

A study on incidence and management of preeclampsia and its complications in a tertiary teaching care hospital

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Date of Submission: 20-06-2021

Date of Acceptance: 03-07-2021

ABSTRACT: This research paper is about to Preeclampsia, which is one of the leading cause of maternal mortality and morbidity. As per WHO, pre-eclampsia is characterized by the onset of a new episode of hypertension and substantial proteinuria occurring after 20 weeks of pregnancy. Preeclampsia affects the arteries carrying blood to the placenta which leads to fetal growth restriction or preterm birth. Antihypertensive drugs that are used in pre-eclampsia were labetalol, nifedipine and hydralazine. The diagnosed criteria are, raised blood pressure systolic blood pressure of 140 mmHg or higher and diastolic blood pressure of 90 mmHg or higher and proteinuria is increased urinary excretion of 0.3g (>300mg/24hr) per or higher in a 24hour of urine specimen. Preeclampsia when remains untreated, it can cause more serious condition known as eclampsia. Eclampsia is a generalized seizure for which women are often treated with magnesium sulfate. The clinical findings of severe preeclampsia are assorted by the presence of systemic endothelial dysfunction and microangiopathy, the liver (hemolysis, elevated liver function tests and low platelet count, namely HELLP syndrome) and the kidney (proteinuria).

KEYWORDS: Preeclampsia, Eclampsia, HELLP Syndrome, obstetrics and gynaecology

I. INTRODUCTION

In rural areas pregnancy induced diseases is very common, mainly pregnancy induced hypertension (PIH) they are mainly classified into 4 categories such as Chronic Hypertension, Preeclampsia-eclampsia, preeclampsia superimposed on chronic hypertension and gestational hypertension. In some of the rural areas most of death occurs due to pregnancy condition, because of lack of essential equipment and medication are unstaffed and have limited or no

access to specialist care [1]. Hypertension is the most common medical problem encountered in pregnancy and remains an important cause of maternal and fetal morbidity and mortality. It complicates almost 10% of all pregnancies. According to the new guidelines given by American Congress of Obstetricians and Gynaecologist (ACOG) in 2013, PIH occurs more frequently in young primigravidae and mothers over 35 years of age. The incidence of primigravidae is about 10% and in multigravidae is 5%.

Pregnancies complicated by hypertension are associated with increased risk of adverse fetal, neonatal and maternal outcomes, including preterm birth, intrauterine growth restriction (IUGR), perinatal death and maternal death etc.. Increased risk of hypertension will cause preeclampsia, and some patients its leads to eclampsia and its complications like HELLP syndrome. The main cause of pregnancy induced hypertension is unknown. High blood pressure during pregnancy poses various risks including; decreased blood flow to the placenta. If the placenta doesn't get enough blood, your baby might receive less oxygen and fewer nutrients. This can lead to slow growth (intrauterine growth restriction), low birth weight or premature birth. New onset of sustained elevated blood pressure after 20 weeks gestation in a previously normotensive woman (≥ 140 mmHg systolic or ≥ 90 mmHg diastolic on at least 2 occasions 6 hours apart. and no proteinuria [2]. The main symptoms of Preeclampsia is high blood pressure and protein in the urine, edema. Slight swelling over the ankles, face, abdomen wall or even the whole body is the mild symptoms of preeclampsia.

And some patients its leads to eclampsia and its complications like HELLP syndrome. The

main cause of pregnancy induced hypertension is unknown.

High blood pressure during pregnancy poses various risks including; decreased blood flow to the placenta. If the placenta doesn't get enough blood, your baby might receive less oxygen and fewer nutrients. This can lead to slow growth (intrauterine growth restriction), low birth weight or premature birth. New onset of sustained elevated blood pressure after 20 weeks gestation in a previously normotensive woman (≥ 140 mmHg systolic or ≥ 90 mmHg diastolic on at least 2 occasions 6 hours apart. and no proteinuria [2]. The main symptoms of Preeclampsia is high blood pressure and protein in the urine, edema. Slight swelling over the ankles, face, abdomen wall or even the whole body is the mild symptoms of preeclampsia. Headache, diminished urine output, disturbed sleep, blurring vision are the alarming symptoms. The warning signs are severe headache, nausea or vomiting, dizziness or double vision, decreased frequency of urination and rapid pulse. During pregnancy, the fetus has some of the demands to develop itself and every organ of the mother's body has to work harder in order to meet the demands. If mother having any chronic disease may struggle to fulfill these demands.[3]. Risk factors for preeclampsia include obesity, prior hypertension, older age, and diabetes mellitus, high blood pressure or kidney disease before starting pregnancy, having another condition such as lupus or antiphospholipid syndrome. Most cases are diagnosed before delivery. Rarely, preeclampsia may begin in the period after delivery. Known risk factors for preeclampsia are chronic hypertension, kidney disease, and family history of preeclampsia, having sub clinical hypothyroidism or thyroid antibodies.

