

## A Study on Epidemiology and Management Evaluation of Hypertensive Disorders of Pregnancy

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### Abstract

**Background:** Hypertensive disorders in pregnancy are classified into 5 types. Hypertension contributes to maternal and mortality.

**Materials and Methods:** A prospective observational study was conducted on 120 patients from gynaecology department units at Government General Hospital, Kurnool. The patient were selected based on inclusion and exclusion criteria. Pregnant women who are diagnosed with any type of hypertensive disorders are included in the study. Hypertensive disorder death cases in pregnant women are excluded in the study.

**Results:** Among the study conducted in pregnant women the majorly occurring hypertensive disorder is pre-eclampsia. The mostly affected pregnant women with types of hypertensive disorders are seen under the age group of 21-30. Pedal oedema, epigastric pain, headache, loss of consciousness, visual disturbances, nausea and vomiting were the most common presenting complaints. Proteinuria levels were more 300-400mg/dl. The range of systolic and diastolic pressure was more occurring around 120/80- 130/110 mm Hg. All patients treatment was evaluated and found that effective treatment was provided.

**Conclusion:** In our study, we observed the mostly occurring type of hypertensive disorders, age, and the distribution of drugs in treating the types of hypertensive disorders in pregnant women. Various types of drugs were used depending upon the type of hypertensive disorders. In our study most commonly antihypertensive agents are used such as beta blockers (labetalol), calcium channel blockers (nifedipine, amlodipine) diuretics (osmotic diuretic – furosemide), centrally acting alpha 2 agonist – methyl dopa. Most commonly used anti convulsive agent is magnesium sulphate which is used to treat the seizures in the types of hypertensive disorders in pregnant.

**Key Words:** Hypertensive disorders in pregnancy, labetalol, Nifedipine, amlodipine

### I. Introduction

Hypertension is one of the common complications met with in pregnancy. It may be a pre-existing (or) appear for the first time during pregnancy. Hypertension contributes to maternal and mortality. The clinical manifestations and effective management play a significant role in the outcome of pregnancy.

**DEFINITION:** Hypertension in pregnancy is defined as a systolic blood pressure (SBP) greater than or equal to 140 mm Hg or a diastolic blood pressure (DBP) greater than or equal to 90 mm Hg or an increase of at least 30 mm Hg in the SBP and an increase of at least 15 mm Hg in the DBP. Hypertension contributes to maternal and prenatal morbidity and mortality. The clinical manifestations and effective management play a significant role in the outcome of pregnancy. Hypertensive disorders complicating pregnancy are common and forms one of the deadly triad along with haemorrhage and infection.

**EPIDEMIOLOGY:** Hypertensive disorders in pregnancy are the most important problem because HDP is a major cause of maternal and prenatal morbidity and prenatal morbidity and mortality. Several epidemiological studies have been performed to determine the subtypes, prevalence and risk factors of HDP. Risk factors for HDP are body mass index, anaemia, primiparous, multiple pregnancies, HDP in previous pregnancy, gestational diabetes mellitus, hypertension, UTI, and a family history of HTN, T<sub>2</sub>DM. Epidemiological studies have examine the association between a history of HDP and its subtypes and future risks of other diseases. HDP is not a rare complication of pregnancy and the influence of HDP remains same for an extended duration.

Physicians should consider the effects of HDP when treating chronic diseases in women.

**CLASSIFICATION:** According to the classification proposed by the national high blood education program (2000). There are five types of hypertensive disorders in pregnancy. They are:

1. Gestational hypertension
2. Pre-eclampsia
3. eclampsia
4. Chronic hypertension
5. Preeclampsia superimposed on chronic hypertension

## II. Materials And Methods

**Study Design:** It is a prospective observational study.

**Study Site:** Department of Gynaecology, Government general hospital, Kurnool.

**Study Period:** The present study was carried out for a period of six months.

**Sample Size:** During the study period of six months, 120 cases were collected.

**Source Of Data:** Patient demographic data collection proforma, Patient clinical profile.

**Inclusion Criteria:**

Pregnant women are taken into consideration based on

Patient characteristics

Medical history

Diagnostic measurements or assays (e.g. , uterine artery Doppler , biomarker

Patient diagnosed with hypertensive disorders in pregnancy. Only inpatients are involved in the study.

**EXCLUSION CRITERIA:** Non human populations, males, non-pregnant women studies that exclusively include individuals seeking fertility treatment and non generalizable populations are excluded.

**IRB APPROVAL:** The research protocol was duly approved by IRB of Dr.K.V.Subba Reddy Institute of Pharmacy vide approval number KVSP/IRB/2019 to 2020/Pharm D/PROJ/10

**METHOD OF STUDY**

The Study begin with the selection of patients based on the inclusion criteria followed by the collection of all the baseline parameters of the patients demographic details, medical history, past allergies, personal history, laboratory data and present treatment and all the data of the subjects was collected by using the patient proforma

## III. Results

**TYPES OF HYPERTENSIVE DISORDERS:** A total of 120 patients were analyzed for a period of 6 months.

In our study of one twenty patients, the majority of type of hypertensive disorder in pregnant women is preeclampsia, which is represented in Table: 1 and Figure: 1

**Table: 1 Different types of hypertensive disorders**

S.no	Types	No. of cases	Percentage (%)
1	Gestational hypertension	22	18.33
2	Preeclampsia	71	59.16
3	Eclampsia	23	19.16
4	Chronic hypertension	4	3.33

