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# POOR APGAR SCORE OF NEONATES BORN TO THE FEMALES PRESENTING WITH PREGNANCY INDUCED HYPERTENSION FOR DELIVERY

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## Abstract

**Background:** Pregnancy induced hypertension (PIH) is defined as BP  $\geq$  140/90 mmHg, taken after a period of rest on two occasions or  $\geq$ 160/110 mmHg on one occasion in a previously normotensive woman. One of the most important aspects is the outcome of pregnancy with PIH. Poor Apgar score is commonly observed in females with PIH. So we conducted this study to find the extent of problem in local population. Objective: To assess the frequency of poor Apgar score of neonates born to the females presenting with pregnancy induced hypertension at term (37-41 weeks) for delivery.

**Study Design:** Descriptive case series. Setting: Unit 4, Department of Gynecology & Obstetrics, Sir Ganga Ram Hospital, Lahore. Duration of Study: 6 months after approval of synopsis i.e. from: 09-11-2021 to 10-05-2022 Patients.

**Methods:** 125 pregnant females with PIH were followed till delivery by researcher herself. After delivery, neonate was assessed for Apgar score at 1 & 5 minutes, if  $<7$ , then it was labeled as poor Apgar score. All this information was recorded on proforma. Statistical analysis was done using SPSS version 20.

**Results:** The mean age of patients was  $30.50 \pm 6.22$  years. The mean gestational age was  $39.78 \pm 1.66$  weeks. The mean BMI was  $26.99 \pm 5.13$  kg/m<sup>2</sup>. There were  $n=59$  (47.2%) male neonates while  $n=66$  (52.8%) female neonates. The mean Apgar score at 1 minute was  $7.29 \pm 1.36$  while at 5 minutes was  $7.70 \pm 1.29$ . Poor Apgar score was noted in  $n=19$  (15.2%) neonates while  $n=106$  (84.8%) neonates had normal Apgar score. Conclusion: The frequency of poor Apgar score (at 1 minute and continuously  $<7$  at 5 minutes) was 15.2% in neonates born to females with PIH. The neonates with poor Apgar Score were admitted to NICU and were managed according to standard hospital protocol.

**Keywords:** Hypertension, Neonates, Pregnancy, Apgar score

## INTRODUCTION

Worldwide, 2.5 to 3% of all pregnancies are complicated by hypertension, and being the most important cause of maternal and perinatal morbidity and mortality (1, 2). It is also estimated that pregnancy induced hypertension (PIH), one of the hypertensive disorders of pregnancy, affects about 5 – 8 % of all pregnant women worldwide (3) PIH is defined as BP  $\geq$  140/90 mmHg, taken after a period of rest on two occasions or  $\geq$ 160/110 mmHg on one occasion in a previously normotensive woman (4).

Pregnancy is a physiological phenomenon for most women. However, some develop problems during its evolution, putting the health of the mother and the conceptus at stake. PIH is one of the maternal diseases that cause the most detrimental effects to the maternal, fetal and neonatal health (5).



With efficient antenatal care and early treatment of PIH disorders, the serious form i.e. eclampsia has become almost a clinical rarity in developed countries. However, in developing country like ours and in the rural population, it still continues to be a major obstetric problem (6).

Gestational Hypertension continues to be responsible for the largest proportion of perinatal deaths resulting from prematurity and IUGR and is a major contributor to perinatal and maternal morbidity and mortality (7). Majority of these conditions are preventable with good antenatal care, but looking at rural areas in country like India or many other Asian and sub-Saharan continents, the scene is still gloomy (8).

In a study, it has been reported that poor Apgar score (a quick way for doctors to evaluate the health of a newborn at 1 and 5 minutes after birth and resuscitation and graded from 1 to 10) was present in 8.9% cases at both; 1 and 5 minute after birth in neonates born to the females with PIH (9). Another study showed that poor Apgar score was 15.9% at 1 minute while only in 0.8% neonates born to the females with PIH (10). Another study has showed that poor Apgar score was 22.0% at 1 minute while only in 3.4% neonates born to the females with PIH (11). One local study has reported that poor Apgar score was 6.06% at 1 minute while only in 4.54% neonates born to the females with PIH (12).