Diagnostic criteria: Pre-eclampsia is diagnosed when a pregnant woman develops:

Blood pressure ≥ 140 mmHg systolic or ≥ 90 mmHg diastolic on two separate readings taken at least four to six hours apart after 20 weeks' gestation in an individual with previously normal blood pressure. In a woman with essential hypertension beginning before 20 weeks' gestational age, the diagnostic criteria are an increase in systolic blood pressure (SBP) of ≥ 30 mmHg or an increase in diastolic blood pressure (DBP) of ≥ 15 mmHg. Proteinuria ≥ 0.3 grams (300 mg) or more of protein in a 24-hour urine sample or a SPOT urinary protein to creatinine ratio ≥ 0.3

or a urine dipstick reading of 1+ or greater (dipstick reading should only be used if other quantitative methods are not available). Suspicion for pre-eclampsia should be maintained in any pregnancy complicated by elevated blood pressure, even in the absence of proteinuria.

Prevention: Preventive measures against pre-eclampsia have been heavily studied. Because the pathogenesis of pre-eclampsia is not completely understood, prevention remains a complex issue. Below are some of the currently accepted recommendations.

Diet: supplementation with antioxidants such as vitamin C, D and E has no effect on preeclampsia incidence, therefore, supplementation with vitamins C, E and D is not recommended for reducing the risk of preeclampsia.

Physical activity: there is insufficient evidence to recommend either exercise or strict bedrest as preventive measure of preeclampsia.

Immune modulation: Some studies have suggested the importance of a woman's gestational immunological tolerance to her baby's father, as the baby and father share genetics. Although preeclampsia is a disease of first pregnancies, the protective effect of multiparity is lost with change of partner.[4]

Treatment:

Treatment can range from expectant management to expedited delivery by induction of labour or Caesarean section, in addition to medications. Bed rest has not been found to be useful and is thus not routinely recommended.

Blood pressure -

The World Health Organization recommends that women with severe hypertension during pregnancy should receive treatment with anti-hypertensive agents.. Labetalol, hydralazine and nifedipine are commonly used antihypertensive agents for hypertension in pregnancy.

Eclampsia is the development of new convulsions in a pre-eclamptic patient that may not be attributed to other cause. It is a sign that the underlying pre-eclamptic condition is severe and is associated with high rates of perinatal and maternal morbidity and mortality.

HELLP syndrome is defined as haemolysis (microangiopathic), elevated liver enzymes (liver dysfunction), and low platelets (thrombocytopenia). This condition may occur in 10–20% of patients with severe pre-eclampsia and

eclampsia and is associated with increased maternal and fetal morbidity and mortality. In 50% of instances, HELLP syndrome develops preterm, while 20% of cases develop in late gestation and 30% during the post-partum period.

The National Institute for Health and Care Excellence (NICE) has commissioned the RCOG to produce evidence based guidelines for health and social care in women's. NICE are determined by vigorous, transparent methods and are based on the best available clinical and cost effective evidence. [

II. OBJECTIVE:

To evaluate the incidence of preeclampsia, study the diagnostic criteria and treatment options for preeclampsia and study the complication of preeclampsia, to provide knowledge about the conditions by patient counselling, patient information leaflet forms.

METHODS:

Study Site: The study was conducted in Chigateri District Hospital (tertiary teaching care hospital), Davangere.

Study Design: The study was a prospective observational study.

Study Duration: The study was conducted for a period of 6 months.

Proposed Sample Size: A total of 130 cases from obstetrics and gynaecology department of the hospital were taken.

Sampling Method: A convenient sampling method was used.

Sources of Data:

- The data will be collected from the case sheets of all inpatients of obstetrics and gynaecology department in Chigateri District Hospital, Davangere.
- Interaction with patients.

Inclusion Criteria:

- Patient beyond 20 weeks with hypertension, proteinuria and convulsions.
- Patient's age group 18-40 years.
- Patients with complete details on their profile form.

Exclusion Criteria:

- Patients are not willing to share their information.
- All pregnant patients with hypertensive disorders complicating pregnancy getting terminated before 20 weeks excluded.

Ethical approval: The study was approved by the Institutional Ethics Committee of SCS College of Pharmacy, Harapanahalli.

Materials Used: Patient case sheet, Data entry form, Patient information leaflet forms, Medscape, Lexi comp, Science Direct, NICE guideline, DC Dutta's textbook of obstetrics 8th edition.

Method Of Data Collection: A prospective observational study was conducted in the inpatients of obstetrics and gynecology department with preeclampsia in Chigateri District Hospital, Davangere; the data required for the study was collected from data collection forms; inpatients in the obstetrics and gynecology ward, meeting the inclusion criteria was enrolled in the study; the demographic details, family history as well as previous pregnancy history was recorded; and the results was analyzed in percentage and provide knowledge about the conditions by patient counseling, patient information leaflet forms.

