they were lost to follow up in the third trimester. While in a study conducted by Seyom E et al.,[30] majorities of the PIH patients had spontaneous onset of labor (62.5%), followed by induced labor in 31.3%. Out of 62.5% of spontaneous labor, 16.7% were seen in the gestational hypertension study subjects.

MODE OF DELIVERY: The present study showed that in patients with Gestational HTN, the most common Mode of Delivery was normal vaginal delivery (51.4%) while the cesarean section was seen in 37.1% of the patients, this association was found to be Statistically Significant. 11.4% of patients had instrumental delivery in group I and fetal distress was the main indication for instrumental delivery. Normal vaginal delivery was the most common mode of delivery in other studies like Madkar CS et al.,[31] Sharma C et al.,[19] Pairu J et al., [32] Kolluru V et al.,[22] Gandhi MR et al.,[20] Seyom E et al.,[30]and Joshi P et al.,[25] In contrast, some other studies showed that cesarean section was seen the most common mode of delivery like in Khosravi S et al.,[16] Ugwu E et al.,[24] Yucesoy G et al., [33] and Hassan M et al.,[29]

Table no 7: Various studies showing the mode of delivery

MODE OF DELIVERY			
	Vaginal	Caesarean Section	Instrumental
Present study (Group I)	51.4%	37.1%	11.4%
Madkar CS et al.,[31]	56%	24%	20%
Sharma C et al.,[19]	54.1%	45.8%	0%
Pairu J et al., [32]	81%	18%	0%
Kolluru V et al.,[22]	54.1%	45.8%	0%
Gandhi MR et al.,[20]	53.4%	46.3%	0%
Seyom E et al.,[30]	56.3%	43.7%	0%
Khosravi S et al.,[16]	50%	41.9%	8.1%
Ugwu E et al.,[24]	41.8%	58.2%	0%
Yucesoy G et al., [33]	41.2%	58.8%	0%
Hassan M et al.,[29]	10%	90%	0%

INDICATION OF CAESAREAN SECTION: The most common Indication for Cesarean section in the present study, in patient with gestational hypertension (Group I) is Meconium stained liquor (38.5%). While in the study conducted by Sharma C et al.,[19] titled "Maternal & Perinatal outcome in Hypertensive Disorders of Pregnancy in a Tertiary Care Hospital in Northern India" showed that the most common indication of cesarean delivery was fetal distress. This may be due to the frequent use of fetal monitoring (cardiotocography) as a routine labor room procedure. The obstetrician may expedite delivery rapidly as fetal heart rate changes in cardiotocography indicate fetal distress.

ANTEPARTUM COMPLICATIONS: The present study showed that in patients with Gestational HTN, the most common antepartum complication was Anemia (34.3%) & in the normal group also, the most common antepartum complication was anemia (11.4%). Anemia was seen as the most common complication in the intrapartum period may be due to the prevalence of chronic anemia in the region or most of the patients belonged to the multiparity group. The association between the two groups was found to be Statistically Significant. Oligohydramnios was seen in 28.6% of group I patients. IUGR was seen in 11.4% of gestational hypertension patients in the present study.
In other studies, like Hassan M et al.,[29], Khosravi S et al.,[16], Patel R et al.,[18] and Kolluru V et al.,[22] showed IUGR as one of the most common complications (30%, 9.9%, 7.8%, and 33.4 % respectively).

INTRAPARTUM COMPLICATIONS: In patients with Gestational HTN, the present study showed that the most common Intrapartum complication was meconium stained liquor (17.1%) while in the normal group, the most common intrapartum complication was fetal distress (4.3%). The association between the two groups was found to be Statistically Significant. Extension of uterine incision was seen in one patient during cesarean section due to difficulty in extraction of the baby as the patient presented with severe oligohydramnios and posted for emergency cesarean section in view of meconium stained liquor. Four patients had vaginal/ cervical lacerations due to difficult instrumental delivery. 5.7% of other intrapartum complications included retained placenta in one patient and another had cord presentation.

POSTPARTUM COMPLICATIONS: The most common Postpartum Complication seen in the present study, in group I was PPH (20%, i.e., 7 patients), while only 2.9% of PPH was seen in the group II. The association between the two groups was found to be Statistically Significant. This study showed the need for better anticipation of PPH in patients with gestational hypertension. The other complications seen in group I were puerperal sepsis, wound infection, and urinary tract infection. In this study, postpartum complications were found to be higher in gestational HTN compared to the comparative normal group. In comparison to other studies: In a study conducted by Madkar CS et al.,[31] PPH was seen in 0.8% of patients. In a study conducted by Gandhi MR et al.,[20] PPH was seen in 5.3% of patients. In a study conducted by Khosravi S et al.,[16] PPH was seen in 1.3% of patients.