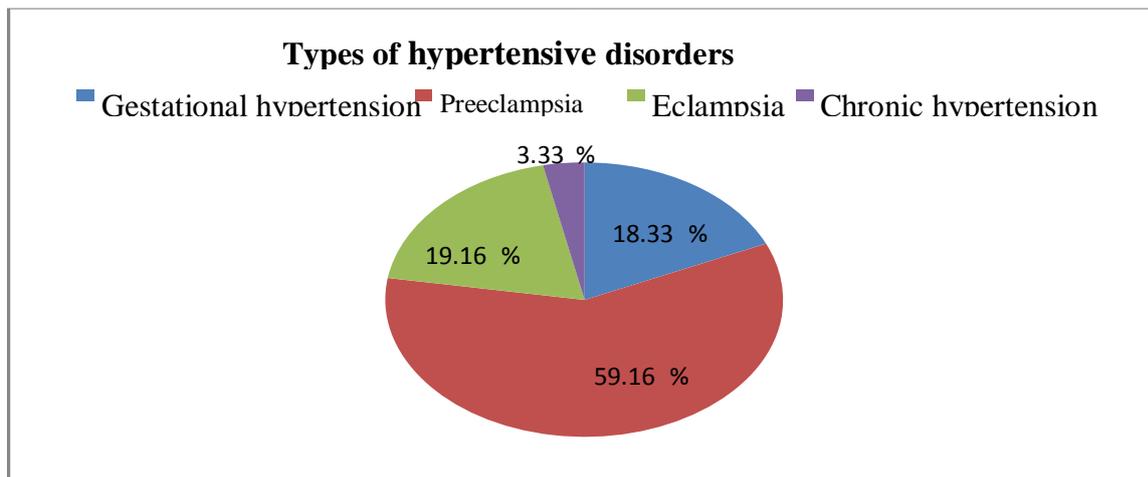


Figure: 1 Graphical representation of types of hypertensive disorders

**HYPERTENSIVE DISORDERS OF DIFFERENT AGE GROUPS:** Among 120 patients, the hypertensive disorders in pregnant women were more common among the age group of 21-30 years (65%).

Table: 2 Hypertensive disorders of different age groups

S.No	Age	No. of cases	Percentage (%)
1	18-20	30	25
2	21-30	78	65
3	31-40	12	10

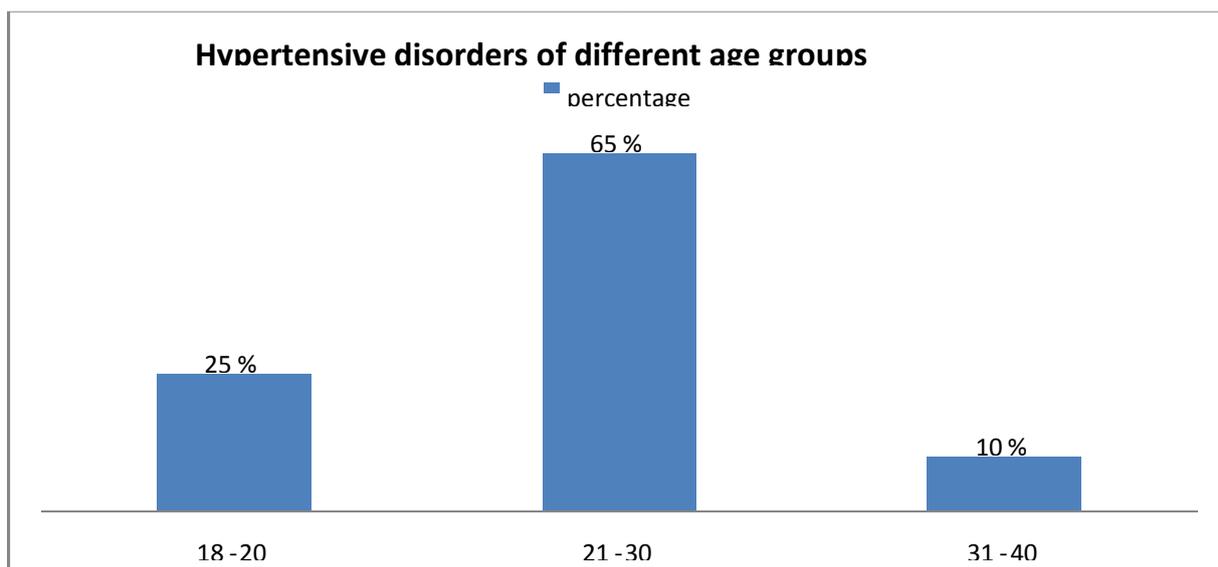


Figure: 2 Graphical representation of hypertensive disorders of different age groups

**TYPES OF PRE ECLAMPSIA:** Among 71 patients, the majority of occurrence of type of preeclampsia is mild pre-eclampsia (88%) shown in the Table: 3

Table: 3 Types of Pre eclampsia

S.No	Pre eclampsia types	No. of cases	Percentage (%)
1	Mild pre eclampsia	62	87.3
2	Recurrent pre eclampsia	4	5.63
3	Severe pre eclampsia	5	7.04

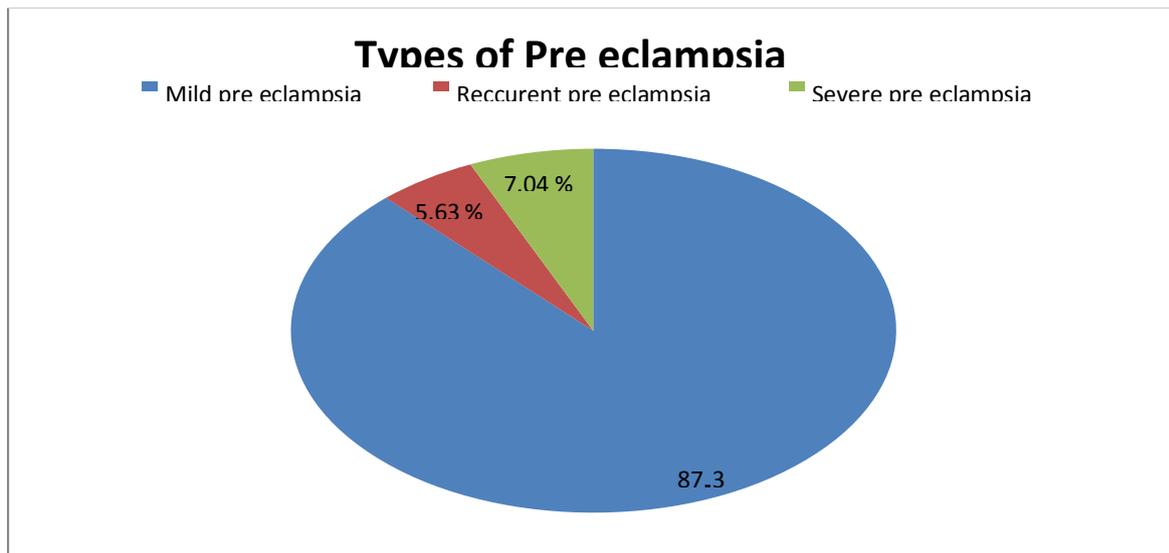


Figure: 3 Graphical representation of types of pre eclampsia

**TYPES OF ECLAMPSIA:** Among 23 patients, the majority of occurrence of type of eclampsia in pregnant women is Antepartum eclampsia (65%) shown in Table: 4

