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TITLE OF THE ARTICLE: OUTCOME OF PREGNANCY IN PREGNANCY INDUCED HYPERTENSION PATIENTS ADMITTED TO A TERTIARY CARE HOSPITAL FOR SAFE CONFINEMENT.

TYPE OF ARTICLE: Original Article

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Abstract

Background:. Hypertensive disorders in pregnancy contributes significantly to maternal and perinatal mortality and morbidity worldwide; aetiology being unknown, study of risk factors and its association is a necessity. **Objectives:** The primary objective of the study was to evaluate the outcome of pregnancy in patients with Pregnancy-induced-hypertension (PIH) and to assess all the associated risk factors. **Methods:** The study was a hospital based cross-sectional study from June 2016-September2017; included all women, admitted to labour room and inpatient wards of Department of Obstetrics &Gynaecology of a tertiary hospital for delivery. .Data was collected by interviewing using a predesigned pretested questionnaire, and analysis was done using IBM SPSS ver.16.0 **Results:** Of the total 373 females with PIH, 47.7% had severe preeclampsia, 28.7% had eclampsia,13.7% were diagnosed with gestational hypertension and 9.9% had mild preeclampsia. There were 13 maternal deaths of which 2 were due to severe preeclampsia and 11 were due to eclampsia. Anaemia , raised LFT &RFT

ISSN: 0975-3583,0976-2833 VOL13,ISSUE05,2022

were significantly associated with adverse maternal outcome. There were 37 foetal deaths , BMI > 25,raised SBP,DBP and raised LFT & RFT were significantly associated with adverse foetal outcomes . **Conclusion:** PIH being associated with adverse maternal and foetal outcomes, a knowledge on risk factors prevalent in specific geographical areas can help decrease maternal and neonatal deaths . Early diagnosis and treatment through regular antenatal check-up is a key factor to prevent hypertensive disorders of pregnancy and its complications.

Keywords : Gestational hypertension ,severe preeclampsia ,eclampsia

Introduction:

Hypertensive disorders of pregnancy (HDP), which comprise a group of hypertension-related diseases, contribute significantly to maternal and perinatal mortality and morbidity. [1, 2] Pregnancy-induced hypertension (PIH) is defined as systolic blood pressure (SBP) >140 mmHg and diastolic bloodpressure (DBP) >90 mmHg. It is classified as mild (SBP 140-149 and DBP 90-99 mmHg),moderate (SBP150-159 and DBP 100-109 mm Hg) and severe (SBP≥160andDBP≥110mmHg).[1] The spectrum of PIH is varied, ranging from gestational hypertension, mild preeclampsia, to severe preeclampsia and eclampsia.

With an incidence of 4-7%, preeclampsia remains a major cause of maternal and neonatal morbidity and mortality. [2] Admission into a hospital being crucial to monitor both mother and fetus, and delivery being the treatment, failure to control blood pressure (BP) in PIH is a cause for maternal and child health concern, because persistently high BP results in preterm births, perinatal deaths and about 18% of maternal deaths worldwide [2]. In the USA, 7% to 15% of all pregnancies were affected by hypertensive disorders and accounted for 22% of all perinatal mortality and 30% of all maternal mortality [3]. A study in India in 2006 reported the incidence of hypertensive disorders complicating pregnancy as 5.38% with preeclampsia, eclampsia, and HELLP (hemolysis, elevated liver enzymes, and low platelet count) syndrome accounting for 44%, 40%, and 7% of cases, respectively. [4] Maternal and perinatal deaths have been reported to be 5.5% and 37.5%, respectively. [4] India being a developing country with high maternal mortality rates, pregnancy complicated by raised BP, results in adverse maternal and fetal outcomes. The etiology of PIH is unknown, but assessment of the factors that predisposes to such a condition can help in early intervention and prevent adverse outcomes. Thus the study was conducted to evaluate the factors associated with PIH and the maternal and fetal outcomes among pregnant females with PIH admitted to a tertiary care

ISSN: 0975-3583,0976-2833 VOL13,ISSUE05,2022

hospital of southern Odisha. The objectives of the study, were to find out the risk factors associated with PIH in the study population, to assess the clinical profile of pregnant women with PIH and to evaluate the outcome of pregnancy of the study population

Materials and methods:

A hospital based cross-sectional study was conducted in inpatient wards of Department of Obstetrics &Gynecology (O&G) of a tertiary care teaching hospital of southern Odisha from October 2015 - November 2017. Approval was sought from the Institutional ethics committee and permission from the head of the department of O&G and Medical Superintendent of the hospital prior to data collection. A predesigned, pretested, interviewer administered questionnaire was used for data collection. The questionnaire was pretested among 30 pregnant females diagnosed with PIH admitted to another district hospital, this district hospital refers patients to the teaching hospital.

The study population comprised all eligible women, who satisfied the inclusion criteria and were admitted to the labour room and in-patient wards of department of O & G, during the study period for safe confinement.

Inclusion Criteria:

- All pregnant women diagnosed with PIH during the antenatal period and admitted for safe confinement and giving written informed consent.
- All PIH cases who delivered at the tertiary care teaching hospital
- All PIH cases who were referred from other health care facilities, treated and delivered here.

