

Study on Foetal Outcome in Pre-eclamptic Mother

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Summary:

Pre-eclampsia or pregnancy induced hypertension (PIH) re-named as gestational hypertension is one of the important causes of maternal death in developing countries like Bangladesh. The foetal outcome is also very unsatisfactory and disappointing in pre-eclamptic mothers. Considering this view, the objective of this study was to assess the foetal outcome in pre-eclamptic mothers and also to identify the factors influencing the outcome. This was a cross sectional study conducted among the pregnant mothers admitted into Gynaecology and Obstetrics Department of Shaheed Suhrawardi Hospital, Dhaka, with specific signs and symptoms of pre-eclampsia during the period from January 2002 to December 2003. A total of 100 pre-eclamptic mothers were studied. Bivariate analysis revealed that a statistically significant

association was present between complicated pre-eclampsia ($p < 0.05$) and previous positive medical history with abnormal foetal outcome ($p < 0.05$), but no statistically significant association was found between foetal outcome and age, occupation of the mother and the husband, socioeconomic status, parity, hypertension, diabetes mellitus, previous surgical and bad obstetrical history, body built, maternal oedema ($p > 0.05$). Analysis also found that poor foetal outcome was significantly associated with haemoglobin level less than 10 gm%, gestational age and mode of delivery ($p < 0.01$). Analysis of relative risk indicated that the abnormal foetal outcome was 7.1 times higher in complicated pre-eclamptic mothers than only pre-eclamptic mothers ($p < 0.001$, 95% CI=2.598-19.957).

(J Bangladesh Coll Phys Surg 2007; 25 : 57-61)

Introduction:

Pre-eclampsia or pregnancy induced hypertension (PIH) or gestational hypertension is a multi-factorial condition involving some sort of immune response to pregnancy. It is characterized by hypertension, proteinuria and also oedema and hyperreflexia

occurring primarily in nulliparas after the twentieth week gestational age and most frequently near term. After all, there is foreign material (i.e. father's genetic component) which tries to graft to the mother with varying intensities of rejection. The term varying intensity is responsible for the numerous ways that presents in different pregnant women which has been the difficulty in nailing down on 'Grand unification theory' of its cause¹. Most often it occurs in young women with a first pregnancy. It is more common in twin pregnancies and in pregnancy induced hypertension in a previous pregnancy and also in women with pre-existing chronic hypertension. The condition PIH or gestational hypertension (previously known as pre-eclampsia) is mainly characterized by high blood pressure and proteinuria¹. Other features are oedema and hyperreflexia or exaggerated tendon reflexes (e.g. the knee jerk). It is one of the two major maternal conditions associated with child birth related maternal deaths. The effects of this condition on the foetus are also very unsatisfactory² and disappointing in some cases. Outcome of foetuses in hypertensive mothers is directly related to the reduced effective blood flow to the utero-placental circuit. Foetal death is usually due to hypoxia, often acute and secondary to *abruptio placentae* or vasospasm, and is generally preceded by intrauterine growth retardation (IUGR). If untreated, severe pregnancy induced hypertension may cause dangerous seizures and even death of the mother and foetus.

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Received: 18 August, 2005

Accepted: 8 February, 2006

Because of these risks, it may be necessary for the baby to be delivered early before 37 weeks of gestation i.e. before the baby being matured. This prematurity also adversely affects the foetal outcome³. Now-a-days, the diagnosis and management of PIH (pre-eclampsia) are improving and will eventually improve the maternal and foetal outcome.

Materials and method:

