



RESEARCH ARTICLE

“A STUDY ON THE PREVALENCE OF FUNDUS CHANGES IN PREGNANCY INDUCED HYPERTENSION AMONG ANTENATAL CARE PATIENTS ATTENDING GMERS HOSPITAL, VALSAD”

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Abstract

Purpose: It was to determine the prevalence of retinal changes in pregnancy induced hypertension (PIH) and any association between the Retinal changes and age, Gravida, Parity, Blood pressure, Proteinuria and Severity of the disease.

Study design: Hospital based Cross sectional study.

Materials & method: All the patients admitted with a diagnosis of PIH were included in this study. Age, Gravida, Parity, Blood pressure, and Proteinuria were noted from the case record. Fundus examination was done by Indirect Ophthalmoscopy. The finding were noted and were analysed using Microsoft Excel.

Result: The mean age of patients was 23.48 years. Prevalence of fundus changes in PIH is 67%. Out of 88 patients, 41 (46.59%) were the primigravida. 3 (7.31%) patients had gestational hypertension, 17 (41.46%) patients had preeclampsia, and 21 (51.21%) had eclampsia. Hypertensive retinopathies were noted in 59 (67%) patients. Retinal detachment was seen in one patient and one patient with papilloedema. There was statistically significant positive association of retinal changes with proteinuria ($p=0.0001$), and severity of the PIH ($p=0.004$).

Conclusions: Retinal changes were seen in 67% of patients with PIH. Better antenatal care and early detection and treatment of PIH cases is needful so that there will be decrease in the chances of developing retinopathy.

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Introduction:-

Hypertensive disorder in pregnancy is considered to be the major risk factor and important cause for maternal morbidity and mortality in the developing countries. In India, prevalence of fundus changes in pregnancy induced

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hypertension is 59%¹ and responsible for 8-9% of maternal death and whereas 15-20% maternal death worldwide. Nowadays most accepted terminology for the following defined syndrome is hypertensive disorder in pregnancy. The term Pregnancy induced hypertension (PIH) is a hypertensive disorder in pregnancy that occurs in the absence of other causes of elevated blood pressure (140/90 mmHg, or a rise of 30 mmHg of systolic pressure, or a rise of 15mmHg of diastolic pressure), taken on two occasions after rest, in combination with generalised oedema and/or proteinuria.^{2,3} PIH which includes Gestational hypertension, Preeclampsia, Eclampsia². Gestational hypertension is characterised by hypertension without proteinuria and oedema. When there is significant proteinuria it is termed as Preeclampsia; seizures or coma as a consequence of PIH is termed as Eclampsia^{2,3}

The disease mechanism of PIH might affect multiple organs of the pregnant mother i.e. ocular involvement, Endocrines, Cardiovascular, Renal and Central nervous system etc. Changes observed in retinal vasculature may be correlate to the severity of the systemic hypertension. Resultant vaso-spastic complication/manifestation in PIH were mostly reversible and these retinal vessels will be returned to normal level after the delivery.⁴

The most common abnormality seen is spasm and narrowing of retinal vessels. Arterioles constriction may take some days to develop and may last for weeks to month. This may persists for sometimes or may be permanent after the termination of pregnancy. Vision threatening conditions like central retinal artery occlusion, central retinal vein occlusion, secondary optic atrophy, macular tear, Central serous retinopathy, retinal detachment, and haemorrhages. Spontaneous vitreous haemorrhage may occurs in cases of HELLP syndrome (i.e. haemolysis, elevated liver enzymes and low platelet count)⁴. During the disease the pathological changes will appears which is related to vascular endothelial dysfunction, which result in consequences of vasospasm and/or capillary leak. Most common symptoms are Blurring of vision, Scotoma, Diplopia, Photopsia will be noted.⁵

The eye serves as a window through which the vessels of the body can be studied. Thus changes in retinal arterioles may indicate a similar state of the placenta; hence it gives 2 reasonable idea of the state of placental circulation and foetal wellbeing. Foetal and maternal complication can be avoided if the fundus changes are detected early⁶. There is paucity of data available in the published literature on the prevalence of retinal changes in PIH from India. Therefore, this study was under taken to determine the prevalence of retinal changes in PIH and association between the retinal changes and severity of PIH.

