



A study of relationship between the haemoglobin concentrations with severity of pregnancy induced hypertension

Authors

Dr Renuka Ramanwal¹, Dr Rekha Sapkal², Dr Jitendra Gothwal³

^{1,2}Department of Obstetrics & Gynecology, People's College of Medical Sciences and Research Centre, Bhopal, MP, India

Introduction

Pregnancy induced hypertension is defined as the hypertension that develop as a multisystem disorder of unknown etiology characterized by development of hypertension to the extent of 140/90 mm Hg or more with proteinuria after the 20th weeks in previously normotensive and non-proteinuric patients.¹ Risk of a woman in low income country dying of preeclampsia/eclampsia is 300 times that of a woman in high income country.^{2,3} Preeclampsia/eclampsia is a frequently encountered medical complication affecting 3-5% of pregnancies, but in India, overall incidence is 5-15%.^{1,4} PIH more often affects nulliparous women.⁵ Normally intravascular volume increases during pregnancy but in preeclampsia intravascular volume minimal or completely absent. The reduced volume is predominantly of plasma and as a result, hemoconcentration.⁶ Preeclampsia represents a state of hemoconcentration and increased haematocrit levels. By detecting the hemoconcentration one may predict the severity of disease & fall in repeat haematocrit values may denote clinical improvement.⁷

Severity of PIH is associated with increased maternal and neonatal morbidity and mortality.

Hence it is important to diagnose and treat. Early decision making of termination of pregnancy is very important in severe PIH. Termination of pregnancy is the only treatment of severe PIH. Decision making about termination can be prompt and prognosis can be better.

Present study is done to know the relationship between haemoglobin concentration and severity of PIH, also to know the average hemoglobin concentration in various period of gestation & correlate the hemoglobin concentration with preeclampsia.

Material and Methods

A cross-sectional study conducted at Department of Obstetrics & Gynaecology, People's College of Medical Sciences and Research Centre, Bhopal during the period of AUG 2016 to JULY 2017. The study protocol was approved by the Institute's Ethical Committee and each subject signed an informed consent statement prior to participation and could withdraw without prejudice at any time. The study group consisted of 100 pregnant women in which 50 patients with PIH & other 50 normal pregnant women as control group. Data were collected from hospital records and statistical analysis was done using chi-square test.

Cases were selected according to following inclusion and exclusion criteria.

Inclusion Criteria

- Willing to participate in the study
- All the patient present with Hypertension, Hypertention in pregnancy is defined as per (ISSHP) INTERNATIONAL SOCIETY FOR THE STUDY OF HYPERTENTION IN PERGNANCY: Systolic blood pressure >140mmHg or Diastolic blood pressure >90 mmHg on at least 2occasion taken 6hrs apart.
- All patients presenting with pre-eclampsia Definition of mild pre-eclampsia:-(ACOG) BP >=140 /90mm hg at 2 intervals 4 hrs apartwith or without significant proteinuria. Definition of severe pre-eclampsia (ACOG) BP>=160/110mm hg, Proteinuria>5gm/24hrs

Exclusion Criteria

All ANC patients before 24 weeks of gestation, Pregnancy associated with medical disorders like Diabetes, Rh iso-immunnization, UTI, Ectopic pregnancy & V MOLE.

Observations & Results

In 50 cases with PIH 82% of patient had raised Hb concentration. In control group of 50 cases 20% had raised haemoglobin concentration. Highly significant association was found between gestational period and haemoglobin levels in cases with PIH (P = 0.001). Hence more the period of gestation more haemoglobin concentration. 88% patients with >36 wks gestational period in PIH cases had raised haemoglobin concentration. 12% patients with <36 wks gestational period in PIH cases had raised haemoglobin concentration

I. Mean Age

	(PIH GROUP)	(CONTROL GROUP)
Age(Mean	30.7 years	30.84 years
Std. Deviation	2.533	3.08

There was no difference in mean age of both groups

II. Mean HB % in the study

	(PIH)	(Normal pregnancy)
Range	11-15.5	10-14.1
Haemoglobin Mean(gm%)	13.87	12.38
Std. Deviation	0.8765	0.9187

