

# Pregnancy Induced Hypertension (PIH) – Prevalence, Risk Factors & Fetomaternal Outcome: A Study from Tertiary Care Hospital, Ahmedabad

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## Abstract

**Objectives:** To study Prevalence, risk factors & fetomaternal outcome in PIH cases. **Materials & method:** hospital based case control study was conducted over the period of one year in the department of Obstetrics & Gynaecology in NHL municipal college, Ahmedabad. All pregnant women (including PIH-cases & non PIHcontrol) delivered during the study period were enrolled & their antenatal records were scrutinized to collect necessary information such as detailed history, clinical examination findings & investigations performed. **Results:** In the present study, the Prevalence of PIH was 7.85% which includes Prevalence of pre-eclampsia & eclampsia 6.97 & 0.94% respectively. **On Univariate analysis – risk factors such as those who have not registered in antenatal period, teenage age groups, primigravida, who had history of PIH in previous pregnancy, family history of PIH & obesity were significantly associated with cases (PIH) as compared to control (non-PIH). Maternal mortality was nil & perinatal mortality was 17% (14 in pre-eclampsia cases & 3 in eclamptic cases). Conclusion: Pregnant women at risk of PIH should be identified as early as possible & high quality antenatal care should be given in order to minimize the complications of PIH both for the mother & the fetus.**

**Keywords:** Pregnancy induced hypertension; Prevalence; Risk factors; Feto-maternal outcome.

separate entity in older time. The disease was known to ancient, Egyptian & Chinese since 16th century. PIH which includes pre-eclampsia & eclampsia is a pregnancy specific, multisystem disorder characterized by development of edema, hypertension & proteinuria after 20 weeks of gestation.[1] In India, the Prevalence of PIH is more than 4 percent (41.2 per 1,000) reported in 2009. This level has risen more than 50 percent since 1990 which was 2% (27.2 per 1000).[2] The reason could be there are many risk factors which are not yet prevented as well as controlled. The risk factors for PIH includes sociodemographical factors (extremes of reproductive age, socioeconomic status, ethnic group), genetic factors, pregnancy factors (multiple pregnancies, primigravidae, previous pre-eclampsia) or personal medical history (obesity, chronic renal disease, chronic hypertension, diabetes mellitus, thrombophilia).[3]

Hypertensive disorders of pregnancy seem to be one of the major causes of maternal morbidity & mortality leading to 10-15% of maternal deaths specially in developing world.[4] World Health Organization estimates that at least one woman dies every seven minutes from complications of hypertensive disorders of pregnancy.[5] The condition is also associated with adverse fetal, neonatal & maternal outcome including preterm birth, intrauterine growth retardation (IUGR), perinatal death.[5,6]

As PIH remains a serious & poorly

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## Introduction

PIH was not recognized as a

understood complication of pregnancy, we need to identify epidemiological & clinical risk factors to predict it before it threatens the survival of both mother and fetus. Thus, we can reduce the maternal mortality by identifying risk factors, prevention & proper management of risk factors & complications associated with PIH cases. Hence, the present study was conducted to find out the Prevalence, risk factors & feto maternal outcome in PIH cases.

## Materials and Methods

Hospital based case control study was carried out for duration of one year in the Department of Obstetrics & Gynaecology in NHL municipal college, Ahmadabad, Gujarat, India. All the mothers who delivered in the hospital during study period were scrutinized for completeness of history and case write-up through their antenatal records. Information relating to maternal and obstetric factors was obtained from the case records, which included age, parity, body mass index (BMI), multiple pregnancy, history of diabetes, history of renal disease, family history of hypertension, and history of PIH in earlier pregnancy. There were total 273 pregnant women delivered during study period of which 173 mothers had PIH which was taken as case group & 100 mothers were normotensive which constituted control group. Verbal informed consent of each pregnant woman was taken. Data was entered in MS Excel & analyzed using Statistical Package of Epi info.

