

Influence of Pregnancy Induced Hypertension on the Birthweight of the New-Born: A Cross Sectional Study

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Abstract: *Introduction: Birth weight is an important indicator and prognostic factor for the health of new-borns, as it reflects the nutritional and metabolic conditions of the mother, as well as foetal development during pregnancy. Pregnancy Induced Hypertension (PIH) is a major contributor of maternal and neonatal morbidity and mortality. This study was conducted to explore the effect of PIH on the birth weight of the newborn. Methodology: A cross sectional observational study was conducted among 150 women with PIH in a maternity hospital following their delivery. The study was carried out for a period of 3 months and the sampling method adapted is the non-probability purposive sampling. The data was collected using a pre designed and pre tested questionnaire. The collected data was then analysed using SPSS software. Results: Among the women with PIH, about 16% mothers delivered babies with less than 2500g, among which, there is one baby with an extremely low birth weight of <1000g. The majority of the mothers were in the age group of 21-25 years. Nearly half (55.3%) of the women are primiparous. Out of 150 cases, 10 cases were referred to a higher center for the management of PIH, among the 140 women, only 134 women delivered live babies and the rest 6 had intrauterine foetal deaths.*

Keywords: Pregnancy, Low Birth Weight, PIH, New-born

1. Introduction

Pregnancy is a period where women are at risk of chronic diseases which might lead to a complicated period of gestation, further leading to potentially increased risk of chronic diseases in both the woman and her offspring. Pregnancy induced Hypertension (PIH) is a familiar medical complication that significantly leads to increased maternal and perinatal morbidity and mortality. Sometimes, Pregnancy may aggravate hypertension in women who already have high blood pressure before pregnancy and may also induce hypertension in women who are normotensive before they become pregnant.¹ The group of diseases in PIH includes pre-eclampsia, eclampsia and gestational hypertension which are peculiar to pregnancy.

Globally, the prevalence of PIH has been reported to range from 4.6% to 13.1% contributing to 9.2% of neonatal deaths.² The incidence is higher in primigravidae and those with lower socio-economic status. In the UK, it was noticed that hypertensive disorders are the second direct cause of maternal mortality. In the USA, 7-15% of all pregnancies were affected by hypertensive disorders and were related with up to 22% of all perinatal mortality and 30% of all maternal mortality.³

The WHO defines low birth weight as a birth weight of less than 2500g, regardless of gestational age. More than 10 million low birth weight infants are born in developing countries as a result of PIH. In PIH due to utero-placental perfusion, there is a significantly increased risk of IUGR, preterm birth and other newborn comorbidities.

The most common fetal outcome noticed in PIH cases was prematurity followed by IUGR.^{1, 3} The World Health

Organization (WHO) envisions a world in which every expectant mother and newborn receives top-notch care during pregnancy, delivery, and the immediate postpartum period. Neonatal health is in fact one of the Sustainable Development Goals, with the goal of reducing it down to 12 per 1000 live births by 2030 and under 5 mortality to 25 per 1000 live births.¹¹

There are numerous studies describing the prevalence of hypertension during pregnancy, however since pregnant women's health is of the utmost importance and PIH still affects newborn's health today, the current study was carried out to understand the influence of PIH on the birth weight of the new-born.

Objective

To assess the effect of PIH on the birth weight of the new-born.

2. Materials and Methods

Study Design: A Cross-Sectional study

Study Area: District Maternity Hospital, Vizianagaram.

Study Population: Pregnant women diagnosed with PIH

Inclusion Criteria: All Stable Pregnant Women in the hospital above 20 weeks of Period of Gestation diagnosed with PIH admitted for delivery.

Exclusion Criteria:

a) Pregnant women who have other co-morbidities along with PIH like gestational diabetes, heart disease, chronic hypertension, Infections, severe anemia etc.

- b) Women with multiple pregnancy.
- c) Those not prepared to provide Informed Consent.
- d) Those not available for follow-up to know the outcome.

Sample Size: A study by Mirzaei et al.,⁴ from Coimbatore in 2020 reported the prevalence of PIH to be 22% which was taken for calculating the sample size. At 95% confidence interval with an allowable error of 7% and a non-response rate of 10%, the calculated sample size was then 148 which was rounded off to 150.

Sampling Method: Non-Probability Convenient Sampling method.

Study Duration: January 2022 to June 2022.