Table: 4 shows types of Eclampsia

S.no	Eclampsia types	Frequency	Percentage (%)
1	Imminent eclampsia	4	17.39
2	Antepartum eclampsia	15	65.21
3	Postpartum eclampsia	3	13.04
4	Static eclampsia	1	4.34

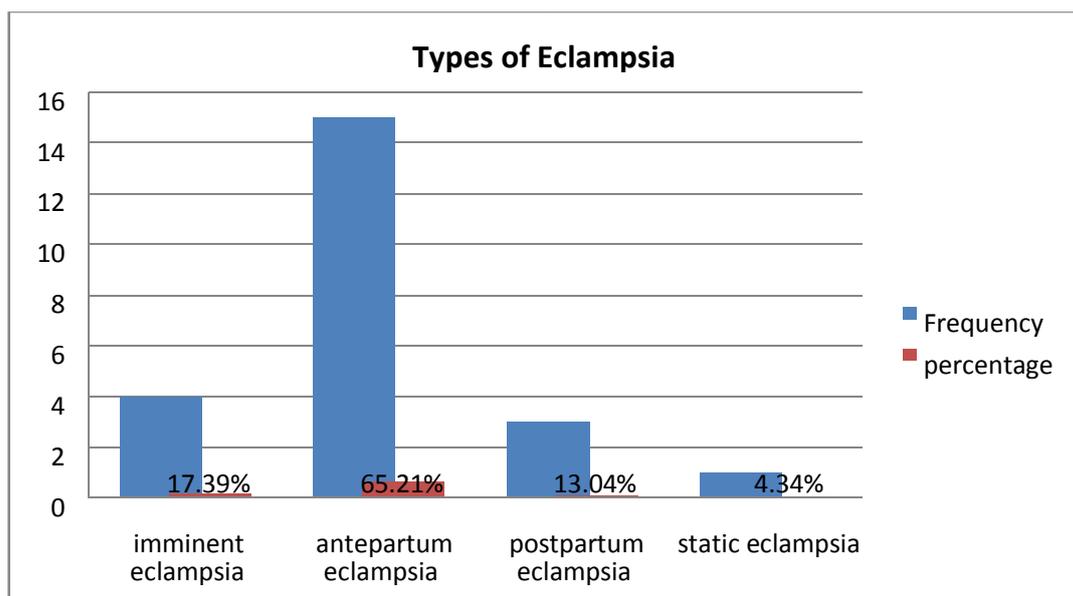


Figure: 4 Graphical representations of types of Eclampsia

**MANAGEMENT OF HYPERTENSIVE DISORDERS:**

Among 120 patients, the most frequently used anti-hypertensive drug is labetalol (68%) shown in Table: 5

Table: 5 shows types of drugs used in the hypertensive disorders

S.No	Drugs	No.Of drugs prescribed
1	Labetalol	113
2	Magnesium sulphate	30
3	Nefidipine	7

4	Amlodipine	11
5	Lasix	2
6	Mannitol	1
7	Levipil	2
8	Methyldopa	1

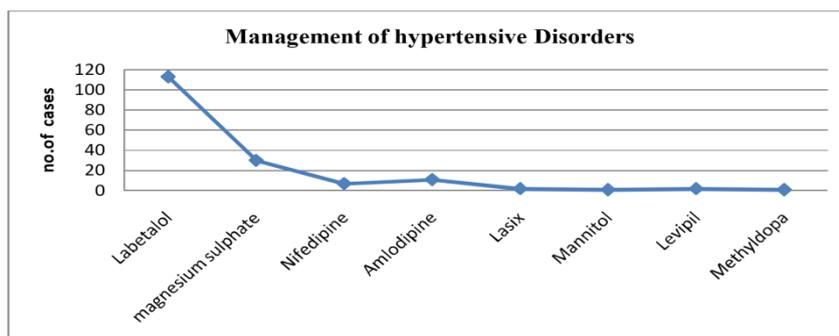


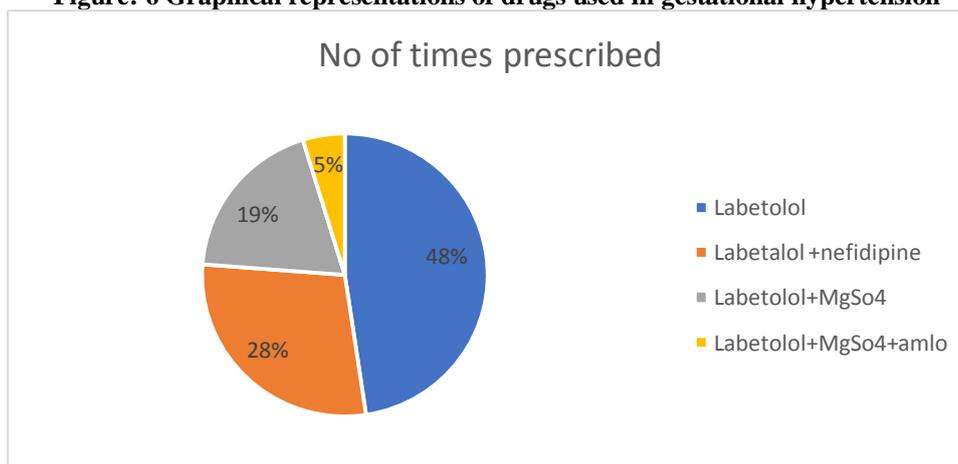
Figure: 5 Graphical representation of drugs used in hypertensive disorders

DRUGS USED IN GESTATIONAL HYPERTENSION: In our study, among 21 patients, the most commonly used anti hypertensive drug is labetalol (82%) other than combination drug therapy. Table:6 shows the distribution of drugs in gestational hypertension

Table: 6 shows the distribution of drugs in gestational hypertension

S.no	Gestational Hypertension	No of times prescribed	Percentage (%)
1	Labetalol	10	47.6
2	Labetalol+nefidipine	6	28.5
3	Labetalol+MgSo <sub>4</sub>	4	19
4	Labetalol+MgSo <sub>4</sub> +amlo	1	4.7