The rationale of this study is to assess the frequency of poor Apgar score of neonates born to the females presenting with pregnancy induced hypertension at term for delivery. It has been noticed from literature, PIH has impact on poor Apgar score of neonate. But controversial results have been seen in the literature. Moreover, few studies have been done locally. So to confirm the evidence we want to conduct this study. This will help to improve our practice and knowledge and in future, we will be able to implement the surveillance programs to prevent the fetal complications in females having PIH.

## MATERIALS AND METHODS

It was a Descriptive Case Series conducted at Unit 4, Department of Gynecology & Obstetrics, Sir Ganga Ram Hospital, Lahore from 09-11-2021 to 10-05-2022. Sample size of 125 cases was calculated with 95% confidence level, 5% margin of error and taking expected percentage of poor Apgar score i.e. 8.9% in females presenting with PIH. Non probability consecutive sampling was done.

Females of age 20-40 years, parity<5, presenting with diagnosis of PIH (as per operational definition), at term (gestational age>37 weeks as per LMP) were included in the study. Those with Multiple pregnancy (on USG), Females with systemic problems including gestational or chronic diabetes (BSR>186mg/dl), Anemia (Hb<10gm/dl), Chronic hypertension (BP≥140/90mmHg) before pregnancy, Deranged LFTs (AST>40IU, ALT>40IU), deranged RFTs (Creatinine>1.2mg/dl) were excluded from the study. 125 patients who fulfilled the selection criteria were included in the study from labor room of Department of Obstetrics and Gynecology, Sir Ganga Ram Hospital, Lahore. After taking Informed consent, demographic details (name, age, gestational age, parity) were obtained. Then all patients were followed till delivery by researcher herself. After delivery, neonate was assessed for Apgar score at 1 and 5 minutes, if <7, then poor Apgar score was labeled (as per operational definition). All this information was recorded on proforma. All neonates having Apgar score <7 were managed actively according to standard protocols.

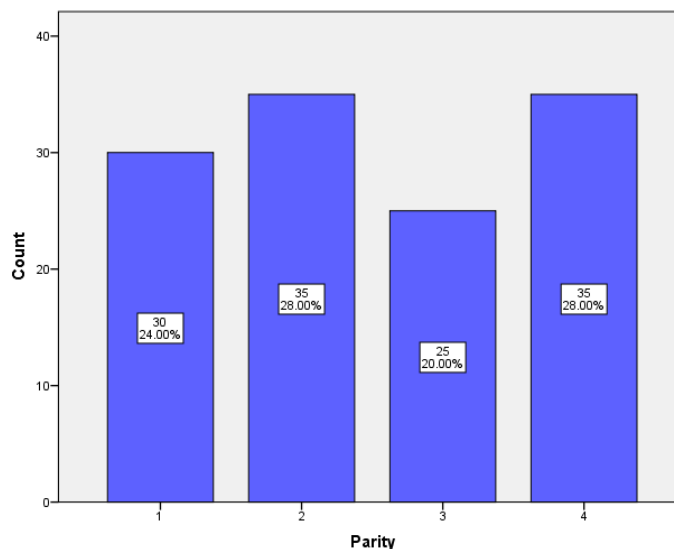
Statistical analysis was done using SPSS version 20. Quantitative data i.e., age, BMI, parity, Apgar score at (1min & 5min) and gestational age were presented as mean and  $\pm$ SD. Qualitative data like gender of baby and poor Apgar score were presented as frequency and percentage. Frequency was calculated for parity. Data was stratified for age, parity, gender of neonate and BMI. Post-stratification, chi-square test was applied with P-value≤0.05 taken as significant.