Materials And Method:-

We conducted a hospital based cross sectional study of 88 confirmed PIH cases. Study duration was from November 2020 to August 2021 at GMERS Medical College & Hospital Valsad, Gujarat. The study was approved by Institutional Ethical Committee as well as permitted by Obs & Gynec Department. Study included all PIH patients irrespective of the stage of hypertension with gestational age more than 20 weeks. Who willing to give written informed consent, in uncooperative condition, consent will be given by her Husband. Patients with preexisting hypertension, co-existing Diabetes mellitus, co-existing chronic renal diseases, Heart diseases, seropositive patients, severe anemia and connective tissue disease. Co-existing ocular diseases like glaucoma, cataract, corneal opacity, ocular trauma, previous ocular surgery or laser surgery were excluded from the study. Patient will be subjected to details history taking. Including Age, Gravida, Parity, and blood Pressure, Vision on Snellen's chart, Anterior Segment examination on torch, and Indirect Ophthalmoscope for fundus examination to rule out hypertensive retinopathy by Grading under KW-Barker classification. All the data were recorded in a tabulated form in MS Excel sheet and relationship between various parameters were checked. Chi Square Test was applied to analyze the data using p value of <0.05 at 95% confidence interval.

Observation And Result:-

In our study, Mean age distribution from 17-42 years was 23.47 years, with Standard deviation of ± 4 . Total number of 88 cases were examined in our study. Out of which 29 cases show no Retinopathy. 59 cases show retinopathy changes. 13 numbers of cases seen in age group of ≤ 19 years, 4 cases had no retinopathy, 9 cases had Hypertensive retinopathy. 54 cases seen in age group 20-25 years, out of which 17 cases show no retinopathy changes and 37 cases show retinopathy changes in fundus. 16 cases seen in age group 26-30 yrs out of which 7 cases had no changes in fundus and 9 cases show retinopathy changes. 5 cases seen in >30 years age group, out of which one case shows no fundus changes and 4 cases shows retinopathy changes. (P value- 0.7279) Age is not significant with retinopathy changes in PIH. 13 number of cases seen in age group of ≤ 19 years, 4 cases had no retinopathy, 9 cases had hypertensive retinopathy, out of which 3 cases of grade I, 5 cases of grade II, 1 case of grade III and no case of

grade IV hypertensive retinopathy is seen. Grade II hypertensive retinopathy is found to be more common at this age group. Most population found at age groups of 20-25 years .i.e. 54 number of cases. 17 cases had no retinopathy and 37 cases had hypertensive retinopathy changes, out of which 18 cases of grade I, 17 cases of grade II, 1 case of grade III and grade IV hypertensive retinopathy. Grade I and grade II is more common in this age group. At age group 26-30 years, out of 16 cases, 7 cases had no retinopathy and 9 cases had hypertensive retinopathy. Out of which 3 cases of grade I, 5 cases of grade II, no case in of grade III and one case of grade IV hypertensive retinopathy. In >30 years age group, out of 5 cases, 1 case had no retinopathy. No case in grade I and grade III, and one case seen in grade IV hypertensive retinopathy. (p value = 0.436). Age is not significant with Grade of hypertensive retinopathy

Out of 88 cases in study, 29 (32.95%) patients had normal fundus, Among 59 cases with fundus changes. 24 patients (27.27%) had grade I, 30 patients (34.09%) had grade II, 2 patients (2.27%) had grade III and 3 patients (3.40%) had grade IV hypertensive retinopathy in PIH patients.

In ≤ 19 years age, one case of gestational hypertension, mild pre eclampsia, severe pre eclampsia and 10 cases of eclampsia seen. In 20-25 years age group 4 case of GHT, 21 cases of mild preeclampsia, 8 cases of severe pre eclampsia and 21 cases of eclampsia seen. In age group 26-30 years shows 1 case of GHT, 7 cases of mild pre eclampsia, 4 cases of severe pre eclampsia and eclampsia seen. In >30 years age group shows no GHT, 2 case of mild pre eclampsia, one case of severe pre eclampsia and 2 cases of eclampsia (p value = 0.332), Age had no significant association with severity of disease.

Out of 10 cases of grade I, 17 cases of grade II, 2 cases of grade III and 1 case of grade IV hypertensive retinopathy. Fundus changes are more in Primigravida than Multigravida. Grade II hypertensive retinopathy is more common in primigravida in our study. In gravida 2, 7 Cases had no retinopathy, 9 cases of grade I, 8 cases of grade II, no cases of grade III and one case of grade IV hypertensive retinopathy seen. In gravida 3, 3 cases of grade I, 4 cases of grade II, no cases of grade III and one case of grade IV hypertensive retinopathy seen. In gravida 4, there were 3 cases out of which 1 case of each grade I & grade II and no cases in grade III and grade IV respectively. In gravida 5 there were 2 cases out of which 1 case of grade I and no cases in other grades of hypertensive retinopathy. In gravida 9 there was no any case of hypertensive retinopathy. Here 24 cases of grade I, 30 cases of grade II, 2 cases of grade III, 3 cases of grade IV hypertensive retinopathy seen. $p=0.956$ gravid had not significant association with grade of hypertensive retinopathy.