Exclusion criteria:

- Pregnant women with chronic hypertension,
- Known cases of hypertension prior to antenatal period
- Pregnancy associated with other co morbid diseases or medical conditions (renal disease, thyrotoxicosis, pheochromocytoma) and other convulsive diseases,
- Cases of PIH who were referred to other set up before delivery
- All PIH cases who died in the hospital during antenatal period / before delivery

ISSN: 0975-3583,0976-2833 VOL13,ISSUE05,2022

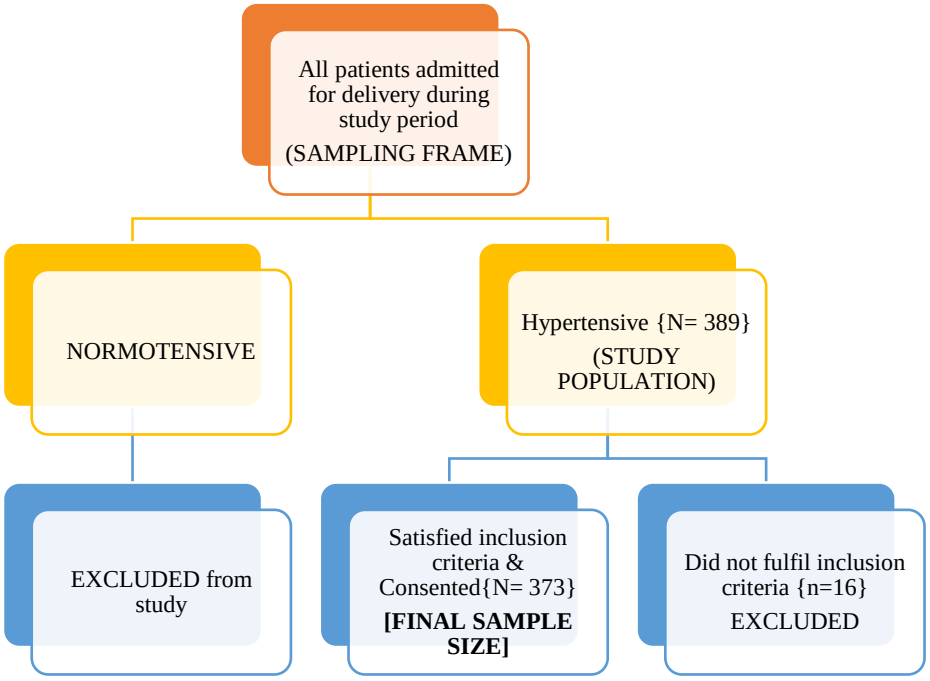

Fig 1: Sample size

A total 389 cases of PIH were admitted during the study period out of which 16 cases were not interviewed as they did not fulfil the inclusion criteria. Hence were excluded from the study. The final study population was fixed at 373 [Fig 1]. All the eligible pregnant women diagnosed with PIH were interviewed. Interviews were conducted in the local language using the predesigned, pretested questionnaire. Data were collected and recorded twice in a week preferably during the morning hours. Relevant information on socio-demographic, menstrual history, obstetric history, nutritional history, substance abuse was collected. All the pregnant women with PIH were followed till their outcome of pregnancy that is till their delivery, discharge, referral or death. Assessment of socio-economic status was done as per Modified B.G.Prasad scale 2014; the classification is based on per capita monthly income that is compared with predefined values according to the consumer price index (CPI. [5] Two readings of BP were taken 5 minutes apart in the left hand with patient in supine position and average reading was recorded. Antenatal BP values were noted from their case sheets.

Operational definitions [6-9]

- Gestational hypertension was classified as SBP/DBP ≥ 140/90 without proteinuria
- Mild Preeclampsia is classified as SBP/DBP 140-160/90-110 mm Hg with proteinuria rangingfrom1+to2+
- Severe Pre-eclampsia is blood pressure ≥ 160/110mmHg with raised biochemical parameters and proteinuria ranging from 3+ to

ISSN: 0975-3583,0976-2833 VOL13,ISSUE05,2022

≥4+

- Eclampsia is mild to severe preeclampsia with convulsions

Blood investigations [Liver Function Tests(LFT), Renal Function Tests(RFT)] was recorded from the case sheets of the patients, compared with normal range, and accordingly patients were classified as normal LFT and RFT or raised LFT and RFT.All data was entered into Microsoft excel spreadsheet and analyzed using SPSS Software version IBM SPSS ver.16.0. Proportions were calculated for categorical variables and compared using Pearson's chi-square test wherever applicable, at a pre- set alpha error of 5% with p value<0.05 considered significant. Mean and standard deviations were estimated for continuous variables as the measures of central tendency and dispersion respectively.