## RESULTS

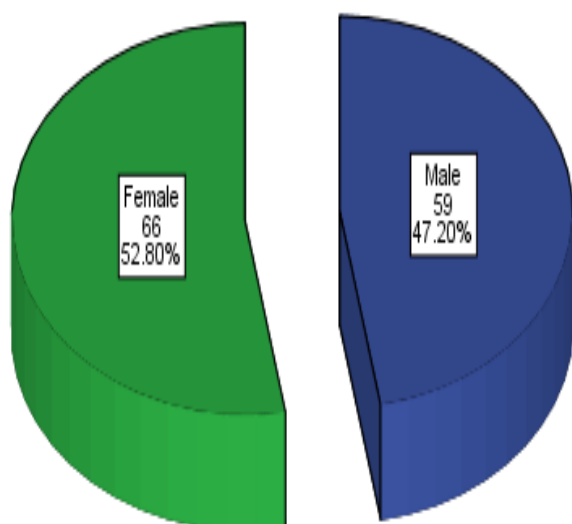
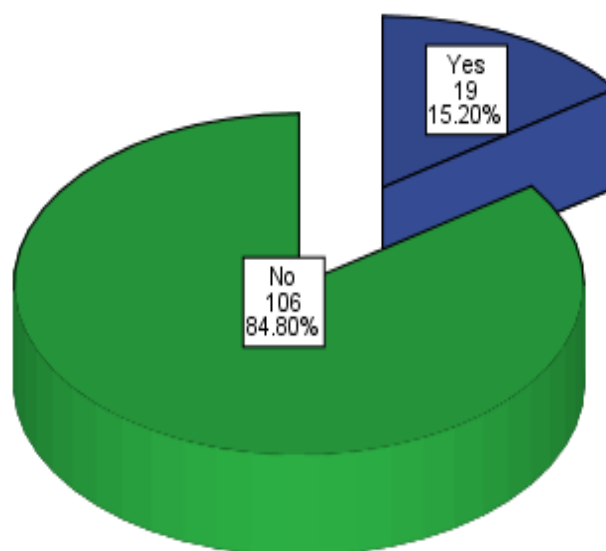
The mean age of patients was 30.50±6.22 years (Table I). The mean gestational age of patients was 39.78±1.66 weeks (Table I). In this study,  $n=30$  (24%) patients had parity 1,  $n=35$  (28%) had parity 2,  $n=25$  (20%) patients had parity 3 and  $n=35$  (28%) had parity 4 Fig. 1.

**Table I.** Descriptive statistics of different variables of mothers (n=125)

| Variables                | Mean  | ±SD  | Minimum | Maximum |
|--------------------------|-------|------|---------|---------|
| Age (Years)              | 30.50 | 6.22 | 20      | 40      |
| Gestational age (weeks)  | 39.78 | 1.66 | 37      | 42      |
| BMI (kg/m <sup>2</sup> ) | 26.99 | 5.13 | 19.20   | 36      |
| APGAR score              |       |      |         |         |
| i. At 1st min.           | 7.29  | 1.36 | 3       | 4       |
| ii. At 5th min.          | 7.70  | 1.29 | 9       | 9       |

**Fig. 1.** Distribution of parity of mothers

The mean BMI was  $26.99 \pm 5.13 \text{ kg/m}^2$  (Table I). There were  $n=59$  (47.2%) male neonates while  $n=66$  (52.8%) female neonates Fig. 2 (a). The mean Agar score at 1 minute was  $7.29 \pm 1.36$  while at 5 minutes was  $7.70 \pm 1.29$  (Table I). Poor Apgar score was noted in  $n=19$  (15.2%) neonates while  $n=106$  (84.8%) neonates had normal Apgar score as seen in Fig. 2 (b).

**Fig. 2 (a).** Distribution of gender of neonate**Fig. 2 (b).** Distribution of poor Apgar score of neonates

Data was stratified for age of mothers. In mother's age 20-30years, poor Apgar score was noted in 8(13.6%) neonates and in mother 31-40 years, poor Apgar score was noted in 11(16.7%) neonates. The difference was insignificant ( $p=0.629$ ) (Table II).