According to gravida status- out of 88 gravida cases: 41 (46.59%) cases were of Primigravida, 44 (50%) cases were of Multigravida and 3 (3.409%) cases were of Grand multigravida.

Total 59 gravida patients had retinopathy changes in fundus. There were 41 cases of primigravida, out of which 11 cases had no retinopathy and 30 cases seen with retinopathy. 10 cases of grade I, 17 cases of grade II, 2 of cases of grade III and one case of grade IV hypertensive retinopathy. Out of 44 cases of multigravida, 16 cases had no retinopathy whereas 28 cases had retinopathy, 13 cases of grade I, and grade II hypertensive retinopathy seen. Out of 3 grand multigravida, two cases had no retinopathy and only one case shown with grade I hypertensive retinopathy. p value = 0.582) gravida is not significant with grade of hypertensive retinopathy

Out of 41 cases of Primigravida, 3 cases show Gestational hypertension, 13 cases of mild preclampsia, 4 cases of Severe pre eclampsia and 21 cases of Eclampsia. Out of 44 case of Multigravida, 3 cases show Gestational hypertension, 17 cases of Mild pre eclampsia, 9 cases of Severe pre eclampsia and 15 cases of Eclampsia.

Out of 3 Grand multigravida, no cases show Gestational hypertension, one case of each Mild pre eclampsia, severe pre eclampsia and Eclampsia. Table shows Eclampsia is more common in Primigravida and Mild pre eclampsia in Multigravida. p value = 0.654) gravida had no significant association with severity of disease. p value = 0.654) gravida had no significant association with severity of disease.

Out of 42 cases of parity, 19 cases of normal fundus and 23 cases of hypertensive retinopathy. There were 23 cases of Primipara out of which, 9 cases had no changes and 14 cases had fundus changes. 17 cases of Multipara (≥ 2 birth)

out of which 8 cases had no changes and 9 cases had fundus changes. Out of 2 case of Multigravida, no changes seen in fundus. (p value = 0.2480) had no significant association with hypertensive retinopathy changes in PIH.

Table 1:- Distributions of cases according to Systolic blood pressure and Number of fundus changes.

Systolicbloodpressure	NoRetinopathy	No.OfcaseswithRetinopathychanges
Upto140mmHg	3	2
141-160mmHg	22	43
161-180mmHg	2	13
181-200mmHg	2	1
Above200mmHg	0	0
Total	29	59

Systolic blood pressure ≤ 140 seen in 5 cases, where 3 cases had no hypertensive retinopathy changes and 2 had changes. In range of 141-160 mmHg seen 65 cases out of which 43 cases had hypertensive retinopathy. In range of 161-180 mmHg systolic blood pressure seen in 15 cases out of which 13 cases had hypertensive retinopathy. Range of 181-200 mmHg seen in 3 cases out of which 1 case had hypertensive retinopathy and Systolic blood pressure. >200 mmHg was not found in any patient in our study(p value = 0.120) S.B.P. is not significant with retinopathy changes in PIH.

Table 2:- Associations in fundus changes and normal fundus in Systolic Blood Pressure.

SystolicBloodPressure	Normalfunduscases	Numberoffunduschangescases
<160 mmHg	25	45
>160 mmHg	4	14

In <160 mmHg SBP ,total patients were 70, out of which 25 cases had normal fundus and 45 cases had fundus changes.

In >160 mmHg SBP, total patients were 18, out of which 4 had normal fundus and 14 cases had fundus changes. (p value =0.227) SBP had not significant association with fundus changes.

Table 3:- Associations between Diastolic blood pressure and number of fundus changes:

Diastolicblood Pressure	Numberofnormal Cases	Numberoffunduschangescases	Percentageof funduschanges
<110 mmHg	25	55	(68.75%)
>110 mmHg	4	4	(50%)

In <110 mmHg, 25 had normal fundus where as 55 cases had fundus changes found. In >110 mmHg shows 4 cases with normal fundus and 4 cases had fundus changes.(p value =0.282) had not significant.

Total 88 sample size, 83 cases had vision-

6/6, out of which 29 cases had no retinopathy and 54 cases had retinopathy changes in fundus. 3 cases had vision-

6/9; All 3 cases show retinopathy changes in fundus. One patient with both eye vision FC- <1 Meter and one patient with both eye Vision- FCCF show hypertensive retinopathy changes. (p value = 0.456), Vision had not significant with retinopathy changes in PIH

54 cases had hypertensive retinopathy changes in fundus with Vision- 6/6. out of which 23 cases of grade I , 28 cases of grade II , 2 cases of grade III and one case of grade IV hypertensive retinopathy changes on fundus examination.