Figure: 6 Graphical representations of drugs used in gestational hypertension

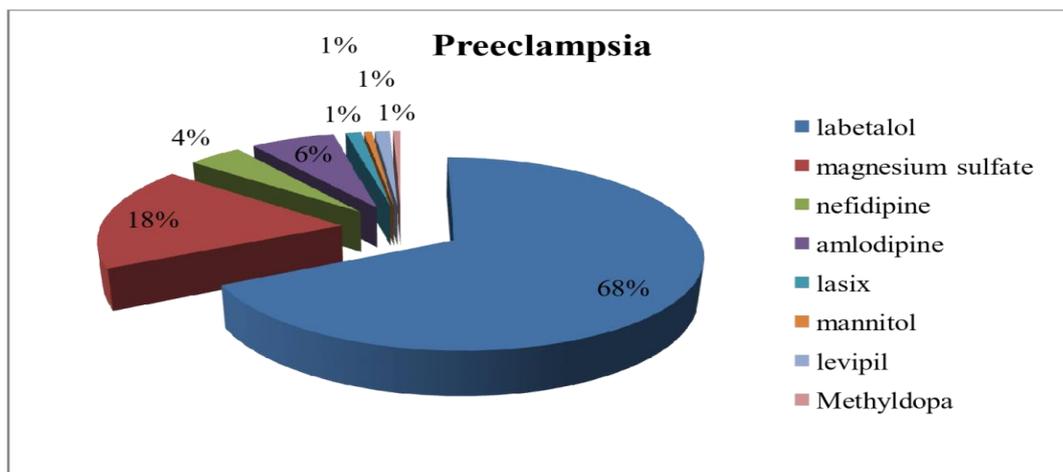


DRUGS USED IN PRE ECLAMPSIA: Among 70 patients, the most frequently used drug is labetalol (69%) and labetalol + magnesium sulphate (12%) shown in the Table: 7

Table: 7 shows the distribution of drugs in pre eclampsia

S.No	Preeclampsia treatment	Frequency	Percentage
1	Labetalol	48	69
2	Labetalol+MgSo <sub>4</sub>	8	12
3	Labetalol+nefidipine	4	6
4	Labetalol+Amlo	4	6

5	Labetolol+MgSo <sub>4</sub> +amlo	3	4
6	Labetolol+MgSo <sub>4</sub> +lasix	1	1
7	Labetolol+MgSo <sub>4</sub> +mannitol	1	1
8	Labetalol+Methyl dopa	1	1

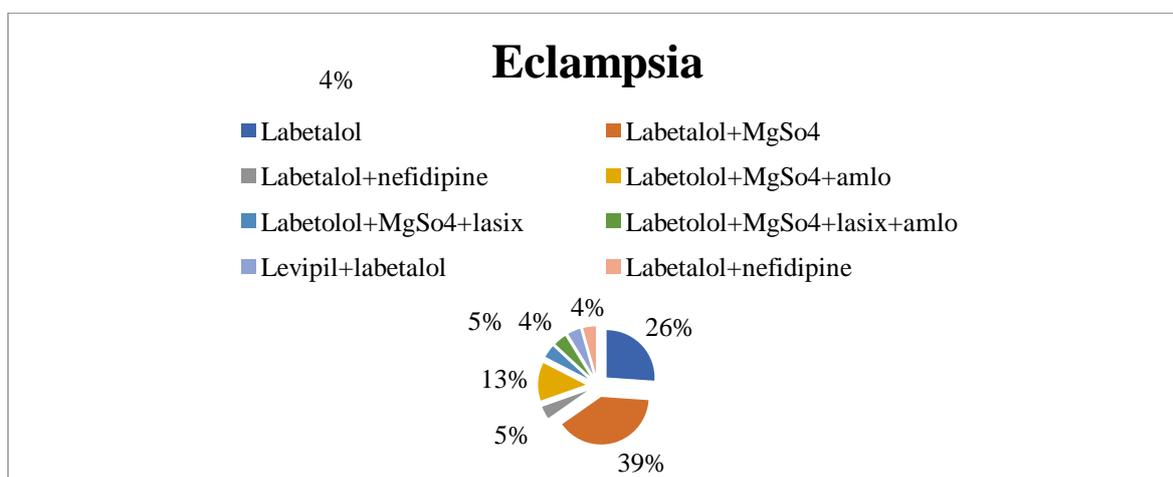


**Figure: 7 Graphical representation of drugs used in pre eclampsia**

**DRUGS USED IN ECLAMPSIA:** Among 23 patients, the most frequently used drug is labetalol + magnesium sulphate (33%) shown in the Table: 8

**Table: 8 shows the distribution of drugs in eclampsia**

S. No	Eclampsia treatment	frequency	Percentage (%)
1	Labetalol	6	26
2	Labetalol+MgSo <sub>4</sub>	9	39
3	Labetalol+nefidipine	1	4.3
4	Labetolol+MgSo <sub>4</sub> +amlo	3	13.04
5	Labetolol+MgSo <sub>4</sub> +lasix	1	4.3
6	Labetolol+MgSo <sub>4</sub> +lasix+amlo	1	4.3
7	Levipil+labetalol	1	4.3
8	Labetalol+nefidipine	1	4.3

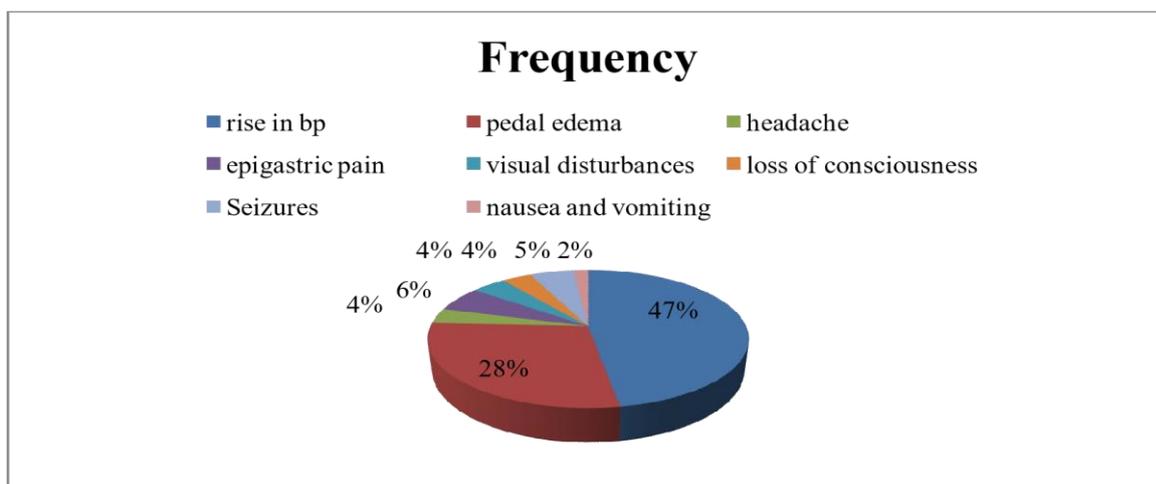


**Figure: 8 Graphical representations of drugs used in Eclampsia**

**CLINICAL MANIFESTATIONS:** Among 120 patients, rise in blood pressure (47%) and pedal oedema (28%) are the most common presenting symptoms of hypertensive disorders shown in Table 9