Ethical Clearance: The study was conducted after the approval by the Institutional Ethics Committee of NRI Institute of Medical Sciences, which was enclosed in the annexure and permission taken from the Medical Superintendent of the District Hospital in Vizianagaram. Written and Informed consent was taken from all the study participants in the language understood by them.

Statistical Analysis

The collected data was compiled and entered into Microsoft Excel and analyses were carried out using Statistical Package of Social Sciences (SPSS) Version 26. Mean & Standard Deviation (SD), were used to summarize continuous variables and Categorical data were expressed as proportions, Chi-square test and Fischer Exact t-Test was applied to test differences in categorical data. A p-value of <0.05 was considered as statistically significant.

3. Results

Table 1: Sociodemographic Profile of the Study Population (N=150)

Variable	Category	N	%
Age	≤ 20	21	14.0
	21-25	88	58.7
	26-30	35	23.3
	>30	06	4.0
Place of Residence	Rural	136	90.7
	Urban	14	9.3
Level of Education	Illiterate	22	14.7
	Primary School	45	30.0
	Secondary School	56	37.3
	Diploma	09	6.0
	Graduate	14	9.3
Occupation	Postgraduate	04	2.7
	Unemployed (housewife)	134	89.3
	Unskilled Worker	05	3.3
	Semiskilled Worker	02	1.3
	Skilled Worker	03	2.1
	Semi Professional	05	3.3
Family Type	Professional	01	0.7
	Nuclear	34	22.7
Religion	Joint Family	116	77.3
	Hindu	131	87.3
Religion	Christian	09	12.7
	Others	0	0

Majority (58.7%) of the women with PIH were between 21-25 years and the mean age was identified as 23 ± 3.3 years.

About one-thirds (37.3%) having finished their secondary schooling. Most (89.3%) of them are unemployed or housewives.

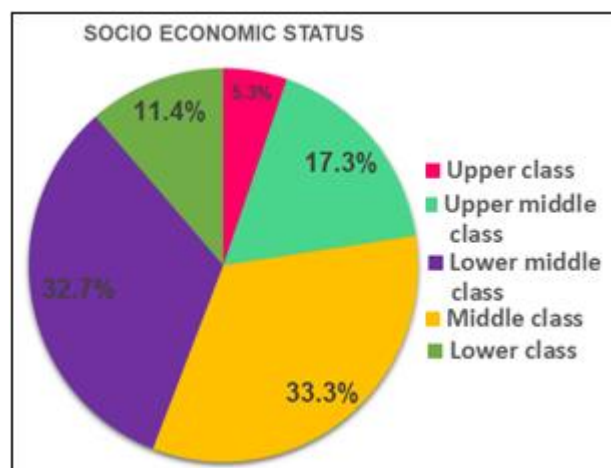


Figure 1: Socio Economic Status of the Study Population (N=150)

Equal portions (33%) of the study population belong to middle class and lower middle class i. e., class III and class IV of the socio economic status scale with a monthly per capita income between 1166-3808 in accordance with the revised modified BG Prasad Scale 2021.

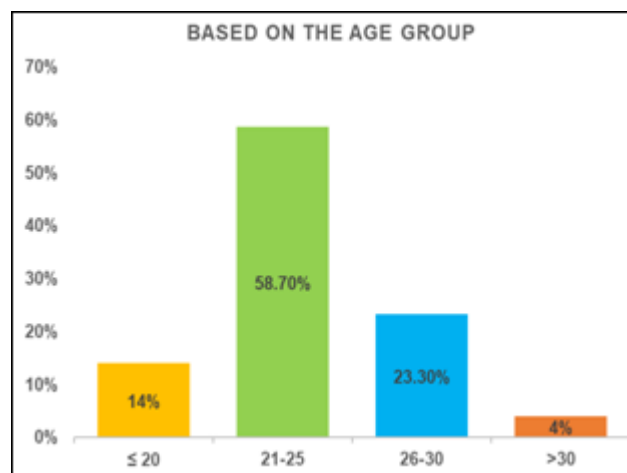


Figure 2: Age Distribution of the Study Population (N=150)

Among those who are under 20 years (21; 14%), 6 of them were in the age group of 15-19 years.

Table 2: Mode of Delivery of the Study Population (N=140)

Variable	Category	N	%	
Mode of Delivery	Vaginal	Spontaneous	31	22.1
		Induction	04	2.9
	C-Section	Emergency	103	73.6
		Elective	02	1.4

Among the study population (N=150), 10 cases were referred to the higher centre. Out of the rest (N=140), majority (105, 75.1%) of them underwent C-Section followed by a quarter (36, 24.9%) of them had normal vaginal delivery. No instrumental mode was adapted.