APGAR Score at 1 Min: In this study, in the Gestational HTN group, APGAR Score at 1 Min of 4-6 was seen in 3 (8.6%) patients, while 91.4% of patients had APGAR Score at 1Min of >/= 7. In a study conducted by Khosravi S et al.,[16] titled "Study of the Prevalence of Hypertension and Complications of Hypertensive Disorders in Pregnancy" upon examining the first minute APGAR score, 2.5% (4) of new-borns scored lower than 4, 19.8% (32) scored between 5 - 6, and 74.4% (121) scored between 7 – 10.

BIRTH WEIGHT: The Birth Weight of <2.5 kg was seen in 5 (4.8%) patients in the present study overall. Out of which, 4/5 (80%) patients belong to Gestational HTN. The association between the two groups was found to be Statistically Significant. 5.7% of babies in group I had weight > 4kg. Similarly, the Majority of the babies with a birth weight of less than 2.5kgs was seen in studies like Patel R et al.,[18] Gandhi MR et al.,[20] Ugwu E et al.,[24] and Joshi P et al.,[25]

Table no 8: Various studies showing the Birth Weight (<2.5 kg)

Birth Weight (<2.5 kg)	
Study	Percentage
Present study (group I)	8.6%%
Madkar CS et al.,[31]	38%
Patel R et al.,[18]	53.1%
Gandhi MR et al.,[20]	67.3%
Khosravi S et al.,[16]	17.3%
Ugwu E et al.,[24]	58.2%
Joshi P et al.,[25]	68.6%

NICU ADMISSION: In the present study NICU Admission was seen in 54.3% of patients with Gestational HTN while in group II NICU admission was seen in 17.1% only. The association between the two groups was found to be Statistically Significant. The most common reason for NICU admission was jaundice (20%) in group I. 14.3% had birth asphyxia as the reason for NICU admission. In a study conducted by Madkar CS et al.,[31] NICU Admission was seen in 10% of patients. In a study conducted by Gudeta TA et al.,[17] NICU Admission was seen in 21.2% of patients with gestational hypertension. In a study conducted by Patel R et al.,[18] NICU Admission was seen in 18.8% patients. In a study conducted by Sharma C et al.,[19] NICU Admission was seen in 4.1% of patients with gestational hypertension. In a study conducted by Kendre VDD et al.,[34] NICU Admission was seen in 30% of patients with gestational hypertension.

Table no 9: Various studies showing the percentage of NICU Admissions

NICU Admission	
Study	Percentage
Present study (group I)	54.3%
Madkar CS et al.,[31]	10%
Gudeta TA et al.,[17]	21.2%
Patel R et al.,[18]	18.8%
Sharma C et al.,[19]	4.1%
Kendre VDD et al.,[34]	30%

V. Conclusion

Gestational Hypertension is one of the most extensively researched subjects in obstetrics. Still, the etiology remains an enigma to us. Pre-eclampsia and Eclampsia still remains a major problem in developing countries. Though the incidence of pre-eclampsia and eclampsia is on the decline, still it remains the major contributor to poor maternal and fetal outcomes. The gestational hypertension in pregnancy is more seen among the extreme of age group, multiparity, and in the economically backward class of the population. The complications like oligohydramnios, IUGR, cesarean section rate, Meconium stained liquor, vaginal/ cervical lacerations, and postpartum hemorrhage occurring more in gestational hypertension pregnancies. The neonatal complications leading to NICU admission are also high in neonates born to hypertensive mothers. Hence all efforts should be made to diagnose the high-risk patients for gestational hypertension, regular antenatal check-up, the early use of antihypertensive drugs and the optimum timing of delivery will help to achieve a successful outcome. The health care provider should detect the complications early in high risk mothers and treat them promptly, which is also an important part in the case of Gestational Hypertension. Proper care and evaluation should be done from the antenatal period till the completion of parturition. The value of the present study needs further evaluation by a larger study spread over a longer period of time.

Limitation of the Study - The primary limitation of the study is the limited number of gestational hypertension pregnant women in this study as compared to larger numbers in other studies, there was variation in the outcome of the study. Hence the findings of the study may not truly reflect the prevailing situation in the community setting**.**

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