**Table: 9 shows the clinical manifestations of hypertensive disorders in pregnancy**

S.No	Clinical manifestation	Frequency	Percentage (%)
1	Rise in blood pressure	80	47
2	Pedal oedema	48	28
3	Headache	6	4
4	Epigastric pain	10	6
5	Visual disturbances	7	4
6	Loss of consciousness	6	4
7	Seizures	9	5
8	Nausea and vomiting	3	2

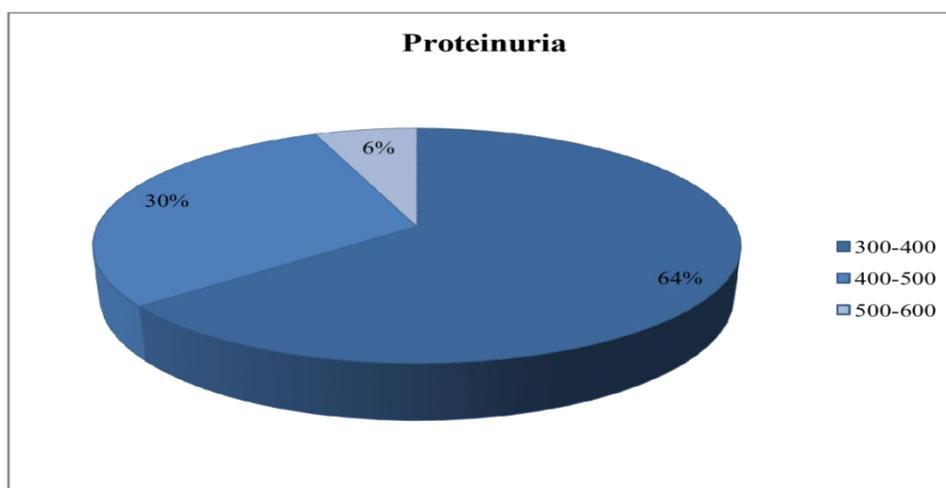


**Figure: 9 Graphical representations of clinical manifestations**

**PROTEINURIA LEVELS:** Among 120 cases, 300 to 400 proteinuria (64%) are most frequently occurred shown in Table: 10

**Table: 10 shows the proteinuria levels of hypertensive disorders of pregnancy**

S.No	Proteinuria	Frequency	Percentage (%)
1.	300-400	43	64
2.	400-500	20	30
3.	500-600	4	6

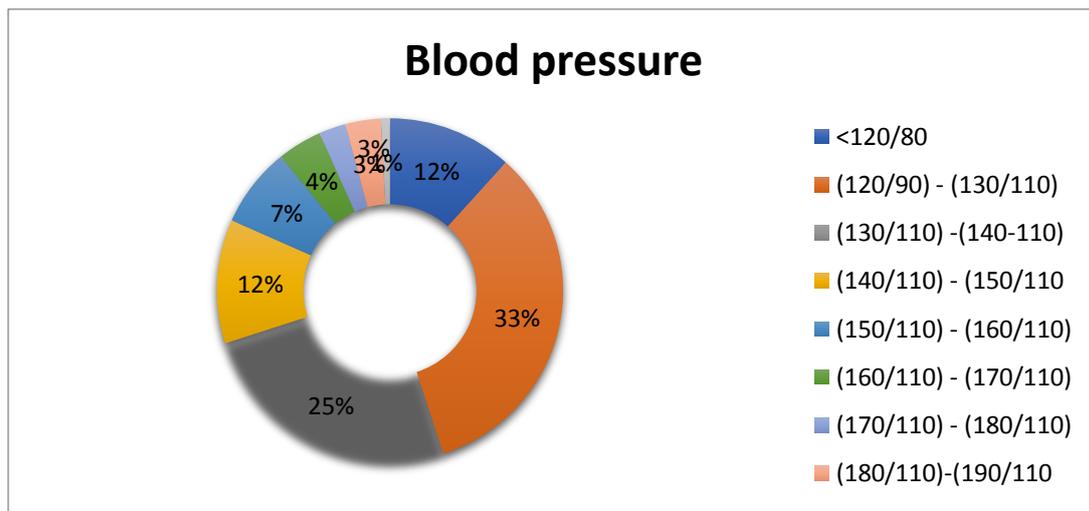


**Figure: 10 Graphical representation of proteinuria**

**BLOOD PRESSURE LEVELS:** Among 120 patients, (120/80)-((130-/110) are the most frequently occurred BP level (33%) as shown in Table 11

**Table: 11 shows the blood pressure levels of hypertensive disorders of pregnancy**

S.No	BP Levels	Frequency	Percentage (%)
1	<120/80	14	12
2	(120/90) - (130/110)	40	33
3	(130/110) -(140-110)	30	25
4	(140/110) - (150/110)	14	12
5	(150/110) - (160/110)	9	7
6	(160/110) - (170/110)	5	4
7	(170/110) - (180/110)	3	3
8	(180/110)-(190/110)	4	3
9	(190/110 )- (200/110)	1	6

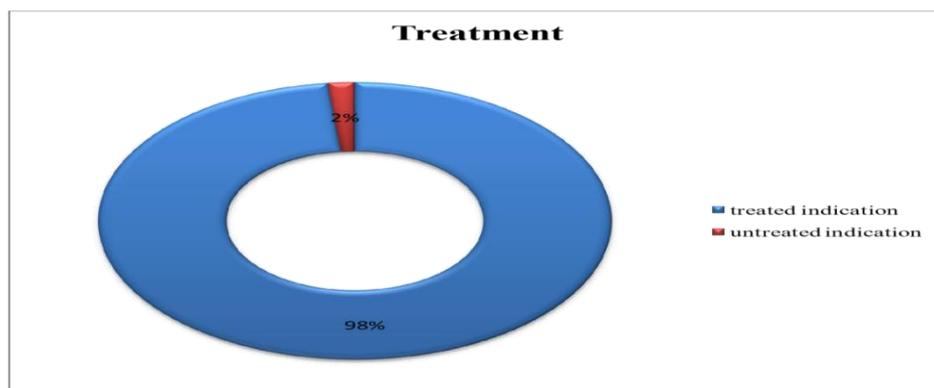


**Figure: 11**Graphical representation of BP levels

**TREATMENT:** Among 120 patients, 98.33% patients are mostly treated shown in Table 12

**Table: 12 shows the distribution of treatment levels**

S.No	Treatment	No of patients	Percentage (%)
1	Treated cases	118	98.33
2	Untreated cases	2	1.66