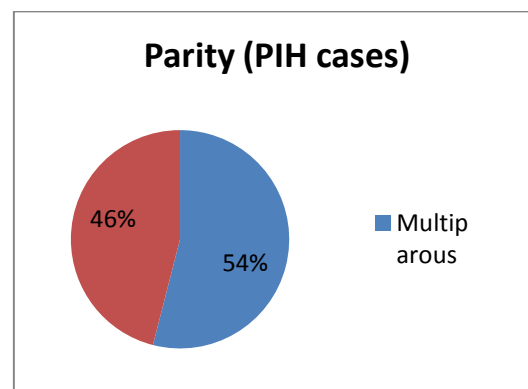
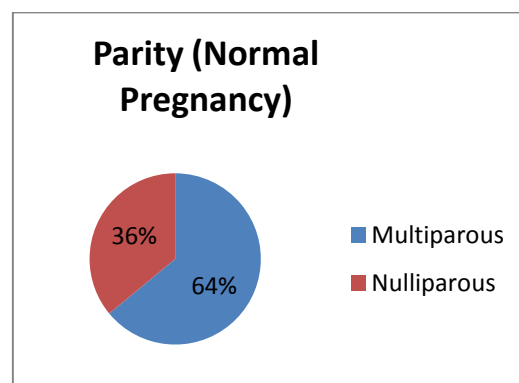
Range of HB in PIH was 11-15.5 while in control was 10-14.1

MEAN HB in PIH was 13.8 while in control group was 12.38 with standard deviation +/- 0.8

III. Parity Distribution in Study

PIH	
Multipara	27 (54%)
Nullipara	23(46%)
CONTROL	
Multipara	32(64%)
Nullipara	18(36%)

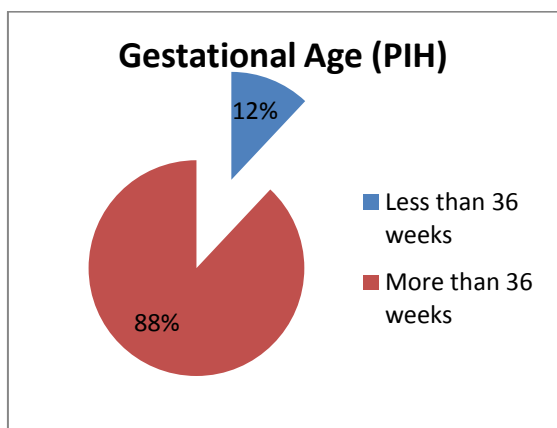
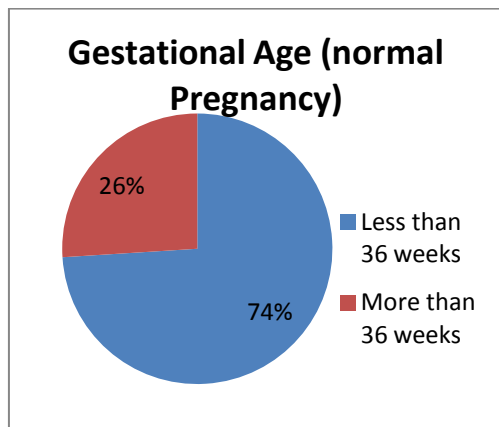
In study population maximum cases were multipara. P value = 0.309



IV. Gestational Age Distribution in Study

	PIH Cases	CONTROL
Gestational period		
preterm	6(12%)	37(74%)
Fullterm	44(88%)	13(26%)

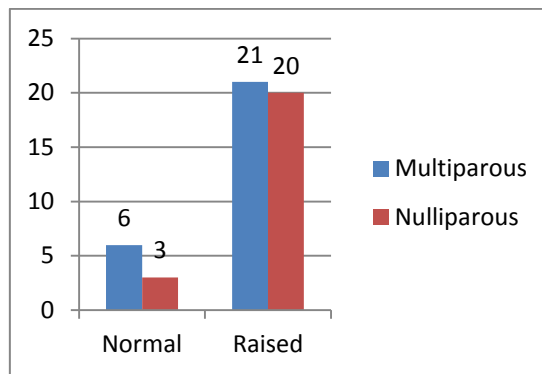
88% of patient were full term



V. Relation of Hb Percentage with Parity in PIH Group

PIH cases	Haemoglobin	
	<13.2 NORMAL	>13.2 Raised
Multiparous	6(67%)	21(51%)
Nulliparous	3(33%)	20(49%)
Chi-square	0.709	P value=0.400 (Not significant)