Three cases of vision 6/9 had one case of grade I and 2 cases of grade II hypertensive retinopathy changes on fundus examination. One patient with both eye vision FC- <1 Meter and one patient with both eye Vision- FCCF show hypertensive retinopathy changes. (p value =0.001), Vision had significance with grade of retinopathy changes in PIH

Table 4:- Number of Fundus changes in Proteinuria.

Proteinuria	Cases with fundus changes	Normal fundus
Nil	6	2
+	13	6

++	22	12
+++	15	8
++++	3	1
Total	59	29

(p value = 0.976), Proteinuria had not significant with retinopathy in PIH patients

Out of total 88 cases, 58 cases had proteinuria. Nil Proteinuria seen in 8 cases out of which 6 cases shows fundus changes. Proteinuria 1+ seen in 19 cases out of which 13 cases shows fundus changes. Proteinuria ++ seen in 34 cases out of which 22 cases shows fundus changes. Proteinuria +++ seen in 23 cases out of which 15 cases shows fundus changes. In Proteinuria ++++ seen in 4 cases out of which 3 cases had fundus changes.

Out of 88 cases, 28 cases had no retinopathy and 60 cases had retinopathy changes on fundus examination. Nil proteinuria seen in 8 cases, out of which 2 cases had no retinopathy, 6 cases had retinopathy changes, out of which 2 cases had no changes. Proteinuria + seen in 19 cases, out of which 6 had no fundus changes and 13 had retinopathy fundus changes, out of which 7 cases of grade I, 5 cases of grade II, no case of grade III and one case in grade IV. Proteinuria ++ seen in 34 cases, no fundus changes seen in 12 cases. 23 cases had retinopathy changes. Out of which 8 cases had grade I, 13 cases had grade II, no cases of grade III and 2 cases of grade IV retinopathy. In proteinuria +++ seen in 23 cases, 8 cases had no retinopathy, 4 cases of grade I, 10 cases of grade II, 1 case of grade III and no case of grade IV retinopathy. In proteinuria ++++, one case of Mild preeclampsia and one case of Severe preeclampsia. (p value = 0.346), Proteinuria had not significant with grade of retinopathy

Table 5:- Percentage-wise distributions of cases according to Grading of retinopathy (KW & Barker classification).

Grade of retinopathy	Number of cases	Percentage
No retinopathy	29	32.95
Grade I	24	27.27
Grade II	30	34.09
Grade III	2	2.27
Grade IV	2	2.27
Retinal detachment	1	1.136

According to KW and Barker classification, No retinopathy seen in 29 (32.95%) cases. Grade I hypertensive retinopathy changes seen in 24 (27.27%) cases, grade II hypertensive retinopathy changes seen 30 (34.09) cases. Grade III hypertensive retinopathy changes seen in 2 (2.27%) case and Grade IV hypertensive retinopathy changes seen in 3 cases (3.406%) with Retinal detachment seen in one patient (1.136%). No evidence of cortical blindness seen in our study.

Table 6:- Relations between Severity of disease & Number of hypertensive retinopathy cases:

Severity of disease	No retinopathy	No. Of cases of retinopathy
GHT	1	5
Mild preeclampsia	13	18
Severe eclampsia	5	9
Eclampsia	10	27

(p value = 0.477), no significant association in retinopathy and Severity of disease.

Out of 88 cases, 29 cases had no retinopathy and 59 cases had retinopathy. 6 cases had Gestational hypertension in which one case had no hypertensive retinopathy changes but 5 cases had changes. 31 cases of Mild preeclampsia out of which 13 cases had no hypertensive retinopathy changes and 18 cases had changes. 14 cases of Severe preeclampsia seen out of which 5 cases had no hypertensive retinopathy changes but 9 cases had changes. 37 cases of Severe eclampsia seen out of which 10 cases had no hypertensive retinopathy changes but 27 cases had changes on fundus examination.

Table 7:- Association between Severity of disease and Grade of hypertensive retinopathy.

Severity	No change	Grade I	Grade II	Grade III	Grade IV
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GHT	1	1	2	0	0
Mildpreeclampsia	15	13	12	0	0
Severepreeclampsia	3	1	3		
Eclampsia	10	9	13	2	3

(pvalue=0.665), no significant association seen.