**Table II.** Comparison of poor Apgar score with age of mothers

|                  |     | Age groups  |             | Total       |
|------------------|-----|-------------|-------------|-------------|
|                  |     | 20-30 years | 31-40 years |             |
| Poor Apgar score | Yes | 8 (13.6%)   | 11 (16.7%)  | 19 (15.2%)  |
|                  | No  | 51 (86.4%)  | 55 (83.3%)  | 106 (84.8%) |
| Total            |     | 59 (100%)   | 66 (100%)   | 125 (100%)  |

\*Chi-square = 0.233, \*p-value = 0.629 (Insignificant)

Data was stratified for parity of mothers. In females with parity 1-2, poor Apgar score was noted in 12(18.5%) neonates and in females with parity 3-4, poor Apgar score was noted in 7(11.7%) neonates. The difference was insignificant ( $p=0.290$ ) as shown in (Table III).

**Table III.** Comparison of poor Apgar score with parity of mothers

|                  |     | Parity     |            | Total       |
|------------------|-----|------------|------------|-------------|
|                  |     | 1-2        | 3-4        |             |
| Poor Apgar score | Yes | 12 (18.5%) | 7 (11.7%)  | 19 (15.2%)  |
|                  | No  | 53 (81.5%) | 53 (88.3%) | 106 (84.8%) |
| Total            |     | 65 (100%)  | 60 (100%)  | 125 (100%)  |

\*Chi-square = 1.118, \*p-value = 0.290 (Insignificant)

Data was stratified for BMI of mothers. In females with BMI=18.5-24.9kg/m<sup>2</sup>, poor Apgar score was noted in 15(24.9%) neonates, in females with BMI=25-30kg/m<sup>2</sup>, poor Apgar score was noted in 4(11.8%) neonates and in females with BMI>30kg/m<sup>2</sup>, no neonate had poor Apgar score. The difference was insignificant ( $p=0.000$ ) as seen in (Table IV).

**Table IV.** Comparison of poor Apgar score with BMI of mothers

|                  |     | BMI (kg/m <sup>2</sup> ) |            |           | Total       |
|------------------|-----|--------------------------|------------|-----------|-------------|
|                  |     | 18.5-24.9                | 25-30      | >30       |             |
| Poor Apgar score | Yes | 15 (29.4%)               | 4 (11.8%)  | 0 (0%)    | 19 (15.2%)  |
|                  | No  | 36 (70.6%)               | 30 (88.2%) | 40 (100%) | 106 (84.8%) |
| Total            |     | 51 (100%)                | 34 (100%)  | 40 (100%) | 125 (100%)  |

\*Chi-square = 15.473, \*p-value = 0.000 (Significant)

Data was stratified for gender of baby. In male neonates, poor Apgar score was noted in 8(13.6%) neonates and in female neonates, poor Apgar score was noted in 11(16.7%) neonates. The difference was insignificant ( $p=0.629$ ) as shown in (Table VI).

**Table V.** Comparison of poor Apgar score with gender of baby

|                  |     | Gender     |            | Total       |
|------------------|-----|------------|------------|-------------|
|                  |     | Male       | Female     |             |
| Poor Apgar score | Yes | 8 (13.6%)  | 11 (16.7%) | 19 (15.2%)  |
|                  | No  | 51 (86.4%) | 55 (83.3%) | 106 (84.8%) |
| Total            |     | 59 (100%)  | 66 (100%)  | 125 (100%)  |

\*Chi-square = 0.233, \*P-value = 0.629 (Insignificant)

## DISCUSSION

Hypertensive emergencies are the second leading cause of maternal mortality during pregnancy, affecting one out of ten pregnancies. In the United States, pre-eclampsia accounts for 15% to 17.6% of maternal deaths. Hypertension complicates approximately one out of every ten pregnancies (13, 14).