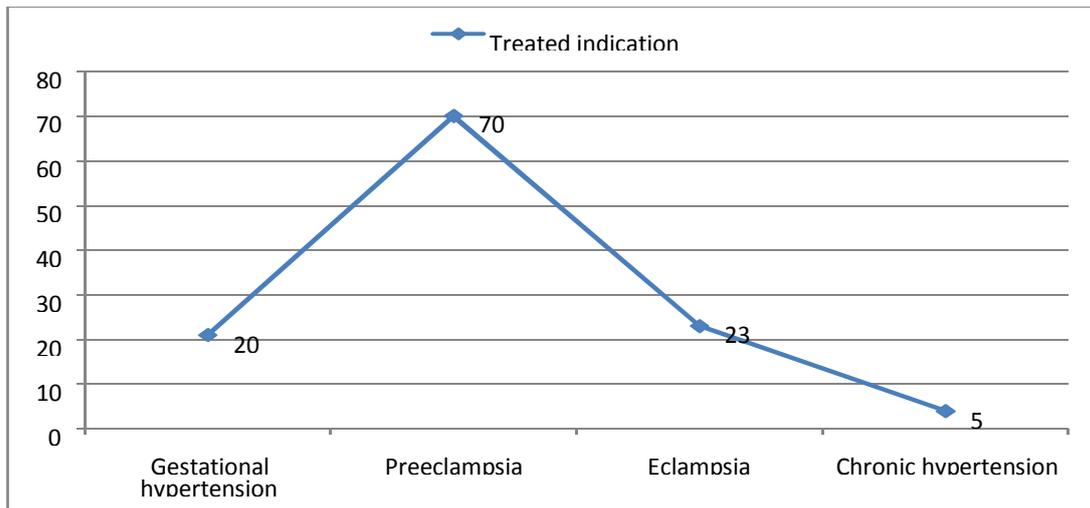
**Figure: 12** Graphical representation of treatment

**IV. Summary Of Treated Patients Of Hypertensive Disorders:**

Among 118 treated patients, most frequently treated is preeclampsia with 59% shown in Table 13

**Table: 13 show the distribution of treatment level in types of hypertensive disorders:**

S. No	Types of hypertensive disorders	No. of patients	Percentage (%)
1	Gestational hypertension	21	18%
2	Preeclampsia	70	59%
3	Eclampsia	23	20%
4	Chronic hypertension	5	3%

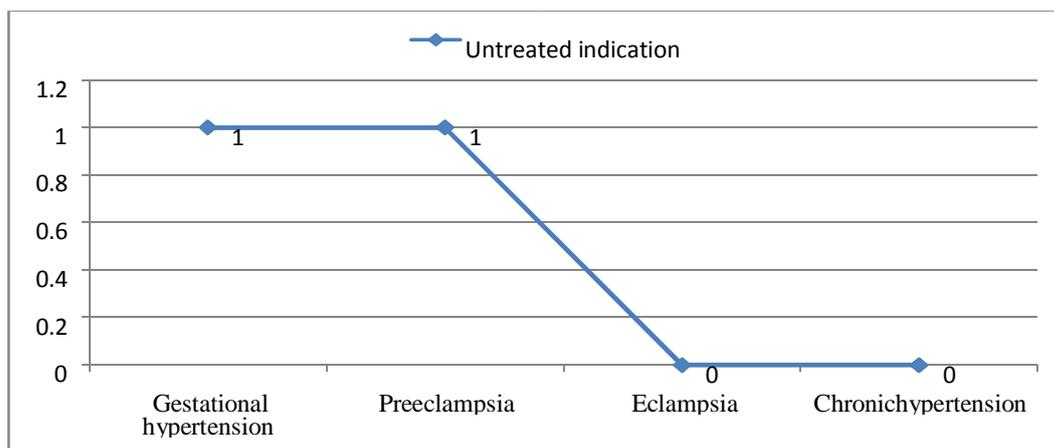


**Figure: 13 shows Graphical representation of treated patients of hypertensive disorders**

**SUMMARY OF UNTREATED PATIENTS OF HYPERTENSIVE DISORDERS:** Among 4 types, gestational hypertension 50% and preeclampsia 50% are untreated equally represented in Table 14

**Table: 14 shows Distribution of untreated levels in types of hypertensive disorders in pregnancy**

S. No	Types of hypertensive disorders	No. of patients	Percentage (%)
1	Gestational hypertension	1	50
2	Preeclampsia	1	50
3	Eclampsia	0	0
4	Chronic hypertension	0	0

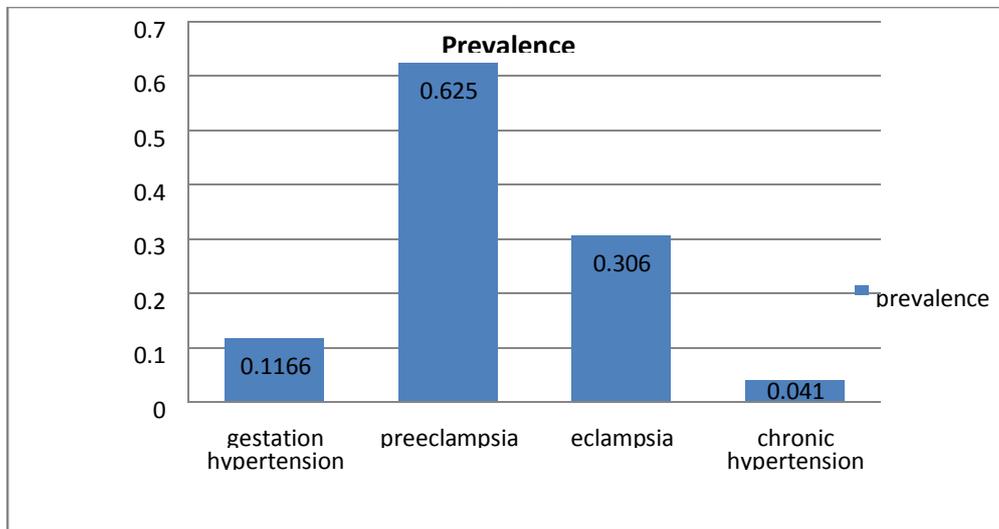


**Figure: 14 Graphical representation of untreated patients of hypertensive disorders.**

**PREVALENCE:** Among all types, preeclampsia has more prevalence (0.625) as shown in Table

**Table: 15 shows the prevalence of hypertensive disorders**

S.No	Types of hypertensive disorders	Frequency	Prevalence
1	Gestational hypertension	21	0.1166
2	Preeclampsia	75	0.625
3	Eclampsia	23	0.306
4	Chronic hypertension	5	0.041