In our study, out of 4 patients of GHT, one case had no changes, one case of grade I, and 2 cases of grade II. In Mild pre eclampsia, out of 30 patients, 15 cases had no changes, 13 cases of grade I, and 12 cases of grade II. In Severe pre eclampsia, out of 7 patients, 3 cases had no changes, one case grade I, and 3 cases of grade II. In Eclampsia, out of 37 patients, 10 cases had no changes, 9 case of grade I, 13 cases of grade II, 2 cases of grade III and 3 cases seen in grade IV hypertensive retinopathy. (p value = 0.665) is not significant.

Discussion:-

Pregnancy-induced hypertension is one of the most common problems encountered in obstetrics. Preeclampsia is a multi-system hypertensive disorder which is a clinical syndrome that affects 3-5% of pregnancies and is a leading cause of maternal mortality, especially in developing countries.^{7,8} In pregnancy induced hypertension, the various pathological changes in different organs of the body can be studied directly visualising the ocular fundus and may give a true index of changes in vascular system of brain and retina.⁹ Maternal mortality in eclampsia patients was observed as very high in India and this ranges varies from 2 to 30%,⁶ it was much more in rural setups than the urban areas. But, if treated early mortality rate would be less than 2%.¹⁰

Mean age distribution-

Study	TadinI	A. P.Shah	KarkiP	Presentstudy
Average age of Patients	29.1±4 year	25.1years	26.65years	23.48±4years

In the present study 88 patients, the mean age of population was 23.48 years. In a study of Tadin et al¹¹, the average age of 40 patients were 29.1 years. In study of A P Shah et al¹³ mean age of the patient was 25.1 years. In study of karki P et al¹⁰ mean age population was 26.65years. There was no significant effect of extreme of age on degree of changes.

Studyname	Tadin etal	S.C. reddy et al	Javadekaret al	Present study
Prevalence rate(%)	45%	59%	42%	67%

In our study found prevalence of 59(67%) out of 88 PIH cases for hypertensive retinopathy changes.

Tadin et al.¹¹ from Croatia have reported 45% of retinal changes in their study of 40 patients with PIH.

In S. C. Reddy et al study,¹ 38.5%(30) cases had Mild preeclampsia, 59%(46) cases had Severe pre eclampsia and 2.5%(2) cases had Eclampsia. In 78 cases. 11 In Javadekar study prevalence rate is 42%.¹²

Age wise distribution-

Age(years)	Number of cases	No retinopathy	Retinopathy changes
≤19 years	13	4	9
20-25 years	54	17	37
26-30 years	16	7	9
>30 years	5	1	4
Total	88	29	59

Our study had 13 patients in age group ≤19 years, 9 cases had retinopathy. Out of 54 patients in the age group 20-25 years, 37 cases had hypertensive retinopathy. Out of 16 patients in age group 26-30 years, 9 cases had hypertensive retinopathy. Out of 5 patients in age group >30 years had 4 case of hypertension retinopathy. (P value = 0.728) is not significant. Age is not associated with retinopathy changes.

In AP Shah study,¹³ out of 4 patients in age group of <19 years, none developed retinopathy fundus changes. While out of 119 patients in age group of 20-29 years, 14 (11.76%) cases showed hypertensive retinopathy changes. 27 cases were of age >30 years, among them 4(14.81%) cases showed retinopathy changes. (p value = 0.865) Age is not significant with retinopathy.

Gradedistribution-

Grade	Kumaranandastudy	Prabhanjan study	Presentstudy
Grade I	13%	15%	27%
Grade II	3.70%	5%	34%
GradeIII	3%	3%	2.27%
GradeIV	2%	1%	3.405

In our study 59 out of 88 cases had retinopathy as grade I changes were seen in 27% (24), Grade II changes were seen in 34% (30) and Grade III changes were seen in 2.27% cases (2). Grade IV changes were seen in 3.40% cases (3). In this study shows Grade II hypertensive retinopathy changes were more common than grade I. Out of 3 cases of Grade IV hypertensive retinopathy, one case had bilateral retinal detachment.

In Kumara Nanda et al study¹⁴, 23 out of 100 cases had retinopathy as grade I changes were seen in 13% cases (13), Grade II changes were seen in 3.70% (5) and Grade III changes were seen in 3% cases (3). Bilateral serous retinal detachment (grade-IV) was seen in 2% cases (2).

In Prabhanjan et al¹⁵ study, grade I changes were seen in 15 cases (15%), Grade II changes were seen in 5 cases (5%) and Grade III changes were seen in 3 cases (3%). Bilateral serous retinal detachment (grade-IV) was seen in 1 case (1%).