Statistical method: Data was represented graphically and analyzed using statistical method like MS Excel

III. RESULTS

In this study 130 patients were enrolled after getting informed consent. The prescribing pattern and demographic details were collected in the data collection form. The filled form were analysed and the results were interpreted by using Microsoft excel

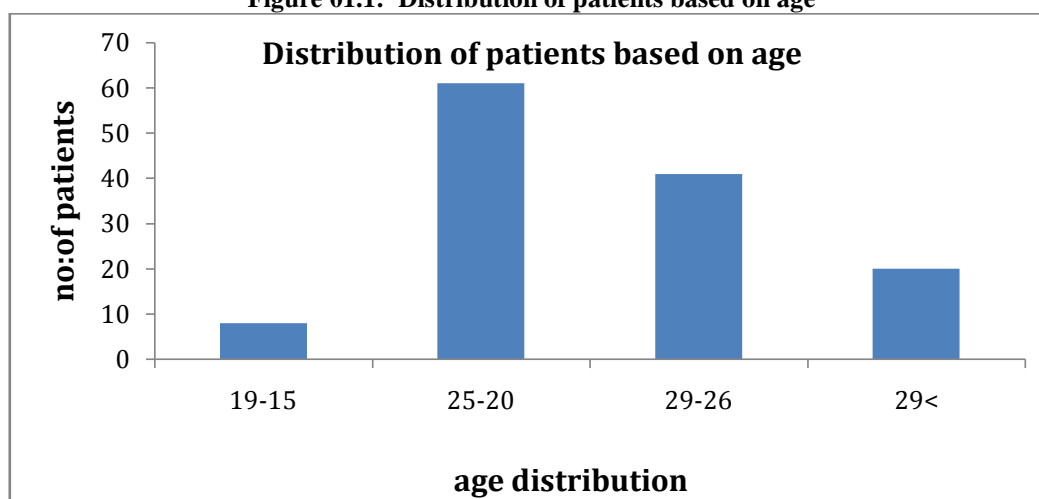
1) Distribution of patients based on Age

Out of 130 patients analysed, majority of patients were in the age group of 20-25 years 61, (46.92%) followed by 26-29 years 41(31.53%), greater than 29 years 20 patients are there(15.38%), and in between 15-19 years 8 patients (6.15%).

Table 01: Distribution of patients based on AgeN=130

Age (in years)	No: of patients	Percentage (%)
15-19	8	6.15
20-25	61	46.92
26-29	41	31.53
>29	20	15.38

Figure 01.1: Distribution of patients based on age



2) Distribution of patients based on duration of pregnancy /Gestational Age

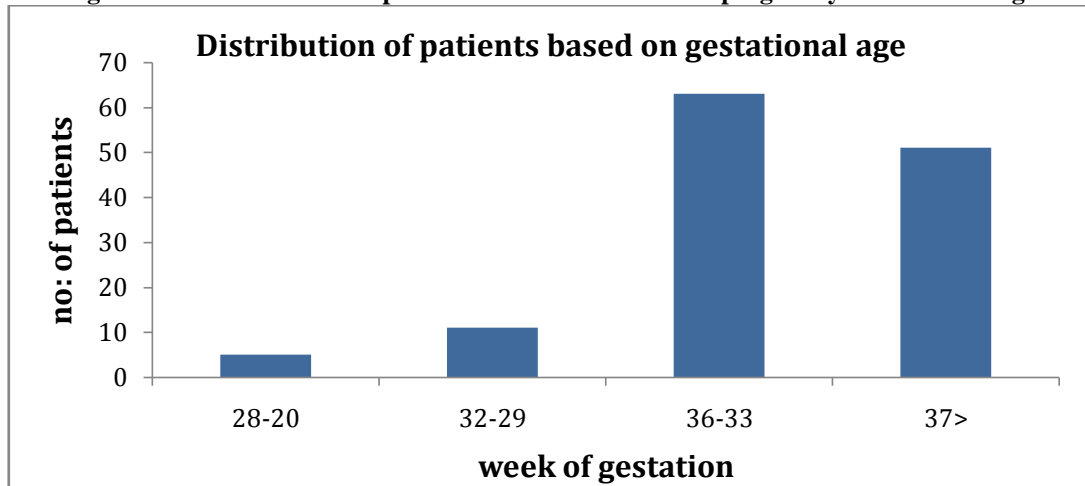
Out of 130 patients analysed, majority of patients were in the age group of 33-36 weeks of gestation 63 patients(48.46%), followed by greater

than 37 weeks of gestation 51 patients (39.23%), 11 patients are in the 29-32 weeks of pregnancy (8.46%) and 5 patients are in the period of 20-28 weeks of gestation(3.84%).