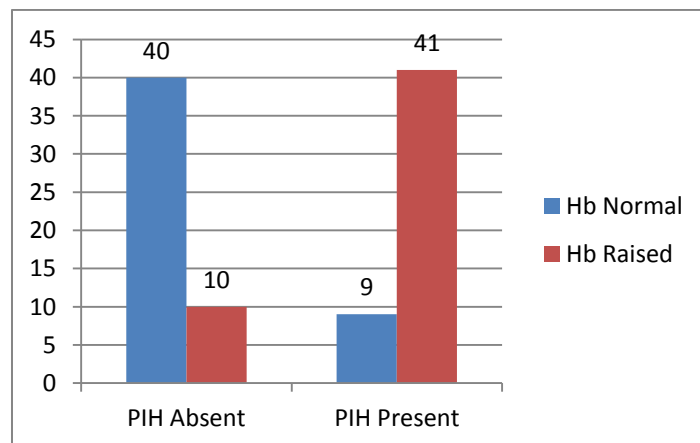
51% of multiparous women had raised HB



VI. Hemoglobin Distribution in the study

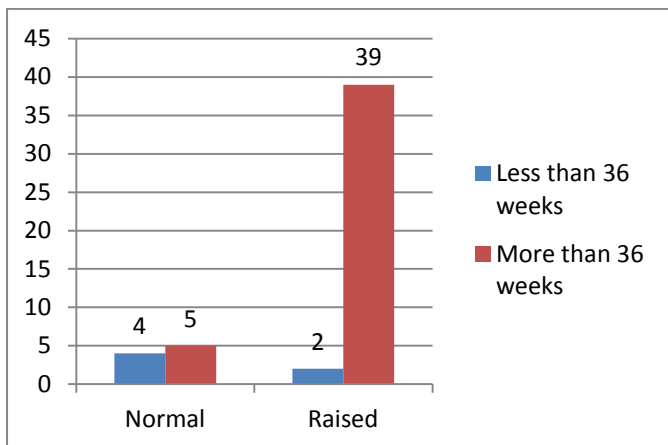
	CONTROL	PIH
Haemoglobin		
Normal (<13.2)	40(80%)	9(18%)
Raised (>13.2)	10(20%)	41(82%)
Chi-square	38.455	P value=0.00 (Significant)

In PIH group 82% of patient had raised Hb concentration and was significant



VII. Hb Distribution in Preterm and Full term Cases of PIH

PIH cases	Haemoglobin	
	Normal	Raised
Gestational period		
PRETERM	4(44%)	2(5%)
FULLTERM	5(56%)	39(95%)
Chi-square	10.941	P value=0.001 (Highly significant)

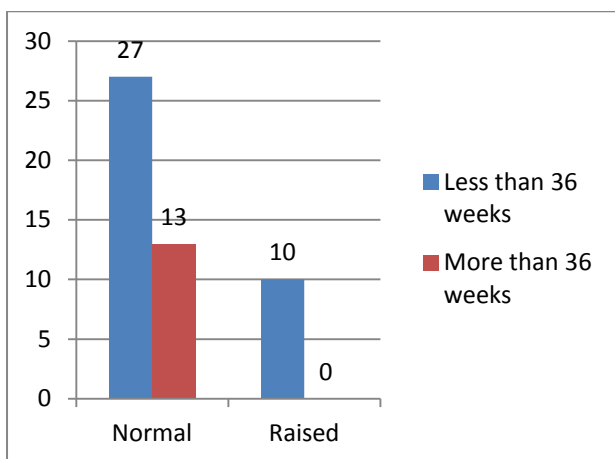


95% of full term patient had statically significant raised hb as compare to control group

VIII. Hb Distribution in Preterm and Full term Cases of Control Group

Normal pregnancy	Haemoglobin	
	Normal	Raised
Gestational period		
PRETERM	27(68%)	10(100%)
FULL TERM	13(33%)	0(0%)
Chi-square	4.392	P value=0.036 (Significant)

Raised Hb concentration was found in preterm patient was significant



Discussion

Our study indicates that women with high Hb concentration during the second and third trimester were associated with higher risk of developing PIH. Our finding also shows that there was a statistically significant relation between high maternal hemoglobin in the second and third trimester of pregnancy and preeclampsia. PIH might be explained by a generalized

vasoconstriction and abnormal endothelial cell function.⁸ Muphy et. al showed that the levels of Hb in the first and second trimesters were related to adverse pregnancy outcome such as preeclampsia.⁹ While Azar Agahmohammadi et al.¹⁰ showed that the levels of Hb in the first trimester were related to adverse pregnancy outcome such as PIH. Consequently, high maternal hemoglobin (Hb>13.2g/dl) in the first and second trimester is a risk factor for PIH.

The present study demonstrated that the mean haemoglobin concentration of PIH women was 13.8gm/dl and that of Control group was 12.38gm/dl. The results of this study are supported by the study done by Heilmann et al.¹¹ Gifford et al¹² recommended Hb and haematocrit value estimation along with other laboratory evaluation for the women in whom hypertension develops after mid pregnancy as, hemoconcentration supports diagnosis of preeclampsia and is an indicator of severity.

The present study demonstrated the significant rise of haemoglobin /haematocrit value in preeclamptic women over normal pregnant women however it could not say about pregnancy outcome for which large scale prospective study may be performed.

Conclusions

By considering present and previous studies more is the period of gestation more is the concentration of Hb. High hemoglobin concentration in second trimester of pregnancy can be considered as risk factor for Pregnancy induced hypertension. As high maternal hemoglobin is one of the risk factor for PIH, hemoglobin estimation has to be done during each antenatal check-up from first trimester till delivery.

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