Severity of disease-

Severity	No change	Grade I	Grade II	Grade III	Grade IV
GHT	1	1	2	0	0
Mild preeclampsia	15	13	12	0	0
Severe preeclampsia	3	1	3	0	0
Eclampsia	10	9	13	2	3

(p value = 0.665), Severity of disease had no significant association with grading of hypertensive retinopathy.

In our study, out of 4 patients of GHT, one case had no changes, 3 cases had hypertensive retinopathy. In Mild preeclampsia, out of 30 patients, 15 cases had no changes, 25 cases had hypertensive retinopathy changes. In Severe preeclampsia, out of 7 patients, 3 cases had no changes, 4 cases had hypertensive retinopathy. In Eclampsia, out of 37 patients, 10 cases had no changes, 27 cases had hypertensive retinopathy changes. There is no significant association between Severity of disease and Retinopathy changes.

Severity of disease	SC Reddy study	Present study
GHT		6.8%
Mild preeclampsia	38.5%	35.22%
Severe preeclampsia	59%	15.90%
Eclampsia	2.5%	42%

In our study, 6 (6.81%) cases had gestational hypertension, 31 (35.22%) cases had Mild preeclampsia, 14 (15.90%) cases had Severe preeclampsia and 37 (42%) cases had Eclampsia.

In Tadin I. et al study,¹¹ all cases 100% (40) cases had Severe preeclampsia.

In S.C. Reddy et al study,¹ 38.5% (30) cases had Mild preeclampsia, 59% (46) cases had Severe preeclampsia and 2.5% (2) cases had Eclampsia.

Age group	GH	Mild preeclampsia	Severe preeclampsia	Eclampsia
20-25 years	4	21	8	21

In our study, at age group of 20-25 years had more Severity of disease. 4 out of 6 cases had GHT, 21 out of 31 cases had Mild Pre Eclampsia, 8 out of 14 cases had Severe pre eclampsia and 21 out of 37 cases had Eclampsia. Most severity of disease seen in Mild preeclampsia and Eclampsia (p=0.33). Age had no significant association with the Severity of disease.

Gravida

Study	Prabhanjanstudy	APshahstudy	Presentstudy
Primigravida	31.88%	6.58%	73.17%
Multigravida	6.45%	17.57%	63.6%
Grandmultigravida	-	-	33.34%

In our study, Total 41(46.59%) were primigravida and 44 (50%) were multigravida, and 3 (3.409%) were grand multigravida. Out of 41 patients of Primigravida, 30 (73.17%) patients developed hypertensive retinopathy while out of 44 patients of Multigravida, 28 (63.6%) patients developed hypertensive retinopathy. 3 patients had Grand multigravida, out of which one case (33.34%) had hypertensive retinopathy. Retinopathy was common in primigravida. ($p=0.58$). Gravida had no significant association with hypertensive retinopathy in our study, which is similar to the results of AP shah¹³.

In Prabhanjan et al study,¹⁵ 69 (69%) cases were Primigravida and 31 (31%) cases were Multigravida. Out of 69 patients who were Primigravida, 22 (31.88%) patients developed hypertensive retinopathy while out of 31 patients who were the multigravida, 2 (6.45%) patients developed hypertensive retinopathy. (p value =0.005) in this study suggesting significant association between gravida and hypertensive retinopathy.

In Shah AP study et al¹⁰ of 150 patients with PIH, 76 (50.67%) patients were primigravida. Of 76 patients who were primigravida, 5 (6.58%) patient developed hypertensive retinopathy. While out of 74 patients who were the multigravida, 13 (17.57%) patients developed hypertensive retinopathy. Retinopathy was 2.6 times more in multigravida than primigravida. But the result was not statistically significant ($P = 0.07$). Gravida was not associated with retinopathy changes in this study.

In our study, Total 41(46.59%) were primigravida and 44 (50%) were multigravida, and 3 (3.409%) were grand multigravida. 6(6.81%) Cases had GHT, 31(35.22%) cases had mild preeclampsia, 14 (15.90%) cases had Severe pre eclampsia and 37 (42.04%) cases had Eclampsia. There are more chances of eclampsia (51.21%) in primigravida. (p value = 0.340) Gravida had no significant association with severity of disease in our study. Association in gravida and severity of disease is not found in any other study

In SC Reddy et al¹¹ 34 (43.6%) cases were Primigravida, 27(34.6%) cases were Multigravida (2-4 pregnancies) and 17 (21.8%) cases were Grand multigravida (5 or more pregnancies). 30 (38.5%) cases had Mild preeclampsia, 46 (59%) cases had Severe pre eclampsia and 2 (2.5%) cases had Eclampsia. In study of Prabhanjan kumara et al¹⁵ Most of the cases, that is, 69 (69%) cases were Primigravida and 31 (31%) cases were Multigravida. Out of 100 cases, 13 (13%) had gestational hypertension, 50 (50%) had mild preeclampsia, 22 (22%) had severe preeclampsia and 15 (15%) had eclampsia.