Table 02: Distribution of patients based on duration of pregnancy /Gestational Age N=130

Duration of pregnancy (in weeks)	No: of patients	Percentage %
20-28	5	3.84
29-32	11	8.46
33-36	63	48.46
>37	51	39.23

Figure 02.1: Distribution of patients based on duration of pregnancy /Gestational Age



3) Distribution of patients based on gravidity status

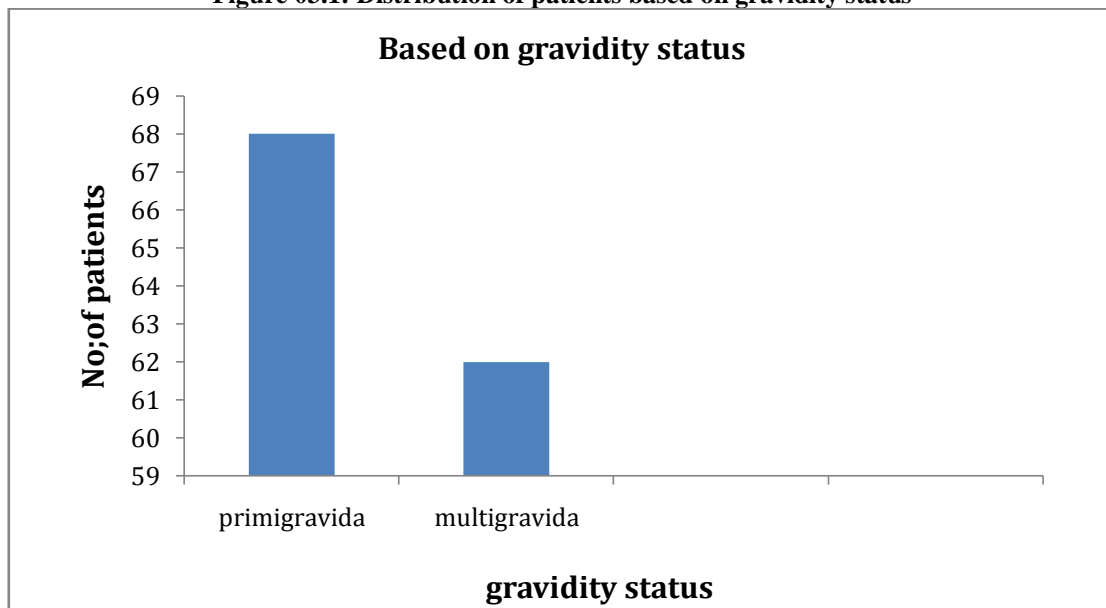
Among 130 patients are analysed on the basics of gravidity status 68 patients (52.30%) were

primigravida and 62 patients (47.69%) were multigravida.

Table 03: Distribution of patients based on gravidity status N=130

Gravidity status	No: of patients	Percentage %
Primigravida	68	52.30
Multigravida	62	47.69

Figure 03.1: Distribution of patients based on gravidity status



4) Distribution of patients based on mode of delivery

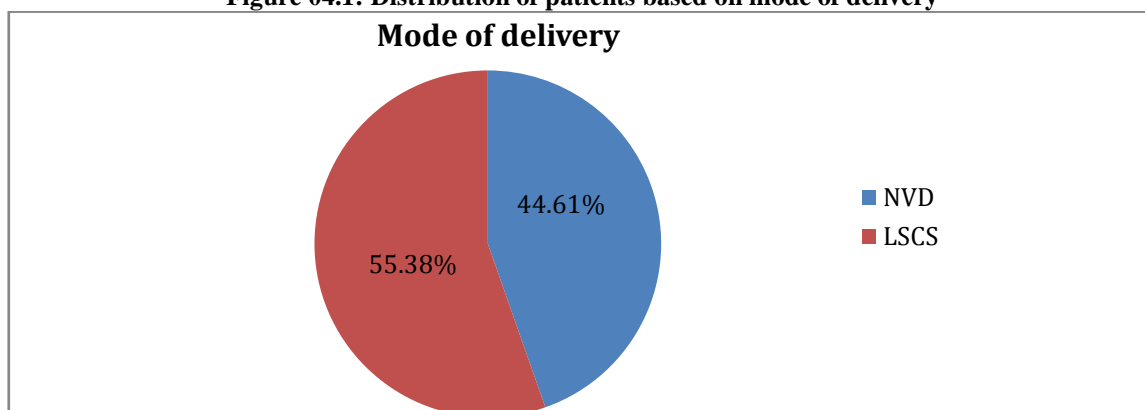
As analysed on the basics of mode of delivery among 130 patients, no: of lower segment

caesarean section LSCS 72 patients (55.38%) is more than normal delivery 58 patients (44.61%).