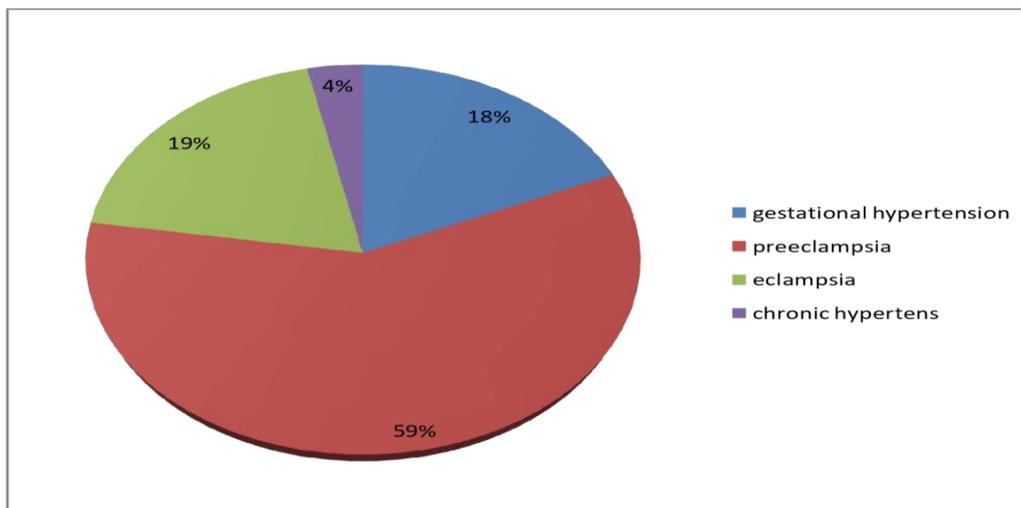


**Figure: 15 Graphical representation of prevalence of hypertensive disorders.**

**INCIDENCE:** Among 120 patients, Mostly preeclampsia has more incidence (59%) rate as shown in Table16

**Table: 16 shows the incidence**

S. no	Types of hypertensive disorders	Frequency	New cases
1	Gestational hypertension	21	22
2	Preeclampsia	71	64
3	Eclampsia	23	22
4	Chronic hypertension	5	2

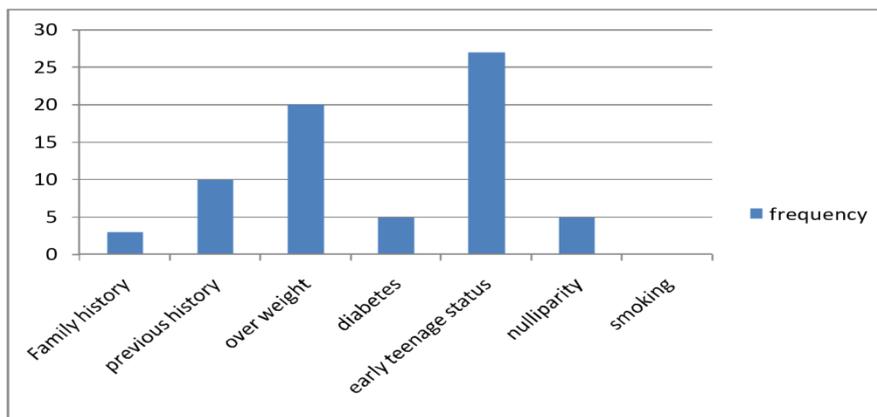


**Figure: 16 Graphical representation of incidence**

**RISK FACTORS:** Among 120 patients, most frequently occurred risk factor is early teenage status and over weight as shown in Table 17

**Table: 17 shows frequency of risk factors**

Risk Factors	Frequency
Family history	3
Previous history	10
Over weight	20
Diabetes	5
Early teenage status	27
Null parity	5
Smoking	0



**Figure: 17 Graphical representations of risk factors**

**STATISTICAL DATA:**

Distribution of Recovered patients in types of hypertensive disorders:

Among 120 patients, most frequently occurred outcome frequency is in preeclampsia shown in Table: 18

**Table: 18 shows distribution of recovered patients in hypertensive disorders**

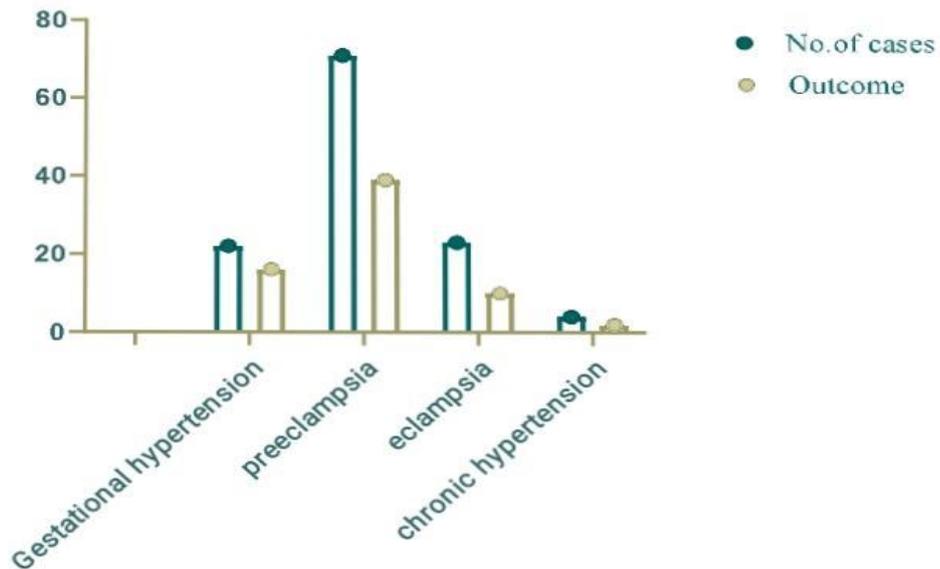
S. No	Types of hypertensive disorders	No. of patients	No. of patients recovered
1	Gestational hypertension	22	16
2	Preeclampsia	71	39
3	Eclampsia	23	10
4	Chronic hypertension	4	2