In study of Prabhanjan kumara et al¹⁵ Most of the cases, that is, 69 (69%) cases were Primigravida and 31(31%) cases were Multigravida. Out of 100 cases, 13(13%) had gestational hypertension, 50(50%) had mild preeclampsia, 22(22%) had severe preeclampsia and 15(15%) had eclampsia.

Visual Acuity- In our study Out of total 88 cases, The visual acuity was found to be normal (6/9 or better) in 86 cases (97.72%). The visual acuity in remaining 2 cases (2.27%) was less than 6 meters in both eyes. One cases had vision FC < 1 meter and other case had vision FCCF. Out of 88 patients, 29 (32.95%) patients had no retinopathy change. Fundus changes were observed in 59 (67.04%) cases. Grade I changes were seen in 24 (40.67%) cases; Grade II changes were seen in 30 (50.85%) cases; Grade III changes were seen in 2 (3.38%) cases and Grade IV changes were seen in 3 cases (5.08%), one case with vision 6/6 and one case with vision FC < 1 meter and one case with vision FCCF seen in this study. ($p=0.001$) Visual acuity is significant with grade of hypertensive retinopathy in our study.

Kumarra nandha study¹⁴, out 100 cases, The visual acuity was found to be normal 6/6 in 95 cases. The visual acuity in remaining 5 cases (2.27%) was less than 6 meter in both eyes. One cases had vision FC around 0.75 meter and other case had vision FCCF. Out of 88 patients, 29 patients had no change in fundus (32.95%). Fundus changes were observed in 23 cases. Grade I changes were seen in 13 cases; Grade II changes were in 5 cases; Grade III were in 3 and Grade IV changes were seen 2 cases. (p value = < 0.001 shows association between visual acuity and hypertensive retinopathy).

Proteinuria- In our study, out of 88 patients, 80 patients had proteinuria ranging from 1+ to 4+ on the dipstick. All 80 patients developed hypertensive retinopathy changes. Out of these, 3 patients had proteinuria of 4+ on dipstick and all with hypertensive retinopathy changes. Patients with severe proteinuria (4+) have greater chance of developing retinopathy. Proteinuria was significantly ($p = 0.001$) associated with hypertensive retinopathy in our study.

In AP Shah et al¹³ study, 58 patients had proteinuria of +1 to +4 on the dipstick. Of 58 patients, 13 (22.41%) patients developed retinopathy compared to 5 (5.43%) patients from 92 who did not have proteinuria. 8 patients who had proteinuria of 4+ on dipstick, 4 (50%) developed hypertensive retinopathy changes. Proteinuria was significantly ($p = 0.0005$) associated with hypertensive retinopathy.

In prabhanjan et al study¹⁵, 90 patients had proteinuria ranging from 1+ to 4+ on the dipstick. Of 90 patients, 24 (26.66%) patients developed retinopathy changes. Of these, 3 patients had proteinuria of 4+ on dipstick, and of them, 2 (66.66%) developed hypertensive retinopathy changes. Patients with severe proteinuria (4+) have greater chance of developing retinopathy than less severe proteinuria. It was significantly associated ($p = 0.02$) with hypertensive retinopathy.

Bloodpressure-(SBP and DBP)

Systolic Blood Pressure	Normal fundus cases	Number of fundus changes cases
<160 mmHg	25	45
>160 mmHg	4	14

In our study, >160 mmHg. 4 cases with no fundus changes, 14 cases had fundus changes. (p value = 0.227) had no significant association with systolic blood pressure.

In Prabhanjan study et al¹⁵, In >160 mmHg. 17 (56.66%) cases with no fundus changes cases, 13 (43.33%) cases had fundus changes, (p value = 0.003) has significant association with systolic blood pressure

Diastolic blood Pressure	Number of normal Cases	Number of fundus changes cases	Percentage of fundus changes
<110 mmHg	25	55	(68.75%)
>110 mmHg	4	4	(50%)

In our study, >110 mmHg shows 4 cases had no fundus changes and 4 cases had fundus changes. (p value = 0.282). Diastolic blood pressure had no significant association with fundus changes..