Results

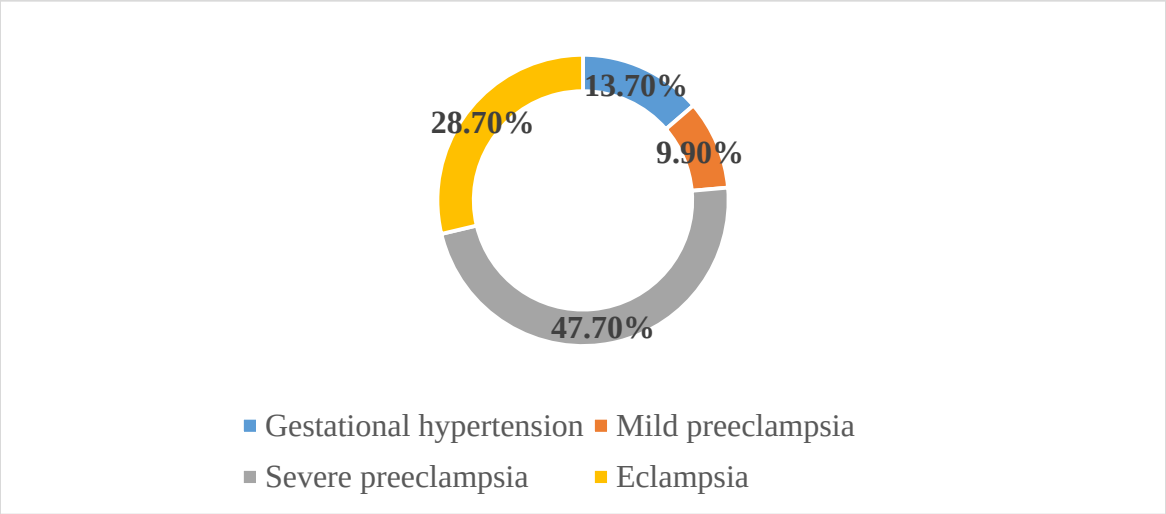

Fig 2:Spectrum of Pregnancy Induced Hypertension

PIH comprising a spectrum of disorders, and was seen in different forms among the patients. Of the total, 47.7% had severe preeclampsia [Fig 2]; majority of the women were Hindus (87.1%), and from nearby districts within a periphery of 100kms (75%).

ISSN: 0975-3583,0976-2833 VOL13,ISSUE05,2022

Table 1: Socio-demographic profile of patients with PIH with maternal outcome (n=373)

Variables	GTN No (%)		Mild PE No (%)		Severe PE No (%)		Eclampsia No (%)	
	Alive (n=51)	Dead (n=0)	Alive (n=37)	Dead (n=0)	Alive (n=176)	Dead (n=2)	Alive (n= 96)	Dead (n=11)
Age group(in years)								
<20 years	8 (15.7)	0 (0)	4 (10.8)	0 (0)	37 (20.7)	0 (0)	30 (28.3)	2 (1.86)
20-30 years	36 (70.6)	0 (0)	31 (83.8)	0 (0)	124 (69.6)	1 (0.56)	55 (51.4)	5 (4.6)
>30 years	7 (13.7)	0 (0)	2 (5.4)	0 (0)	15 (8.42)	1 (0.56)	11 (10.2)	4 (3.7)
p-value	1.0000		1.0000		0.2144		0.1064	
Place of residence								
Rural	44 (86.2)	0 (0)	32 (86.4)	0 (0)	165 (92.6)	1 (0.56)	79 (73.8)	7 (6.54)
Urban	7 (13.7)	0 (0)	5 (13.5)	0 (0)	11 (6.17)	1 (0.56)	17 (15.8)	4 (3.73)
p-value	1.0000		1.0000		0.1306		0.2206	
Type of Family								
Nuclear	23 (45.1)	0 (0)	22 (59.5)	0 (0)	84 (47.2)	0 (0)	39 (36.4)	4 (3.73)
Joint	28 (54.9)	0 (0)	15 (40.5)	0 (0)	92 (51.7)	2 (1.12)	57 (50.5)	7 (6.54)
p-value	1.0000		1.0000		0.4988		1.0000	
Educational status								
Illiterate	5 (9.8)	0 (0)	7 (18.9)	0 (0)	54 (30.3)	1 (0.56)	11 (0.2)	1 (0.93)
Primary	19 (37.3)	0 (0)	12 (32.4)	0 (0)	39 (36.4)	1 (0.56)	28 (26.1)	3 (2.83)
Middle	12 (23.5)	0 (0)	8 (21.6)	0 (0)	33 (18.5)	0 (0)	26 (24.3)	5 (4.85)
High school	7 (13.7)	0 (0)	4 (10.8)	0 (0)	19 (10.7)	0 (0)	10 (9.34)	1 (0.93)
Intermediate	4 (7.8)	0 (0)	0 (0)	0 (0)	24 (16.2)	0 (0)	18 (16.8)	1 (0.93)
Graduate and above	4 (7.8)	0 (0)	6 (16.2)	0 (0)	7 (3.93)	0 (0)	3 (2.8)	0 (0)
p-value	1.0000		1.0000		1.0000		0.9284	

