

## Association of Age and Parity with Pregnancy-Induced Hypertension

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### ABSTRACT

**Objective:** To determine the association of age and parity with gestational hypertension.

**Study Design:** Case-control study.

**Place and Duration of Study:** Department of Gynaecology and Obstetrics, Combined Military Hospital, Sibi Pakistan, from Oct 2020 to Sep 2021.

**Methodology:** A total of two hundred and sixty-eight (n=268) patients (134 controls and 134 cases) were included in this study. Data about age, parity, economic status and education status was recorded. Two consecutive readings of blood pressure were recorded in sitting position, 4 hours apart, and the second reading was entered on the proforma.

**Results:** Mean age of the patients was 28.10±5.61 years and 28.99±6.29 years in cases and controls, respectively. Mean gestational age was 38.46±1.02 weeks in cases and 38.04±1.00 weeks in controls. In cases, primigravida were 88(65.7%) and multigravida were 46(34.3%) and in controls 58(43.3%) were primigravida and 46(56.7%) were multigravida. Odds ratio was 2.50(95% CI: 1.53-4.10), *p* value was <0.001. In cases, 111 women (82.8%) were from young age group and 23 women (17.2%) belonged to advanced age group. In controls 94 women (70.2%) were of young age group while 40 women (29.8%) belonged to advanced age group (*p* value was 0.013).

**Conclusion:** Primigravidae and women of younger age seem to have association with pregnancy induced hypertension.

**Keywords:** Age, Gestational hypertension, Normotensive, Parity, Pregnancy-induced hypertension (PIH).

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### INTRODUCTION

Hypertensive disorders in pregnancy are one of the leading causes of maternal and perinatal morbidity and mortality.<sup>1</sup> Pregnancy induced hypertension (PIH) complicates nearly 6-10% of all pregnancies.<sup>2</sup> PIH is non proteinuric type of hypertension that becomes apparent after 20th week of gestation in a previously normotensive patient and disappears usually after 6 weeks of delivery.<sup>3</sup> Hypertension in pregnancy is defined as systolic blood pressure (SBP) >140mmHg or/and diastolic blood pressure (DBP) of >90mmHg taken on two or more occasions at least 4 hours apart.<sup>4</sup> Pregnancy-induced hypertension is associated with significant elevations in total peripheral resistance, enhanced responsiveness to angiotensin II and marked reduction in renal blood flow and glomerular filtration rate and proteinuria.<sup>5</sup> Reduced uteroplacental perfusion results in placental ischemia leading to oxidative stress due to which endogenous antioxidants (TNF- $\alpha$ , IL-6, IL-10) are produced that activate

vascular endothelium and in progressive cases, causes endothelial damage and dysfunction.<sup>6</sup> Several studies have shown that age and parity are associated with gestational hypertension, showing that young age and primiparity increases the risk of PIH.<sup>4,7</sup> A study conducted in Peshawar reported young age (52.94%) and primiparity (8.72%) as potential risk factors for PIH.<sup>2</sup> Another study in Lahore, showed that 66% of women with PIH were of young age group and 62% were primigravidae.<sup>4</sup> On the other hand, one study showed advanced age as a risk factor for PIH<sup>8</sup> while other studies showed that advanced age and multiparity increases the risk of PIH.<sup>9,10</sup>

Our study was designed to determine the association of age and parity with PIH in pregnant women. The findings of this study will help to develop strategy to screen such women very closely, thereby decreasing the risk of morbidity. Community awareness programs regarding series of consequences of PIH, can also be designed for women at risk.

### METHODOLOGY

The case-control study was conducted at Department of Gynaecology and Obstetrics,

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Combined Military Hospital (CMH) Sibi Pakistan, from October 2020 to September 2021 after gaining approval of Ethical Review Committee (OB/20/21, dated 01 Oct 2020). Sample size was calculated by using WHO sample size calculator by using incidence of PIH as 7.9%<sup>11</sup>. Nonprobability consecutive sampling technique was used.

**Inclusion Criteria:** Pregnant women aged 15-44 years at term gestation with Pregnancy Induced Hypertension were included as cases while pregnant women at term gestation with normal blood pressure i.e., who do not have PIH were included as controls. Women at term gestation with PIH were included in Cases Group and normotensive pregnant women at term gestation were included in control group.

**Exclusion Criteria:** Pregnant women with gestational diabetes mellitus/cardiac disease/renal disease and women with previous history of PIH or hypertension were excluded.

Informed consent was taken from the patients visiting antenatal clinic regarding the usage of their personal information for the purpose of research. Relevant questions were asked to rule out past history of hypertension or history of PIH in previous pregnancies. Data about age, parity (variable under study), economic status and education status (confounding variables) were recorded on a predesigned proforma, which was same for cases and controls. Their gestational age was calculated in weeks from the earliest obstetrical scan available (carried out between 8th to 20th week of gestation). Two consecutive readings of their blood pressure were recorded in sitting position, 4 hours apart and the second reading was entered on the proforma. To overcome bias, data was collected and analysed by single researcher and one standard method was used to measure blood pressure and gestational age. Data was analysed by Statistical Package for the Social Sciences (SPSS) version 21.0. Mean±SD was calculated for quantitative variable and frequency and percentage were calculated for quantitative variable. Chi square test was applied for inferential statistics. The *p*-value of ≤0.05 was taken as significant.