### Definitions

*Pregnancy induced hypertension:* It is defined as systolic blood pressure  $\geq$  140 mm Hg & diastolic blood pressure  $\geq$  90 mm Hg during pregnancy in a previously normotensive pregnant woman who is  $\geq$  20 weeks of gestation and has no proteinuria. Diastolic blood pressure is determined as the disappearance of Korotkoff sound (Phase V).[6]

*Preeclampsia:* Blood pressure of  $\geq$  140/

90 mm Hg after 20 week of gestation, accompanied by proteinuria. The diagnosis of preeclampsia in absence of proteinuria highly suggestive when hypertension is accompanied by headache, blurring of vision, abdominal pain or certain laboratory abnormalities particularly low platelet count & elevated liver enzyme either alone or in combination.[6]

*Eclampsia:* Occurrence of seizure in women with preeclampsia that cannot be attributed to other causes.[6]

*Proteinuria:* It is defined as the urinary excretion of 0.3 g protein or more in a 24 hour specimen/1+dipstick in random urine sample.[6]

## Results

In the present study, Prevalence of PIH was 7.85% which includes Prevalence of preeclampsia & eclampsia was 6.97 & 0.94% respectively among women. Majority of PIH cases have delivered in emergency. Most of the teenage pregnant (54.1%) & primigravida women (51.4%) were having PIH compared to control group & the association between parity & PIH was statistically significant. There was statistically significant association between past history of PIH, family history of PIH & obesity with PIH as compared control group. There was no association found between socioeconomic status & type of delivery with that of PIH. None of the women were found to have diabetes mellitus & renal disease as well there all the women were having singleton pregnancy in both cases & control group.

On Univariate analysis it was found that those who had registered for antenatal care (OR=2.81), teenage pregnancy (OR=3.21), primigravida (OR=2.84), history of PIH in earlier pregnancy (13.19), family history of hypertension (OR = 12.92) & BMI  $\geq$  25 (OR = 5.04) were significantly associated with PIH.

It was evident from Table II that, preterm labor was the commonest maternal complication. Eclampsia & PPH were the next common Complication. Maternal mortality

**Table I: Risk Factors of PIH**

| Variables                      | PIH          |                 |            | OR    | p value                                 |
|--------------------------------|--------------|-----------------|------------|-------|---|
|                                | Case (n=100) | Control (n=173) | Total      |       |   |
| <b>Booked Vs emergency</b>     |              |                 |            |       |   |
| Emergency                      | 58 (50.4)    | 57 (49.6)       | 115 (42.1) | 2.81  | $\chi^2 = 15.3;$<br>p = 0.00; <b>S</b>  |
| Booked                         | 42 (26.6)    | 116 (73.4)      | 158 (57.9) |       |   |
| <b>Age</b>                     |              |                 |            |       |   |
| < / = 20                       | 53 (54.1)    | 45 (45.9)       | 98 (35.9)  | 3.21  | $\chi^2 = 18.9$<br>p = 0.00; <b>S</b>   |
| 21 -30                         | 47 (26.9)    | 128 (73.1)      | 175 (64.1) |       |   |
| <b>Parity</b>                  |              |                 |            |       |   |
| Primi                          | 55 (51.4)    | 52 (48.6)       | 107 (39.2) | 2.84  | $\chi^2 = 15.5;$<br>p = 0.00; <b>S</b>  |
| Multi                          | 45 (27.1)    | 121 (72.9)      | 107 (39.2) |       |   |
| <b>Socio -economic status</b>  |              |                 |            |       |   |
| Lower                          | 51 (41.5)    | 72 (58.5)       | 123 (45.0) | 1.46  | $\chi^2 = 1.9;$<br>p = 0.16; N S        |
| Middle                         | 49 (32.7)    | 101 (67.3)      | 150 (55.0) |       |   |
| <b>Past h/o PIH</b>            |              |                 |            |       |   |
| Yes                            | 68 (73.9)    | 24 (26.1)       | 92 (33.7)  | 13.19 | $\chi^2 = 80.69;$<br>p = 0.00; <b>S</b> |
| No                             | 32 (17.7)    | 149 (82.3)      | 181 (66.3) |       |   |
| <b>Family h/o PIH</b>          |              |                 |            |       |   |
| Yes                            | 60 (76.9)    | 18 (23.1)       | 78 (28.6)  | 12.92 | $\chi^2 = 73.97;$<br>p = 0.00; <b>S</b> |
| No                             | 40 (20.5)    | 155 (79.5)      | 195 (71.4) |       |   |
| <b>Obesity (BM I &gt;= 25)</b> |              |                 |            |       |   |
| Yes                            | 61 (59.8)    | 41 (40.2)       | 102 (37.4) | 5.04  | $\chi^2 = 36.10;$<br>p = 0.00; <b>S</b> |
| No                             | 39 (22.8)    | 132 (77.2)      | 171 (62.6) |       |   |
| <b>Mode of Delivery</b>        |              |                 |            |       |   |
| Normal                         | 63 (38.2)    | 102 (61.8)      | 165 (60.4) | 1.19  | $\chi^2 = 0.3;$<br>p = 0.60; N S        |
| C-section                      | 37 (34.3)    | 71 (65.7)       | 108 (39.6) |       |   |