ISSN: 0975-3583,0976-2833 VOL13,ISSUE05,2022

Socio-economic status								
Lower class	**1 (1.9)**	**0 (0)**	**1 (2.7)**	**0 (0)**	**3 (1.8)**	**0 (0)**	**1 (0.9)**	**0 (0)**
Lower middle	**16 (31.4)**	**0 (0)**	**8 (21.7)**	**0 (0)**	**36 (20.2)**	**2 (1.12)**	**23 (21.5)**	**5 (4.67)**
Middle	**16 (31.4)**	**0 (0)**	**12 (32.4)**	**0 (0)**	**78 (43.8)**	**0 (0)**	**43 (40.2)**	**6 (5.6)**
Upper middle	**16 (31.4)**	**0 (0)**	**14 (37.8)**	**0 (0)**	**57 (32)**	**0 (0)**	**28 (26.2)**	**0 (0)**
Upper	**2 (3.9)**	**0 (0)**	**2 (5.4)**	**0 (0)**	**2 (1.1)**	**0 (0)**	**1 (0.9)**	**0 (0)**
p- value	**1.0000**		**1.0000**		**0.1002**		**0.1529**	

Majority of cases of gestational hypertension (62.7%), mild preeclampsia (56.88%), severe pre- eclampsia(86.5%)was seen among primiparous females while majority of severe eclampsia was seen among multiparous females (50.5%). Most (77.0%) of cases had no history of abortion in previous pregnancies. Stillbirths(14.0%) were more common among eclampsia patients as compared to preeclampsia(7.9%) and gestational hypertension patients(5.9%). Diabetes was seen in majority (21.6 %) of cases with gestational hypertension as an associated morbidity while anaemia was most commonly seen among severe (18.6 %) and eclampsia(22.4%).

During the study period, there were 13 maternal deaths of which 2(15.3%) were due to severe preeclampsia and 11(84.6%) were due to eclampsia. 20 to 30 years age-group had more deaths, followed by >30 years, although this association was not statistically significant (Table 1)

ISSN: 0975-3583,0976-2833 VOL13,ISSUE05,2022

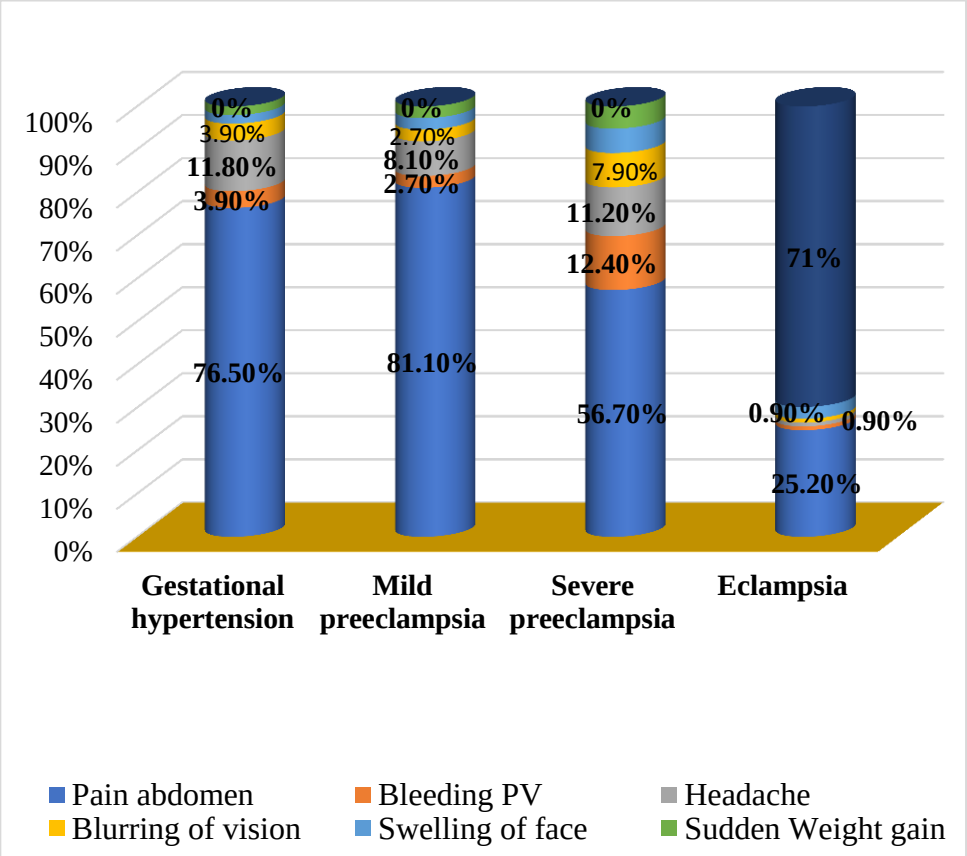

Fig3: Modes of presentation

Pain abdomen was the most common presenting symptom in gestational hypertension (76.5%), mild preeclampsia (81.1%) and in 56.7% of those with severe preeclampsia; while convulsions (71%) was most common presenting symptom in cases of eclampsia (Fig 3).