Fetomaternal morbidity and mortality associated with hypertensive disorders is alarming especially in developing countries. Reason being inadequate antenatal surveillance and management of these cases in less favorable context. Stress should be given on health education of community, status of women and issues regarding reproductive health. Facilities of antenatal surveillance should be provided at doorstep. High-risk obstetric population should be screened earlier in pregnancy. There should be system of early referral and better transport facilities for referral of these cases. Regular fetomaternal monitoring of high-risk case should be under care of specialist doctors and deliveries of such cases should be conducted in well-equipped hospital to minimize adverse maternal and perinatal outcome (12).

In our study, the mean age of patients was  $30.50 \pm 6.22$  years. The mean gestational age at time of delivery was  $39.78 \pm 1.66$  weeks. In this study,  $n=30$  (24%) patients had parity 1,  $n=35$  (28%) had parity 2,  $n=25$  (20%) patients had parity 3 and  $n=35$  (28%) had parity 4. The mean BMI was  $26.99 \pm 5.13$  kg/m<sup>2</sup>. There were  $n=59$  (47.2%) male neonates while  $n=66$  (52.8%) female neonates. The mean Apgar score at 1 minute was  $7.29 \pm 1.36$  while at 5 minutes was  $7.70 \pm 1.29$ . Browne *et al.*, showed that the Apgar score after 1 min was 14% which was normalized by 5 min (11).

In our study, the frequency of poor Apgar score was noted in 19(15.2%) neonates. In a study, it has been reported that poor Apgar score was present in 8.9% cases on both; 1 and 5 minute after birth in neonates born to the females with PIH.<sup>9</sup> Another study showed that poor Apgar score was 15.9% at 1 minute while only in 0.8% neonates born to the females with PIH (10). Another study has showed that poor Apgar score was 22.0% at 1 minute while only in 3.4% neonates born to the females with PIH.<sup>11</sup> One local study has reported that poor Apgar score was 6.06% at 1 minute while only in 4.54% neonates born to the females with PIH (12). The relative risks of obtaining an Apgar value smaller than seven in the first and fifth minutes of life in women with PIH were 1.26 and 1.45 respectively (15).

In another study PIH was associated with poor fetal outcomes. Women with PIH were four times more likely to have a baby with low Apgar score at 5 minutes (OR 4.47,  $p=0.0155$ ) compared to women without PIH. There was however no statistically significant difference in delivery before 37 weeks gestation between women with PIH and those without (OR 1.70,  $p=0.1251$ ) (9).

We stratified our data for age of mothers. In mother's age 20-30 years, poor Apgar score was noted in 8(13.6%) neonates and in mother 31-40 years, poor Apgar score was noted in 11(16.7%) neonates. The difference was insignificant ( $p=0.629$ ). We also stratified data for parity of mothers. In females with parity 1-2, poor Apgar score was noted in 12(18.5%) neonates and in females with parity 3-4, poor Apgar score was noted in 7(11.7%) neonates. The difference was insignificant ( $p=0.290$ ). We also stratified data for BMI of mothers. In females with BMI=18.5-24.9 kg/m<sup>2</sup>, poor Apgar score was noted in 15(24.9%) neonates, in females with BMI=25-30 kg/m<sup>2</sup>, poor Apgar score was noted in 4(11.8%) neonates and in females with BMI>30 kg/m<sup>2</sup>, no neonate had poor Apgar score. The difference was insignificant ( $p=0.000$ ). We also stratified data for gender of baby. In male neonates, poor Apgar score was noted in 8(13.6%) neonates and in female neonates, poor Apgar score was noted in 11(16.7%) neonates. The difference was insignificant ( $p=0.629$ ).

In a study conducted at a tertiary care hospital at Ghana, 34% and 14.9 % of babies of hypertensive mothers had an Apgar score of less than 7 at 1 and 5 minutes respectively. In another large prospective cohort study, there was a strong association between maternal hypertension and poor Apgar score. Another study conducted in Ethiopia indicated strong association of PIH with low Apgar score (16,17,18).

## CONCLUSION

Thus the frequency of poor Apgar score was 15.2% in females with PIH. Now we have got the local evidence. Although the frequency is low, but in future, it will help us in implementing the surveillance programs to prevent the fetal complications in females having PIH

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