Table 04: Distribution of patients based on mode of delivery N=130

Mode of delivery	No: of patients	Percentage %
Normal vaginal delivery (NVD)	58	44.61
Lower segment caesarian section (LSCS)	72	55.38

Figure 04.1: Distribution of patients based on mode of delivery



5) Distribution of patients based on complications of preeclampsia

Out of the 130 patients, 7 were diagnosed with HELLP Syndrome (5.38%) and 21 patients were

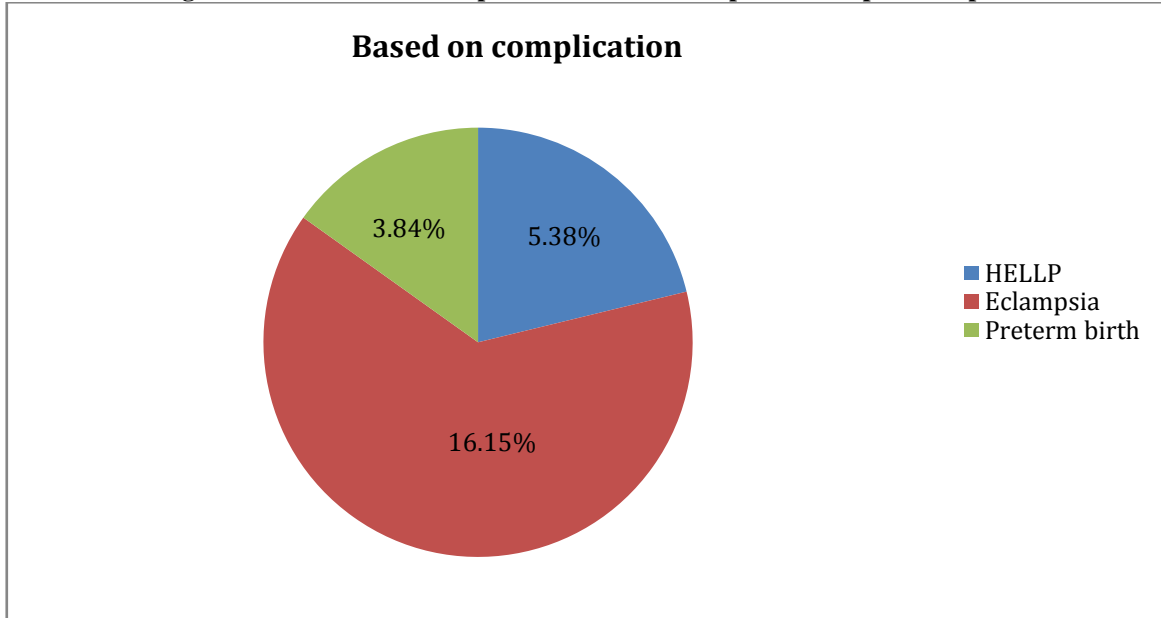
diagnosed with seizure/ eclampsia (16.15%) and 5 patients were having preterm birth (3.84%).

Table 05: Distribution of patients based on complications of preeclampsia

N=130

Complication	No:of patients	Percentage
HELLP Syndrome	7	5.38
Eclampsia	21	16.15
Preterm birth	5	3.84

Figure 05.1: Distribution of patients based on complication of preeclampsia



6) Distribution of patients based on drugs used

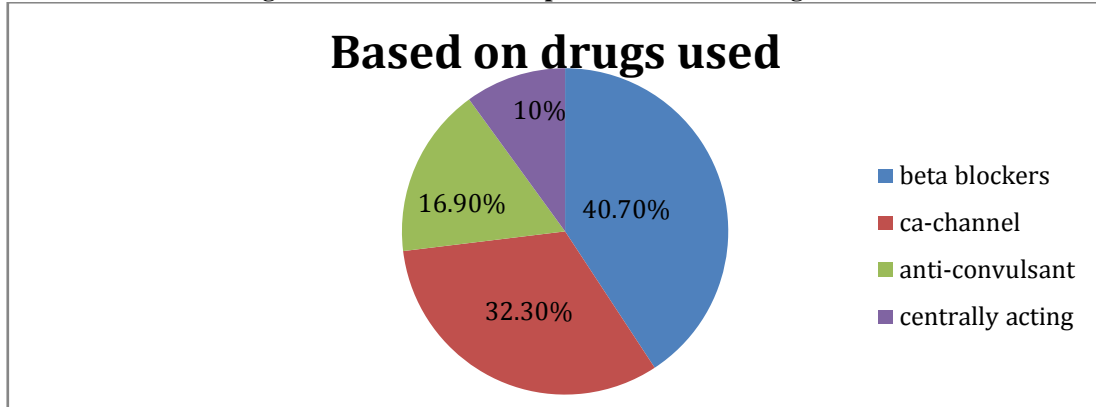
Out of 130 preeclampsia patients, mostly used drugs are beta-blockers (labetalol) in 53 patients (40.7%), calcium channel blockers (

nifedipine) used in 42 patients (32.30%) and anti-convulsant like MgSO₄ is used in 22 patients (16.9%) and centrally acting drugs like hydralazine in 13 patients (10%).