**RESULTS**

A total 268 women (134 cases and 134 controls) were included in this study Mean age of the patients was 28.10±5.61 and 28.99±6.29 years in cases and controls, respectively. Mean gestational age was 38.46±1.02 weeks in cases and 38.04±1.00 weeks in controls. The detail of age distribution shown in

Table-I. In cases, primigravida were 88(65.7%) and multigravidas were 46(34.3%) and in controls 58(43.3%) were primigravida and 46(56.7%) were multigravida. Odds ratio was 2.50(95% CI 1.53-4.10) (*p* value was <0.001) (Table-II). In Cases, 111 women (82.8%) were from Young Age Group and 23 women (17.2%) belonged to Advanced Age Group. In Controls 94 women (70.2%) were of young age group while 40 women (29.8%) belonged to advanced age group. Odds ratio calculated was 2.07(95% CI 1.16-3.71), *p* value was 0.013 shown in Table-III.

**Table-I: Age Distribution of the Study Participants (n=268)**

Parameters	Cases (n=134)	Control (n=134)
<b>Age (Years)</b>		
20-25	53(39.6%)	53(39.6%)
26-30	44(32.8%)	34(25.4%)
31-35	14(10.5%)	08(5.9%)
36-40	23(17.1%)	39(29.1%)
<b>Gestational Age (week)</b>		
37-38	78(58.2%)	98(73.1%)
39-40	56(41.8%)	36(26.9%)

**Table-II: Association of Parity with Pregnancy Induced Hypertension (n=268)**

Parity	Cases n=134	Controls n=134	<i>p</i> -value	Odds Ratio (95% confidence interval)
Primigravida	88(65.7%)	58(43.3%)	<0.001	2.50(1.53-4.10)
Multigravida	46(34.3%)	76(56.7%)		

**Table-III: Association of Maternal Age with Pregnancy Induced Hypertension, (n=268)**

Maternal Age	Cases n=134	Controls n=134	<i>p</i> -value	Odds Ratio (95% confidence interval)
Young Age (≤35years)	111(82.8%)	94(70.2%)	0.013	2.70(1.16-3.71)
Advanced Age (>35years)	46(17.2%)	40(29.8%)		

**DISCUSSION**

Younger age and primiparity emerged as factors associated with PIH in our study. It has been seen in studies conducted across the world and hypertension related conditions affect both mother and foetus during the course of pregnancy.<sup>11,12</sup> Due to decrease in maternal mortality, researchers and physicians both are now more interested in impact of maternal hypertension on morbidity parameters.<sup>13</sup> A Pakistani study summarized the impact of maternal hypertension during pregnancy on neonatal outcome<sup>14</sup> with similar data highlighting poor maternal and

foetal outcome in patients with PIH being published in Taiwan.<sup>15</sup>

Preeclampsia is a condition with high mortality and morbidity and along with acute renal failure ranked among topmost causes of maternal deaths and near miss events.<sup>16</sup> In one study, both postpartum bleeding and eclampsia were recognized by women of different age groups as severe and life-threatening obstetric complications.<sup>17</sup> Our study focused on hypertensive condition in pregnancy and found out young and primigravida women at high risk for this condition. Studies published in recent past have highlighted that PIH has been commonly found in women who get pregnant at young age especially women who were primigravida.<sup>18,19</sup> Our results support the findings generated by researchers in other parts of the world.

In our study, majority of the women were in young age group (20-35 years), which is a risk factor for pregnancy induced hypertension. Similar results were published in a study done where age of more than 20 years at the time of pregnancy and not being primigravida were protective factors against having PIH.<sup>20</sup> Majority of the women were primigravida in Group-A (cases) in our study, which showed that parity was a risk factor for PIH in our data set similar to a study where similar results were published showing that increased parity was associated with obesity which had direct linkage with pregnancy induced hypertension.<sup>21</sup> Multiple other studies conducted in different parts of the world ascertained the relationship of parity with PIH which was supported by our results as well.<sup>22,23</sup>

Our study results established that women who got pregnant at young age, or those having first pregnancy, were more at risk of developing Pregnancy Induced Hypertension as compared to those with older age or multiparity.

Additional studies are needed to examine the relationship between maternal age and maternal and foetal outcomes and the mechanisms on how young maternal age increases the risk of adverse birth outcomes in different subgroups of women for which a cohort study design would have generated better results.

#### LIMITATIONS OF STUDY

With our study design, we cannot conclude definitively that Pregnancy Induced Hypertension was caused by young age pregnancies or primigravida are more prone to develop this condition.

#### CONCLUSION

Women who were primigravida and those who were of younger age were found more at risk of having Pregnancy Induced Hypertension as compared to those who were multigravida and older age.

**Conflict of Interest:** None.

#### Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

AA, SH: Conception, study design, drafting the manuscript, approval of the final version to be published.

Y, MA: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

MZS, IA: Data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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