Hypertensive retinopathy-

Hypertensive retinopathy- In our study, grade I changes were seen in 24 cases (27.27%), Grade II changes were seen in 31 cases (34.09%) and Grade III changes were seen in 2 cases (2.27%) and grade IV changes were seen in 2 (2.27%) cases. Bilateral serous retinal detachment (grade-IV) was seen in 1 (1.136%) case. The management of exudative retinal detachment is the termination of pregnancy after controlling blood pressure and vision can be saved in the affected eye. She was eclampsia (grade IV) patient came from remote area where she did not get any antenatal care and this facility might be affected by covid pandemic lockdown period. Our observations regarding retinal detachment in eclampsia group matches with Fry W.¹⁰

In Prabhanjan study¹⁵, grade I changes were seen in 15 cases (15%), Grade II changes were seen in 5 cases (5%) and Grade III changes were seen in 3 cases (3%). Bilateral serous retinal detachment (grade-IV) was seen in 1 case (1%).

Conclusion:-

In present study, hypertensive retinopathy changes prevalence was 67% and it is more common in age group 20-25 years and in primigravida. Mostly fundus changes seen in systolic blood pressure 141-160 mmHg, and diastolic blood pressure 91-100 mmHg, proteinuria is associated with retinal changes. Timely ophthalmoscopy should be called for in all cases of PIH as it would affect the decision of induction of delivery, thereby preventing complications like serous retinal detachment continue to occur causing ocular morbidity in a physiological state as pregnancy.

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Conflicts of interest:

There are no conflicts of interest

References:-

1. Reddy S C, Siva lingam N, Sheila Rani K G, Tham S W. Fundus changes in pregnancy induced hypertension. 2012; 5(6):694-697 DOI:10.3980/j.issn.2222-3959.2012.06.08.
2. Richard RO. Pregnancy induced hypertension (pre-eclampsia- eclampsia) In: Schacht AP, Murphy RB, eds. Retina. 2nd ed. St Louis: Mosby, 1994: 140512.
3. American College of Obstetricians and Gynaecologists. Diagnosis and Management of Preeclampsia and Eclampsia. ACOG practice bulletin no.33. Obstet Gynaecol 2002; 99: 159-167.
4. American Academy of Ophthalmology; BSCS (Basic and Clinical Science Coarse) Volume -1, Update of General Medicine, Chapter- 3; Hypertension; Edition 2019-2020
5. Ober RR. Pregnancy-induced hypertension (pre eclampsia eclampsia).In: Ryan SJ, Editors. Retina. Vol 2 2nd edition's Louis: C.V.Mosby; 1994, pp. 1405-1412.
6. Jaffe G, Schatz H. Ocular manifestations of Pre-eclampsia, Am J Ophthalmol.; 1987; 103: 309–315
7. Noraihan MN, Sharda P, Jammal AB. Report of 50 cases of eclampsia. J Obstet Gynaecol Res. 2005; 31(4):302-9
8. Nalliah S, Thavarasha AS. Transient blindness in pregnancy induced hypertension. Int J Gynaecol Obstet.1989; 29(3):249-51.
9. Abu Samra K. The eye and visual system in the preeclampsia/eclampsia syndrome: what to expect? Saudi J of Ophthal. 2013;27(1):51-3.
10. Karki P, Malla KP, Das H, Uprety DK. Association between Pregnancy Induced Hypertensive fundus changes and foetal outcome. Nepal J Ophthalmol. 2010; 2(1): 26–30.
11. Tadin I, Bojic L, Mimica M, Karelovic D, Dogas Z. Hypertensive retinopathy and preeclampsia. Coll Antropol 2001; 25 Suppl:77-81.
12. Javadekar SD, Javadekar DP, Joshi K, Khatiwala R. Fundoscopic changes in pregnant mother with hypertension complicating pregnancy and various parameters of foetus. Int J Recent Trends Sci Technol 2013; 7:110-3.
13. Shah AP, Lune AA, Magdum RM, Deshpande H, Shah AP, Bhasvar D. Retinal changes in Pregnancy Induced Hypertension. Med J DY Patil Univ. 2015; 8: 304-307
14. Nandha KV, Swamyraj SV, Hassan KM, et al. Fundus changes in pregnancy induced hypertension in a university hospital of South India. J. Evid. Based Med. Healthc. 2020; 7 (8), 404 - 408 . DOI: 10.18410/jebmh/2020/87
15. Prabhanjan Kumar P., Sahithi and Venkataiah Y.2016, Importance of Ophthalmoscopic Examination and Prevalence of Fundus Changes In Pregnancy Induced Hypertension. In A Tertiary Care Rural Hospital At Kadapa. Int J Recent Sci Res. 7(7), pp. 12481-12486.
16. Fry et al. Extensive bilateral retinal detachment in eclampsia, with complete re-attachment: report of two cases. Arch Ophthalmol 1929; 1: 609–614.