Table 6: Distribution of patients based on drugs used N=130

CLASS OF DRUGS	NAME OF DRUGS	NO:OF PATIENTS	PERCENTAGE
Beta-blockers	labetalol	53	40.7
Ca-channel blockers	nifedipine	42	32.30
Anti-convulsant	MgSO ₄	22	16.9
Centrally acting	Hydralazine	13	10

Figure 6.1: Distribution of patients based on drugs used



7) Incidence of Adverse Drug Reactions

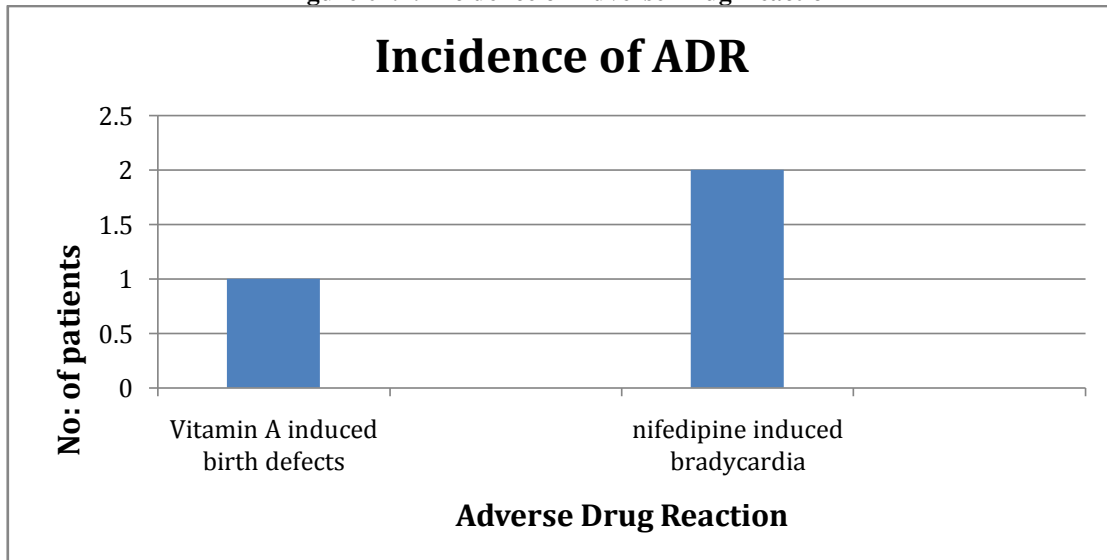
Three adverse drug reactions were reported during the study period. These include one high dose of

vitamin A induced birth defects in developing fetus and two incidence of nifedipine induced bradycardia.

Table 07: Incidence of Adverse Drug Reactions N=130

Adverse Drug Reactions	No: of patients
Vitamin A induced- birth defects	1
Nifedipine induced- bradycardia	2
TOTAL	3

Figure 07.1: Incidence of Adverse Drug Reaction



8) Incidence

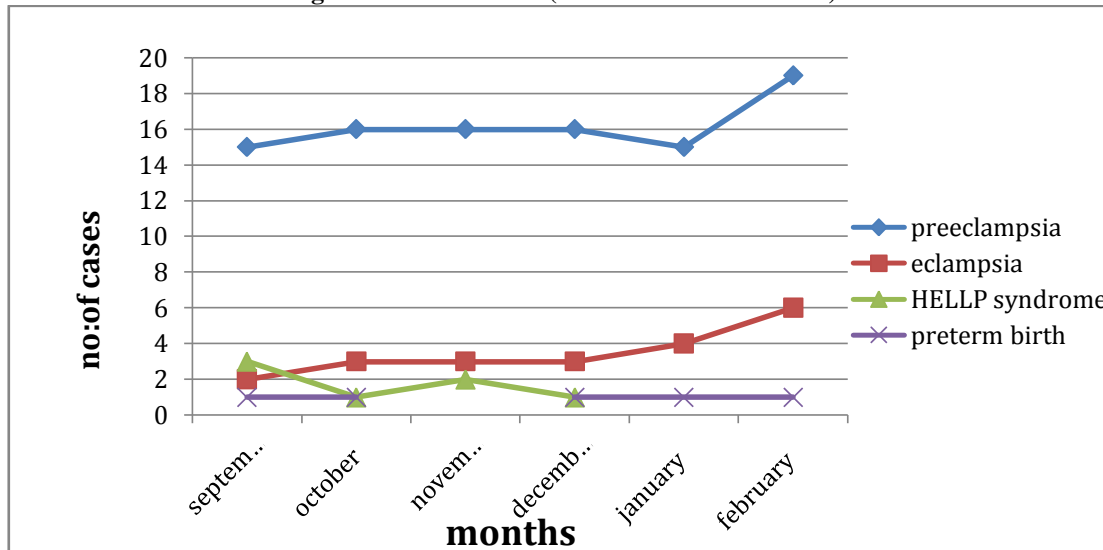
The incidence rate of preeclampsia, eclampsia, HELLP syndrome, pre term birth in our hospital

during 6 month of study period is following.(How many people with disease are newly diagnosed within 6 month of period)