Table Analyzed	Data 1
Column B	Data Set-B
vs.	vs.
Column A	Data Set-A
Paired t test	
P value	0.1404
P value summary	Ns
Significantly different (P < 0.05)?	No
One- or two-tailed P value?	Two-tailed
t, df	t=1.992, df=3
Number of pairs	4

<b>How big is the difference?</b>	
Mean of differences	-13.25
SD of differences	13.30
SEM of differences	6.651
95% confidence interval	-34.41 to 7.915
R squared (partial eta squared)	0.5695
<b>How effective was the pairing?</b>	
Correlation coefficient (r)	0.9854
P value (one tailed)	0.0073
P value summary	**
<b>Was the pairing significantly effective?</b>	Yes

Conclusion: There is a significance difference between cases and outcome

**Figure: 18** Graphical representation of recovered patients in types of hypertensive disorder



Distribution of Recovered patients of different age groups

Among 120 patients, 65 patients are more frequently occurred outcome shown in Table: 19

**Table: 19** shows distribution of age with no. of patients recovered

S. No	Age	No. of patients	No. of patients recovered
1	18-20	30	25
2	21-30	78	65
3	31-40	12	10

<b>Table Analyzed</b>	<b>Data 2</b>
<b>Column B</b>	Data Set-B
vs.	vs.
<b>Column A</b>	Data Set-A
<b>Paired t test</b>	
<b>P value</b>	0.1794

P value summary	Ns
Significantly different (P < 0.05)?	No
One- or two-tailed P value?	Two-tailed
t, df	t=2.031, df=2
Number of pairs	3
How big is the difference?	
Mean of differences	-6.667
SD of differences	5.686
SEM of differences	3.283
95% confidence interval	-20.79 to 7.459
R squared (partial eta squared)	0.6734
How effective was the pairing?	
Correlation coefficient (r)	Perfect line
P value (one tailed)	
P value summary	
Was the pairing significantly effective?	

Conclusion: There is a significance difference between age group and outcome frequency

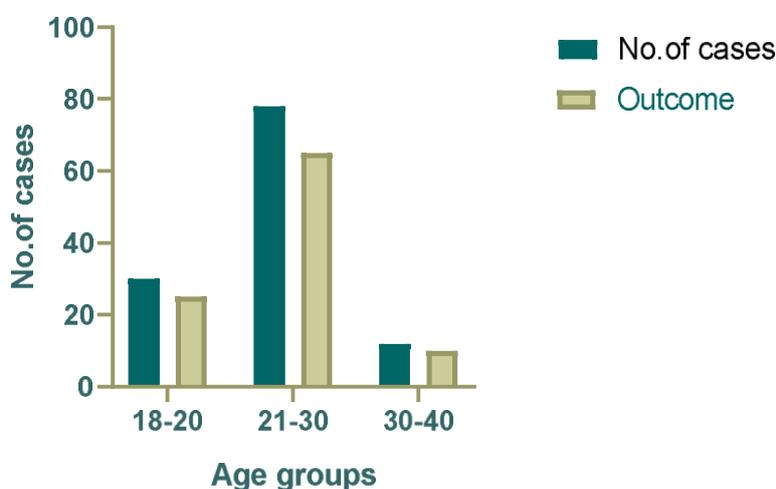


Figure: 19 Graphical representation of recovered patients of different age groups

### V. Discussion

Our prospective observational study was carried out among 120 patients in Gynaecology inpatients department in Government General Hospital shows that the majority of type of hypertensive disorder occurring in pregnant women is pre-eclampsia (59%).

In our current study, age wise distribution shows that the majority of patients admitted to the gynaecology inpatients department were under the age of 18-20 (25%), 21-30 (65%), 31-40 (10%). Age group of 21-30(65%) develop the majority of types of hypertensive disorders. Our study conducted among 120 patients shows majority of type of pre-eclampsia is the mild pre-eclampsia and the type of eclampsia mostly occurring in the patients is antepartum eclampsia (65%).

In our study the drugs used in the treatment of hypertensive disorders in pregnant women are anti hypertensive agents such as beta blockers-labetalol, calcium channel blockers-nifedipine and amlodipine and diuretics-furosemide, and anti convulsive agents such as magnesium sulphate were used respectively. The majority of patients in our study were treated with  $\beta$  blockers-labetalol (68%) and anticonvulsive agents-magnesium sulphate (18%).

The study shows that combination of drugs used in Gestational hypertension is Labetalol (82%), Labetalol + Nifedipine (6%), Labetalol + Magnesium sulphate (6%), Labetalol + Magnesium sulphate +

Amlodipine (6%). The majority of drug used in the gestational hypertension is Labetalol (82%) single therapy rather than combination therapy.

The drugs used in pre-eclampsia is labetalol (69%), Labetalol + Magnesium sulphate (41%),

The outcome of the management evaluation is treated (98.33%). Among all types, preeclampsia has more prevalence (0.625). Preeclampsia has more incidence rate. Early teenage status is the most frequently occurred risk factor.

Statistical data is analyzed for the outcome of age group and types of hypertensive disorders by using Prism software. Data includes that there is no significance difference between age group and outcome and also between types of hypertensive disorders and outcome.

## VI. Conclusion

The study was carried out in an attempt to find out the epidemiology and evaluation of treatment of drugs prescribing at Government General Hospital. The study showed an active involvement of clinical pharmacists in Gynaecology department.

Most of the patients attending the gynaecology department with types of hypertensive disorders were under the age of 20-30. We studied the types of hypertensive disorders occurred in the pregnant women. The incidence of the hypertensive disorders is mostly seen in pre-eclampsia condition.

In our study, we observed the mostly occurring type of hypertensive disorders, age, and the distribution of drugs in treating the types of hypertensive disorders in pregnant women. Various types of drugs were used depending upon the type of hypertensive disorders. In our study most commonly antihypertensive agents are used such as beta blockers (labetalol), calcium channel blockers (nifedipine, amlodipine) diuretics (osmotic diuretic – furosemide), centrally acting alpha 2 agonist – methyldopa. Most commonly used anti convulsive agent is magnesium sulphate which is used to treat the seizures in the types of hypertensive disorders in pregnant.

A prospective observational study was carried out and it concludes that the epidemiological study conducted on the hypertensive disorders in pregnant women is preeclampsia, and the treatment provided to the pregnant women was satisfactory.

## Acknowledgement:

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