Table2: Sociodemographic profile of patients with PIH with fetal outcome (n=373)

Variables	GTN No (%)		Mild PE No (%)		Severe PE No (%)		Eclampsia No (%)	
	Alive (n=50)	Dead (n=1)	Alive (n=35)	Dead (n=2)	Alive (n=165)	Dead (n=13)	Alive (n=86)	Dead (n=21)
Age group(in years)								
<20 years	8 (15.6)	0 (0)	3 (8.1)	1 (2.7)	32 (17.97)	5 (2.8)	19 (17.7)	13 (12.14)
20-30 years	35 (68.6)	1 (1.96)	30 (81.1)	1 (2.7)	119 (66.8)	6 (3.37)	54 (50.5)	6 (5.6)

ISSN: 0975-3583,0976-2833 VOL13,ISSUE05,2022

>30 years	**7 (13.7)**	**0 (0)**	**2 (5.4)**	**0 (0)**	**14 (7.86)**	**2 (1.12)**	**13 (12.14)**	**2 (1.86)**
p-value	**1.0000**		**0.3018**		**0.1009**		**0.0021**	
Place of residence								
Rural	**44 (86.2)**	**0 (0)**	**30 (81.1)**	**2 (1.87)**	**156 (87.6)**	**10 (5.62)**	**69 (64.5)**	**17 (15.88)**
Urban	**6 (11.8)**	**1 (1.96)**	**5 (13.5)**	**0 (0)**	**9 (5.06)**	**3 (1.68)**	**17 (15.88)**	**4 (3.73)**
p-value	**0.1373**		**1.0000**		**0.0621**		**1.0000**	
Type of Family								
Nuclear	**23 (45.1)**	**0 (0)**	**21 (56.7)**	**1 (2.7)**	**80 (44.9)**	**4 (2.24)**	**36 (33.64)**	**7 (6.54)**
Joint	**27 (52.9)**	**1 (1.96)**	**14 (37.8)**	**1 (2.7)**	**85 (47.75)**	**9 (5.05)**	**50 (46.72)**	**14 (13.08)**
p-value	**1.0000**		**1.0000**		**0.2591**		**0.6208**	
Educational status								
Illiterate	**5 (9.8)**	**0 (0)**	**7 (18.9)**	**0 (0)**	**52 (29.2)**	**2 (1.12)**	**8 (7.47)**	**4(3.73)**
Primary	**18 (35.2)**	**1 (1.96)**	**11 (29.7)**	**1 (2.7)**	**35 (19.6)**	**4 (2.24)**	**23 (21.5)**	**8 (7.47)**
Middle	**12 (23.5)**	**0 (0)**	**8 (21.6)**	**0 (0)**	**28 (15.7)**	**5 (2.8)**	**29 (27.1)**	**2 (1.86)**
High school	**7 (13.7)**	**0 (0)**	**3 (8.1)**	**1 (2.7)**	**19 (10.6)**	**0 (0)**	**7 (6.5)**	**4 (3.73)**
Intermediate	**4 (7.8)**	**0 (0)**	**0 (0)**	**0 (0)**	**22 (12.35)**	**2 (1.12)**	**17 (15.8)**	**2 (1.86)**
Graduate and above	**4 (7.8)**	**0 (0)**	**6 (16.2)**	**0 (0)**	**7 (3.93)**	**0 (0)**	**2 (1.86)**	**1 (0.93)**
p-value	**1.0000**		**0.4384**		**0.3076**		**0.0606**	
Socio-economic status								
Lower class	**1**	**0**	**1**	**0**	**3**	**0**	**1**	**0**

ISSN: 0975-3583,0976-2833 VOL13,ISSUE05,2022

	(1.96)	(0)	(2.7)	(0)	(1.68)	(0)	(0.93)	(0)
Lower middle	15 (29.4)	1 (1.96)	7 (18.9)	1 (2.7)	33 (18.5)	5 (2.8)	21 (19.6)	7 (6.54)
Middle	16 (31.3)	0 (0)	11 (29.7)	1 (2.7)	72 (40.4)	6 (3.37)	41 (38.3)	8 (7.47)
Upper middle	16 (31.3)	0 (0)	14 (37.8)	0 (0)	55 (30.8)	2 (1.12)	23 (21.5)	5 (4.67)
Upper	2 (3.92)	0 (0)	2 (5.4)	0 (0)	2 (1.12)	0 (0)	0 (0)	1 (0.93)
p-value	1.0000		0.5796		0.4550		0.3578	

Of the total 37 fetal deaths,19(51.35%) fetal deaths were reported amongst mothers <20 years; of whom 35.13% had eclampsia. Age group had a statistically significant association with adverse fetal outcome (p=0.0021). Of the adverse fetal outcome reported 78.3% were from rural areas and 66.67% of those with eclampsia associated adverse fetal outcomes belonged to joint families (Table 2).