Table 08: incidence (occurrence of new cases) N=130

MONTHS	NO:OF CASES			
	Preeclampsia	Eclampsia	HELLP Syndrome	Preterm birth
September	15	2	3	1
October	16	3	1	1
November	16	3	2	-
December	16	3	1	1
January	15	4	-	1
February	19	6	-	1

Figure 08.1: Incidence (occurrence of new cases)



$$\text{Incidence} = \frac{\text{No: of new cases in a particular time period}}{\text{total population at risk during the same time period}} \times 1000$$

• **The incidence of preeclampsia in our hospital;**

Total no: of patients who had preeclampsia and its complications = 130

No: of patients has only preeclampsia = 97

Total population of patients during 6 months = ~1000

Incidence of preeclampsia = $97/130 \times 1000$
 = **746.15** = **74.6%**

- **The incidence of eclampsia in our hospital;**

No: of patients who had eclampsia = 21

$$\begin{aligned} \text{Incidence of eclampsia} &= 21/130 \times 1000 \\ &= 161.53 \quad = 16.1\% \end{aligned}$$

- **The incidence of HELLP syndrome in our hospital;**

No: of patients who had HELLP syndrome = 7

$$\begin{aligned} \text{Incidence of HELLP syndrome} &= 7/130 \times 1000 \\ &= 53.84 \quad = 5.38\% \end{aligned}$$

- **The incidence of preterm birth in our hospital;**

No: of patients who had preterm birth = 5

$$\begin{aligned} \text{Incidence of preterm birth} &= 5/130 \times 1000 \\ &= 38.46 \quad = 3.84\% \end{aligned}$$

IV. DISCUSSION

Our study was conducted for a period of 6 months and the data of 130 patients from the OBG department, which all who have satisfied with the inclusion criteria and were analysed in prospective manner. Among 130 patients with preeclampsia incidence has calculated for the time period of 6 months. And from these 130 PE patients, complicated cases have been analysed and categorized in groups on the basics of age, BMI, week of gestation, symptoms, mode of delivery, gravidity, severity of condition, comorbidity etc.

From the study with 130 patients for 6-month period identified that there is 97 preeclampsia, 21 eclampsia, 7 HELLP syndrome, 5 preterm birth. The incidence of new cases in each month has been demonstrated with the help of a graph. And for the study period of 6 months the incidence has been calculated with the equation;

The majority of patients in our study were diagnosed with preeclampsia followed by eclampsia, HELLP syndrome and preterm birth, which is in accordance with study is followed in accordance with the study about incidence of preeclampsia in Taiwan conducted by Chan Te-Fu et al., [6]

Out of 130 patient's data collected majority of patients were in the age group 20-25 (46.92%), followed by 26-29 years group (31.53%), 29 years age group (15.38%), and between 15-19

years group (6.15%) as the result, which is similar with the study conducted by PeguZasna et al.,[7] about the severity of preeclampsia in different age groups.

The patients were categorized to underweight, normal weight, over weight and obesity and the study found that majority of patients were having overweight (43.8%), followed by normal weight (37.6%), obesity (10.7%), and underweight (7.6%) respectively, result obtained is correlated with the study of association between pregnancy body mass index and risk of preeclampsia conducted by PeguZera et al[7]Preeclampsia and complications and seen more in higher pregnancy body mass index patients.

Preeclampsia usually begins after 20 weeks of pregnancy. In our study out of 130 patients, majority were in the group of 33-36 weeks (48.46%), followed by 37 weeks (39.23%), 29-32 weeks (8.46%), and 20-28 weeks (3.84%) of gestation, which is accordingly, to the study conducted by ManjushaAjith et al., regarding the incidence of pregnancy induced hypertension and the prescribing patterns of antihypertensive drugs in pregnancy, the patients were classified into groups on the basics of gestational weeks.

As grouping the 130 patients on gravidity basis, 68 patients (52.30%) were in primigravida and 62 patients (47.69%) were in multigravida, i.e.,

majority comes in primigravida for preeclampsia and its complications, which is also correlated with the study conducted by ManjushaAjith et al.,

We analysed 130 patients on the basis of mode of delivery. Since after delivery preeclampsia reduces at higher extent induced labour are used in preeclampsia conditions. Among the 130 patients, 72 were lower segment caesarean section (LSCS) and 58 were normal delivery in the result, which is similar to the study conducted with 200 pregnant women at gauhali medical college for a time period of 1 year. The study was on the basis of age group for severe preeclampsia, and also include high proportion of severe preeclampsia cases among nulliparous women and increased incidence of caesarean section among severe preeclampsia by PeguZasna et al.,

There may be no symptoms with preeclampsia but it is also accompanied with some. Among 130 patients, proteinuria were found in 120 patients (92.30%), peripheral edema in 96 patients (73.84%), severe headache in 110 patients (84.61%), epigastric in 104 patients (80%), blurring vision in 106 patients (81.53%), and seizure in 7 patients (5.38%) as the result, which is correlated with study of incidence of pregnancy induced hypertension conducted by ManjushaAjith et al. and also on the basis of NICE guidelines.