**Table II: Maternal & Fetal Outcome in PIH Cases**

| Variables (N=100)                      | No. |
|--|-----|
| <b>Maternal outcome</b>                |     |
| Pre-term labor                         | 40  |
| Eclampsia                              | 12  |
| Post Partum Hemorrhage (PPH)           | 02  |
| Maternal Mortality (MM)                | 00  |
| <b>Fetal outcome</b>                   |     |
| Prematurity                            | 40  |
| Low Birth Weight (LBW)                 | 32  |
| Intrauterine growth retardation (IUGR) | 11  |
| Intrauterine Fetal death (IUFD)        | 06  |
| Neonatal death (ND)                    | 11  |

was nil. Prematurity was the commonest fetal complication seen. LBW was the next common complication followed by IUGR, IUFD & ND. Total perinatal death was 17 out of 100 cases.

### Discussion

PIH is a major cause of maternal & fetal mortality & morbidity worldwide. Although the etiology of PIH is still unclear, the present study was an attempt to Prevalence, risk factors & feto-maternal outcome in PIH cases.

The present study revealed that the Prevalence of PIH was 7.85% [Prevalence of

pre-eclampsia (6.97) + eclampsia (0.94%)] among women. Study by Vidyadhar B. Bangal[7] found Prevalence of PIH was 8.96%, similarly study by Bhattacharya S[8] had reported the overall Prevalence of PIH to be 15.5% & Shalini K. *et al*[9] had reported the Prevalence of preeclampsia & eclampsia to be 7-10% & 0.5 to 1.8% respectively. The variations can be attributed to racial differences, socioeconomic status & some other parameters like parity & age.

Among women who delivered in emergency, majority were having PIH. The reason could be illiteracy & in a large majority of patients preeclampsia remains asymptomatic & remits spontaneously, since diagnosis of preeclampsia is often missed. Hence these patients never come in contact with the health care system. Among teenage group most of the women (54.1%) were having PIH compared to control group. Vidyadhar B. Bangal[7] also found the same result. Duckitt *et al*[10] observed teenage pregnancy to be one of the risk factors for PIH & eclampsia. Among primigravidas, 51.4% & 48.6 women were belonging to PIH & control group respectively & the association between

parity & PIH was statistically significant. Duckitt *et al*[10] & Bhattacharya S[8] also reported that primigravida was a risk factor for preeclampsia & eclampsia.

There was statistically significant association between past history of PIH, family history of PIH & obesity with PIH as compared to control group. The significant association was also observed between past history PIH, family history of PIH & obesity with that of PIH group as compared to control group as study by Nisar N. *Et al*[11] & study by Kumar S ganesh.[12] The study by Lee CJ also observed BMI as an important determinant for PIH.

There was no association found between socio-economic status & type of delivery with that of PIH. On Univariate analysis it was found that those who had registered for antenatal care (OR=2.81), teenage pregnancy (OR=3.21), primigravida (OR=2.84), history of PIH in earlier pregnancy (13.19), family history of hypertension (OR = 12.92) & BMI  $\geq 25$  (OR = 5.04) were significantly associated with PIH. But socioeconomic status & mode of delivery were not found to be significantly associated PIH. Similar results were obtained in a study by Kumar S ganesh.[12]

In the present study, preterm labor was the commonest maternal complications followed by Eclampsia & PPH were the next common complication. Maternal mortality was nil. Irregular or absent antenatal visit, late admission to medical facilities & improper anticonvulsants prophylaxis may be the responsible factor for the maternal complications in PIH cases. Study by Vidyadhar B. Bangal[7] also found preterm labor as a common maternal complications followed by abruption placenta, PPH, HELLP syndrome, renal failure, pleural effusion & DIC.

Among fetal complications, prematurity was the commonest fetal complication seen followed by LBW, IUGR, IUFD & ND. Total perinatal death was 17 %. Similar results were observed in the study by Shaheen *et al*[13], perinatal mortality was 41.6 percent & prematurity was the main risk factor.

## Conclusions

PIH- still a very common problem. It was common in young primigravidas, who remained unregistered during pregnancy. The adverse maternal & perinatal outcome can be improved by early registration, health education of couple, regular antenatal checkups, early identification of hypertension & timely decision regarding mode of delivery.

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