Table 3: Clinical presentations and laboratory values with maternal outcomes

Variables	GTN No (%)		Mild PE No (%)		Severe PE No (%)		Eclampsia No (%)	
	Alive (n=51)	Dead (n=0)	Alive (n=37)	Dead (n=0)	Alive (n=176	Dead (n=2)	Alive (n=96)	Dead (n=11
Systolic Blood Pressure								
140-160mm Hg	44 (86.3)	0 (0)	35 (94.5)	0 (0)	78 (43.8)	0 (0)	55 (51.4)	5 (4.67)
>160mm Hg	7 (13.7)	0 (0)	2 (5.4)	0 (0)	98 (55.0)	2 (1.12)	41 (38.3)	6 (5.6)
p-value	1.0000		1.0000		0.5049		0.5298	
Diastolic Blood Pressure								
90-110mm Hg	47 (92.1)	0 (0)	36 (97.2)	0 (0)	95 (53.3)	0 (0)	45 (42.0)	5 (4.67)
>110mmHg	4 (7.84)	0 (0)	1 (2.7)	0 (0)	81 (45.5)	2 (1.12)	51 (47.6)	6 (5.6)
p-value	1.0000		1.0000		0.2160		1.0000	
BMI								
<25	12 (23.5)	0 (0)	7 (18.9)	0 (0)	41 (23)	0 (0)	42 (39.2)	4 (3.73)

ISSN: 0975-3583,0976-2833 VOL13,ISSUE05,2022

≥25	**39 (76.5)**	**0 (0)**	**30 (81.1)**	**0 (0)**	**135 (75.8)**	**2 (1.12)**	**54 (50.4)**	**7 (6.54)**
p-value	**1.0000**		**1.0000**		**1.0000**		**0.7544**	
Anaemia								
Present	**23 (45.1)**	**0 (0)**	**25 (67.6)**	**0 (0)**	**122 (68.5)**	**2 (1.12)**	**51 (47.6)**	**11 (10.3)**
Absent	**28 (54.9)**	**0 (0)**	**12 (32.4)**	**0 (0)**	**54 (30.3)**	**0 (0)**	**45 (42.0)**	**0 (0)**
p-value	**1.0000**		**1.0000**		**1.0000**		**0.0023**	
LFT								
Normal	**51 (100)**	**0 (0)**	**35 (94.6)**	**0 (0)**	**75 (42.1)**	**0 (0)**	**35 (32.7)**	**2 (1.86)**
Raised	**0 (0)**	**0 (0)**	**2 (5.4)**	**0 (0)**	**101 (56.7)**	**2 (1.12)**	**61 (57.0)**	**9 (8.41)**
p value	**1.0000**		**1.0000**		**0.5096**		**0.3233**	
KFT								
Normal	**51 (100)**	**0 (0)**	**35 (94.6)**	**0 (0)**	**79 (44.3)**	**0 (0)**	**30 (28.03)**	**2 (1.86)**
Raised	**0 (0)**	**0 (0)**	**2 (5.4)**	**0 (0)**	**97 (54.4)**	**2 (1.12)**	**66 (61.68)**	**9 (8.41)**
p-value	**1.0000**		**1.0000**		**0.5035**		**0.4996**	

Of the 11(84.6%) maternal deaths in the eclampsia category, 100 % were anemic. Presence of anemia was also found to have a statistically significant association with adverse maternal outcome (p= 0.0023)(Table3)

Majority (60.3%) of the cases had four antenatal visits. Around 3.8% cases had more than four antenatal visits, while 1.6% cases had no antenatal check-up. In cases of gestational hypertension majority (52.9%) had delivery at 37-38 weeks in mild preeclampsia, 54.1% had delivery at 36-37 weeks, 2.7% had delivered at 34-35 weeks. In severe preeclampsia majority 26.4% delivered at 36-37weeks, 25.3% had a delivery at 35-36 weeks , while 7.9% could continue their pregnancy till term,2.2% had to terminate before 32 weeks. As compared to severe preeclampsia, proportion was higher for eclampsia cases where (4.7%) had delivered before 32 weeks. Majority of eclampsia cases (34.6%) had delivery at 34-35 weeks, and only (8.4%) cases had delivery at 37-38 weeks. Most common mode of delivery among patients with gestational hypertension was normal vaginal delivery 52.9% followed by 39.2% cases had LSCS.Of the total (373), 284 females had preterm delivery, while 6 females who had gestational hypertension had post term delivery

ISSN: 0975-3583,0976-2833 VOL13,ISSUE05,2022

by LSCS.IUGR was seen among 18 cases of which majority had severe preeclampsia.