As classifying into stages mild and severe based on the severity. The severe preeclampsia were 82 patients (63.07%) was found to be greater than mild preeclampsia, which is 48 patients (36.92%). The classification we have done here is similar with results of the study carried out by ThobbiVidhya et al.,[2]

Untreated preeclampsia may lead to several complications. Such cases are also found in the 6-month study period with 130 patients, from those patients there were 7 HELLP syndrome, 21 seizure/eclampsia and 5 preterm birth which is resembling with the study conducted by ShahulSajid et al., [8] Preeclampsia can also cause your placenta to suddenly separate from your uterus, which is placental abruption, a serious and rare preeclampsia complication due to untreated condition.

In our analysis, we demonstrate the presence of comorbidities in pregnant women who were in the risks for preeclampsia/ eclampsia, including hypertension, asthma, anaemia, diabetes, urinary tract infection, liver problems, malaria, HIV, cardiac problems etc.. Majority of comorbid condition are with Diabetes mellitus(11 patients 8.46%), hypertension(10 patients 10%) and

seizure(7 patients 5.38%) followed by asthma, anaemia 4 patients each, urinary tract infection 3 patients and one each for malaria, HIV, tuberculosis, cardiac problems and liver problems which is in compliance with the outcome of study done by ShahulSajid et al.,

The preeclampsia can be managed by oral and IV medications until the fetus is sufficiently mature to be delivered. The effective treatment is delivery though, labetalol is given before delivery and Nifedipine is given after delivery as a treatment for preeclampsia. Along with these, anticonvulsants like magnesium sulphate is used in 22 patients and centrally acting drugs like hydralazine is used in 13 patients depending on the severity and conditions. This demonstration of our study is in correspondence to the study done by OdigboegwuObinnaya et al.,[9]

During the pregnancy period the medication should be given very accurately due to high risks to the mother and fetus, even a small mistake can lead to maternal and fetus problems. Beyond all the data we collected regarding the complications, symptoms, factors and medications etc. We also collected the adverse drug reactions during the study period. Since the pregnancy period has to be taken cared very well, mostly the treatments were accurate and we found only 3 adverse drug reactions which are one high dose of vitamin A induced birth defect in developing fetus and two nifedipine induced bradycardia. These results were in accordance with the study done by Alfredo oliveria et al.,[10]

V. CONCLUSION

Insight of our study was to demonstrate the increased occurrence of preeclampsia and the complication in pregnant women. In our study for six months, more than the half of the patients were having preeclampsia, which indicates that the occurrence of preeclampsia is more. Standard therapy guidelines were followed by the physician although rarely few adverse drug reaction was also found. The results also show that the influences of factors like age, body weight, previous pregnancy etc. with preeclampsia and its complications. Even though preeclampsia is serious condition it can be well controlled and cured and it had been done in the hospital very well. As like from older times, labetalol, nifedipine and labour reduces the condition to the most.

Lack of awareness about the condition and the care that can be taken, can lead to serious problems, which is one of the reasons for the increased

number of preeclampsia and its complications. Even though the treatments are very good at its peak. "Prevention is always better than cure".

SOME OF THE ADVANAGES FROM THE ABOVE RESULTS

- The incidences of preeclampsia and its complication in pregnant woman has been studied.
- Treatment given according to different causes and the results obtained from that treatment has been studied.
- Occurrence of preeclampsia and the complications in accordance of past medical history of the patient has been identified
- Occurrence of preeclampsia at different age groups , its severity ,importance and risks at different ages had been studied
- Complications occurred due to lack of awareness about preeclampsia or any previous known or unknown medical conditions had been studied

ACKNOWLEDGEMRNT

We wish to express our sincere gratitude to **Dr.R.Nagendra Rao**, Professor and Principal of the SCS College of Pharmacy,Harapanahalli .We express our sincere gratitude to **Prof. J.S Venkatesh**, professor and head of the department ofpharmacy practice, SCS College of Pharmacy, Harapanahalli.We sincerely thank our project guide **Dr.Davan B. Bevoor**, professor, SCS College of Pharmacy, Harapanahalli,**Dr.Shivuraj**, assistant professor SSCP, Tumkur.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee of SCS College of Pharmacy, Harapanahalli

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