Table 3: Foetal Outcome of the Study Population (N=140)

Variable	Category	N	%
Outcome	Live Birth	134	95.7
	Still Birth + IUD	06	4.3
Birth Weight	< 2.5 kg	27	19.2
	≥ 2.5 kg	113	80.8
NICU Admission (N=134)	Yes	26	19.4
	No	108	80.6

Among 150 antenatal women with PIH, 10 cases were referred to higher centre. Of the 140 women, almost all (95.7%) of them have delivered live babies but there are still some (4%) Intra uterine foetal deaths. Around 1/5th of the delivered new born were less than 2.5kg at birth, requiring NICU admission soon after.

Table 4: Association between Type of PIH and Foetal Outcome (N=140)

Type of PIH	Outcome		Total N (%)	p value
	Live Birth N (%)	IUD + Still Birth N (%)		
Gestational Hypertension	120 (96.8)	04 (3.2)	124 (88.5)	0.001
Non-Severe Pre-eclampsia	02 (100)	0	2 (1.5)	
Severe Pre-eclampsia	12 (85.8)	02 (14.2)	14 (10.0)	

Type of PIH was found to be statistically associated with birth outcome. Those with gestational hypertension had normal birth outcome in comparison to those with severe pre-eclampsia among whom, intra uterine deaths were recorded on the higher (14.2%) side.

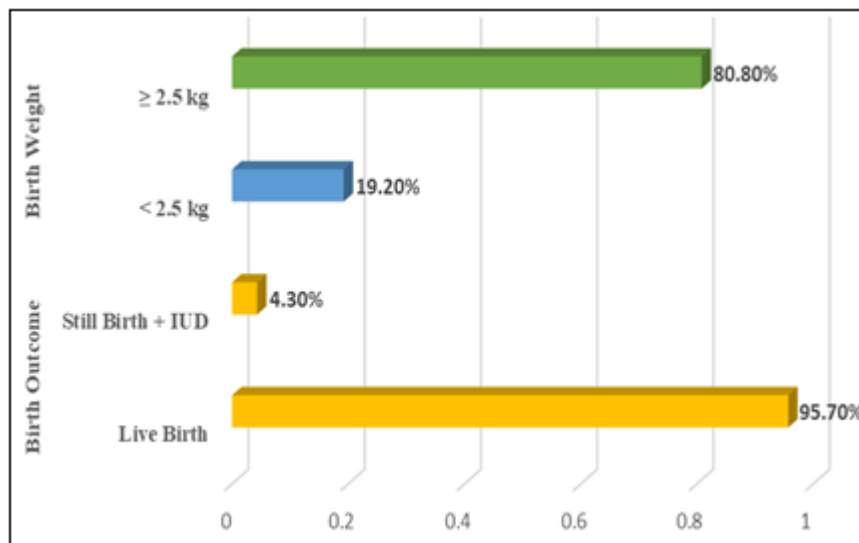


Figure 3: Fetal outcome of the study population (N=140)

Table 5: Association between Type of PIH and Birth Weight (N=140)

Type of PIH	Birth Weight		Total N (%)	p value
	< 2.5 kg N (%)	≥ 2.5 kg N (%)		
Gestational Hypertension	21 (16.9)	103 (83.1)	124 (88.6)	0.000
Non-Severe Pre-eclampsia	0 (0)	02 (100)	02 (1.4)	
Severe Pre-eclampsia	06 (42.9)	08 (57.1)	14 (10.0)	

There is significant association between the type of PIH and the birth weight of the new-born, with about one fifth (19.2%) of the infants born with low birth weight.

4. Summary

With regard to birth outcome, majority was live birth, but among the cases of severe pre-eclampsia IUDs were observed in higher number when compared to gestational HTN. This difference was also statistically significant with a p-value less than 0.05. Although majority are live birth, there were about 4.3% of the delivered new-born that were intra uterine foetal deaths and still births. Majority of the

new born were delivered with normal birth weight, but there were 19.2% with low birth weight and requiring NICU admission and this was found statistically significant with $p < 0.05$. Among the 134 live babies delivered to the PIH women, about 1/5th of them developed neonatal complications and it is statistically significant ($p < 0.05$).

5. Conclusion

Pregnancy induced hypertension has an effect on the foetal outcome and led to still births and IUD's in at least 1/5th of the study population.

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