Table 4: Clinical presentations and laboratory values with fetal outcomes

Variables	GTN No (%)		Mild PE No (%)		Severe PE No (%)		Eclampsia No (%)	
	Alive (n=50)	Dead (n=1)	Alive (n=35)	Dead (n=2)	Alive (n=165)	Dead (n=13)	Alive (n=86)	Dead (n=21)
Systolic Blood Pressure								
140-160mm Hg	44 (86.27)	0 (0)	35 (94.5)	0 (0)	75 (42.1)	3 (1.68)	54 (50.46)	6 (5.6)
>160mmHg	6 (11.7)	1 (1.96)	0 (0)	2 (5.4)	90 (50.6)	10 (5.61)	32 (29.9)	15 (14.01)
p-value	0.1373		0.0015		0.1513		0.0065	
Diastolic Blood Pressure								
90-110mm Hg	47 (92.1)	0 (0)	35 (94.5)	0 (0)	90 (50.5)	5 (2.8)	40 (22.4)	10 (9.34)
>110mmHg	3 (5.8)	1 (1.96)	0 (0)	2 (5.4)	75 (42.1)	8 (4.49)	46 (42.9)	11 (10.28)
p-value	0.0784		0.0015		0.3874		1.0000	
BMI								
<25	12 (23.5)	0 (0)	7 (18.9)	0 (0)	31 (17.4)	10 (5.6)	40 (37.3)	6 (5.6)
≥25	38 (74.5)	1 (1.96)	28 (75.6)	2 (5.4)	134 (75.2)	3 (1.68)	46 (42.9)	15 (14.01)
p-value	1.0000		1.0000		0.0000		0.1503	
Anaemia								
Present	23 (45.09)	0 (0)	23 (62.1)	2 (5.4)	31 (17.4)	10 (5.6)	40 (37.3)	10 (9.34)
Absent	27 (52.9)	1 (1.96)	12 (32.4)	0 (0)	134 (75.2)	3 (1.68)	46 (42.9)	11 (10.28)
p-value	1.0000		1.0000		0.7569		0.3293	
LFT								
Normal	51 (100)	0 (0)	35 (94.5)	0 (0)	75 (42.1)	0 (0)	30 (28.03)	7 (6.54)
Raised	0 (0)	0 (0)	0 (0)	2 (5.4)	90 (50.5)	13 (7.3)	56 (52.3)	14 (13.08)
p-value	1.0000		0.0015		0.0007		1.0000	
KFT								

ISSN: 0975-3583,0976-2833 VOL13,ISSUE05,2022

Normal	**51 (100)**	**0 (0)**	**35 (94.5)**	**0 (0)**	**73 (41)**	**6 (3.37)**	**30 (28.0)**	**2 (1.86)**
Raised	**0 (0)**	**0 (0)**	**0 (0)**	**2 (5.4)**	**92 (51.6)**	**7 (3.93)**	**56 (52.3)**	**19 (17.75)**
p-value	**1.0000**		**0.0015**		**1.0000**		**0.0315**	

A total of 37 deaths (25 neonatal + 12 IUD) were seen ; majority of dead babies were seen among preeclampsia(35.13%) and eclampsia(56.7%) cases. Raised SBP (p=0.0065), raised DBP(p= 0.0015), BMI ≥25 (p=0.0001), raised LFT (p= 0.0007) and raised KFT (p=0.0315) were associated with adverse fetal outcome (Table 4).

Out of total of 13 maternal deaths,7(53.8%)deaths were due to HELLP syndrome,1(7.6%)death due to abruptio placentae,3 (23.0%)deaths were due to pulmonary edema and 2(15.3%) deaths were due to postpartum Haemorrhage(

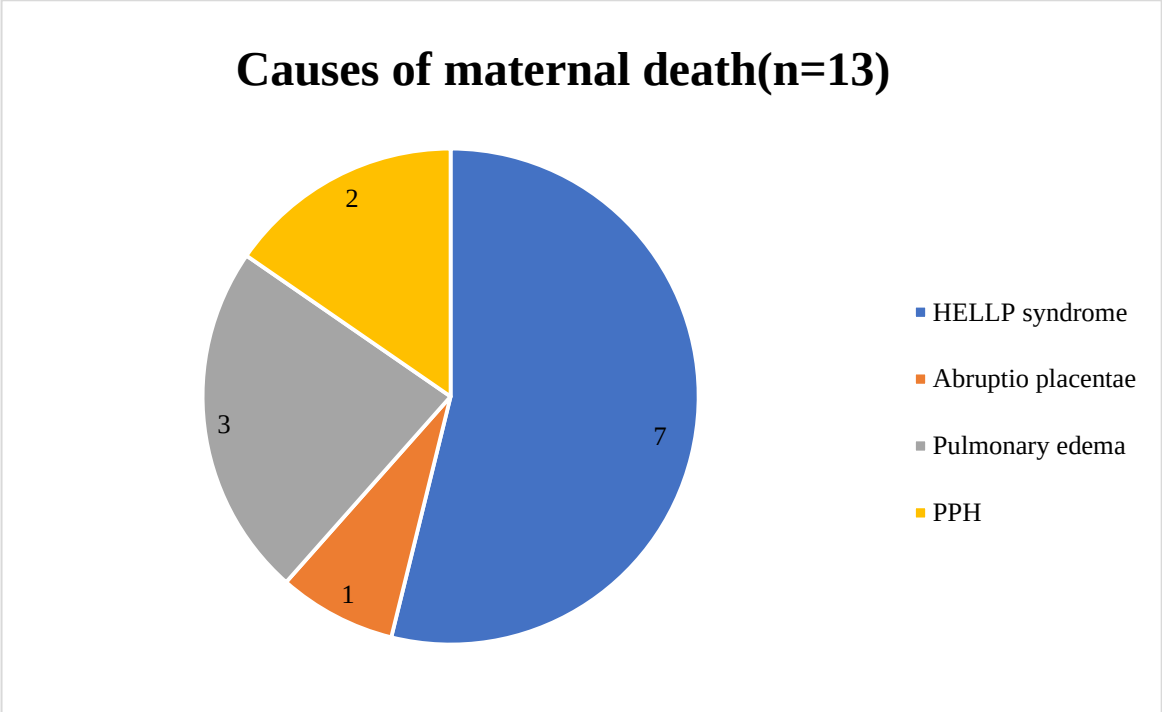

Fig4)

Fig 4: Causes of Maternal death

Discussion:

PIH manifests as different variants. Present study revealed 47.7% had severe preeclampsia, 28.7% had eclampsia, 13.7% were diagnosed with gestational hypertension and 9.9% had mild preeclampsia. As this study

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was done in a tertiary care health institution, which is also a referral set-up, so may be the reason for more number of severe cases. In a study conducted by Shoaib *et al (2019), t*he major pregnancy-related hypertensive disorder were eclampsia (n=48; 43.24%) and preeclampsia (n=28; 25.23%)which is similar to the present study.[10]. Borade *et al* (2014) reported preeclampsia in 63.3% cases and eclampsia in 11.5% of the cases. [11]

Majority of the cases of PIH were in the age group of 20-30 years which is congruent with the study findings of Sengodan SS et al [12] Findings from a study by Chabbra*et al* conducted in a tertiary hospital in New Delhi in 2008 is analogous to the present study findings [13].Another study by Bora *et al* among 200 pregnant females in a tertiary hospital in Assam also revealed similar findings[14].

Rural background seen in majority of cases of PIH in the present study, is in concordance with a study by Singhal et al which also showed majority (84%) of patients with preeclampsia were from rural background [15]. More cases from rural areas may be due to issues related to access to healthcare centers for ANC care and identification of these high-risk cases of PIH. High prevalence of preeclampsia among women from joint families is similar to study by Verma *et al* . [16] Study by Sachdeva*et al*.[17], Chawla *et al*[18] findings were congruent with present study findings of higher incidence of PIH even among the literates Owiredu*et al*. [19] reported no significant relationship of PIH and educational status. Similarly, joint families being a factor associated with higher cases, may be lack of attention and care of the individuals residing together.

As majority are from rural areas, joint families and have low educational status ,these factors has impact on health seeking behaviour of mother ,accessibility and quality of health care. Statistically significant relationship was seen in females with PIH and their BMI >25kg/m^2. The present study has helped to identify a few modifiable risk factors of hypertension during pregnancy, such as obesity, which confirms to those observed in other similar study settings by Anita et al 2021[20)]A meta-analysis by Wang *et al* [21] on maternal obesity as an independent risk factor for preeclampsia showed obese or overweight pregnant women had a substantially increased risk of preeclampsia, eclampsia which is similar to present study findings.

Present study findings are similar to the NFHS -4 data state fact-sheet for Odisha, showing mothers who had at least 4 antenatal care visits to be

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62%.[22].

LSCS was the most common mode of delivery among 40.5% cases of mild preeclampsia, 44.9% cases of severe preeclampsia, 46.9% cases of eclampsia followed by normal vaginal delivery(NVD) in the figures of 24.3%,26.4%,34.6% respectively.

A cross sectional study by Rajamma et al [23] conducted in Kerala showed overall caesarean delivery rate of 46.3%, which is similar to present study findings. Caesarean section was done in 65.6% of cases and NVD in 34.4% cases in a study by Nankali et al.[24] .Higher incidence of caesarean section in the study may be attributed to the need for immediate delivery of the fetus in majority of cases. As this hospital is a tertiary care hospital and most cases are referred from peripheral health institutions with complications and indications for caesarean section, hence LSCS. rate was high.

There were 336 live births and 37 fetal and neonatal deaths. Out of 37 dead babies, 12 were macerated IUD's, 25 were early neonatal deaths. Majority of dead babies were seen among severe preeclampsia and eclampsia cases. This finding was found to be statistically significant.

Shakya et al in a study on eclampsia inferred 13.3% cases had IUD. [25] Another study by Solwayo on severe preeclampsia, eclampsia in Bulawayo, Zimbabwe showed perinatal mortality as high as 22%.[26]

Limitations: Being a cross-sectional study, the causal effect cannot be ascertained. Being a hospital-based study, the study is not representative of the whole community and results are not generalizable. Responder bias could not be ruled out from the study participants' responses

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Conflict of interest: None

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

Conclusion: The present study reiterates the fact that PIH is a public health problem in pregnant females, complicating pregnancy and is associated with maternal and neonatal mortality and morbidity. Hypertensive disorders complicating pregnancy is one of the extensively researched subjects. The pathology should be understood, and involvement of multi-organ dysfunction should be taken into account.Age20-30 years, BMI≥25 Kg/m^2, primiparity, early age of

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menarche (12 years), first pregnancy before 20 years were found to be significantly associated with development of PIH (eclampsia). Most of these factors are non-modifiable, but can be used to screen women during antenatal visits to identify those at higher risk of PIH. Early diagnosis and treatment through regular antenatal check-up is a key factor to prevent hypertensive disorders of pregnancy and its complications. Therefore, it is the need of hour to devise a sound screening strategy to screen out hypertension in pregnancy and advocate comprehensive strategy for management of hypertension in pregnancy, to prevent maternal and fetal complications.

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