This was a cross sectional study conducted among pregnant mothers admitted in the Gynaecology and Obstetrics department of Shaheed Suhrawardi Hospital, Dhaka, with specific signs and symptoms of pre-eclampsia, over the period from January 2002 to December 2003. Data was collected by using a pre-designed questionnaire. A detailed history of the patient covering the age, parity, socio-economic status, occupation of both husband and wife, and past obstetrical, medical and contraceptive history was taken. The detailed obstetric history included parity, previous pregnancy outcome (in multiparous women) and if any history of pre-eclampsia or PIH in previous pregnancies. Patient's height was measured in centimeter with bare foot and no head cover, and weight was measured in kilogram (kg) with 100 gm precision. Maternal blood pressure was recorded by using mercury manometer, and was monitored with prime importance. The blood pressure 140/90 mm of Hg or a significant increase in systolic or diastolic or both pressures associated with protein in urine with or without oedema considered as features of pre-eclampsia⁴. Meticulous obstetrical examinations along with other general examinations were done to diagnose or to exclude few findings which have importance in patients with pre-eclampsia. As for example, fundal height, liquor volume, foetal size etc. On general examination, special importance was given to blood pressure recording, anaemia, any oedema and other signs related to complications of pre-eclampsia. Few baseline investigations were done in each case which were available in this institute such as Hb%, random blood sugar (RBS), fasting blood sugar (FBS) and two hours after 75gm glucose in patients with high RBS level or strong family history of diabetes mellitus (DM) or previous history of gestational diabetes, urea, creatinine, uric acid and ultrasonography (USG) of gravid uterus. Due to limitations, estimation of 24 hours total protein output in urine could not be done though it was needed to assess severity of the condition in few cases. In some severe cases, liver enzymes and platelet count were done to diagnose

haemolysis, elevated liver enzyme and low platelet (HELLP) syndrome. Before collection of data, all the patients were briefed about the purpose of the study and informed consent was obtained from each patient. Data analysis was done using Statistical Package for Social Science (SPSS, version 11.5). Univariate analysis was done to see the frequencies. Bi-variate analysis was done between foetal outcome and selected socio-demographic and maternal variables to find out any association. Statistical significance was tested at 5 percent of probability level and p value at <0.05 was considered as significant.

Results:

The mean age of the mothers was 27.0 ± 5.8 years ranging from 14 to 37 years. Among them, 10% were adolescent mothers. Regarding the socio-economic conditions, more than two-fifths (44%) were poor, 48% were average and only 8% had higher socioeconomic status. More than four-fifths (83%) were housewives and remaining 17% were engaged in different types of jobs such as service, garment worker, maidservant, students etc. About half (48%) of them were primipara. Regarding risk factors, highest percentage (57%) had hypertension, followed by 43% had past history of some medical problems, 32% had bad obstetric history, 16% had diabetes mellitus, only 4% had previous history of surgical treatment and two third of the mothers had haemoglobin level less than 10 gm% (63%).

Out of 100 patients, 51% had normal foetal outcome, 18% had low birth weight, 12% had intra uterine growth retardation, 10% had birth asphyxia, 5% twin pregnancy, 2% congenital malformation, and intrauterine death of the foetus was found in 2%. The mothers with complicated delivery such as low birth weight, intra uterine growth retardation, birth asphyxia, twin birth etc were found to have abnormal foetal outcome (Figure:- 1).

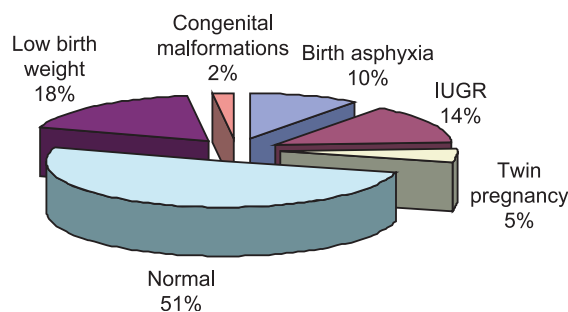


Fig.-1: Shows the percentage distribution of foetal outcome

Bi-variate analysis revealed a statistically significant association between complicated pre-eclampsia ($p<0.05$) and previous positive medical history ($p<0.05$) with abnormal foetal outcome, but no

statistically significant association was found between foetal outcome and age, occupation of the mother and the husband, socio-economic status, parity, hypertension, diabetes mellitus, previous surgical and

Table II*Percentage distribution of foetal outcome by selected variables*

| Variables | Foetal Outcome | | Total (N=100) | P value |
|-------------------------|----------------|-----------------|-------------------|-------------------|
| | Normal (n=51) | Abnormal (n=49) | | |
| Age in years | | | | |
| 20-29 | 49 | 57.1 | 53 | 0.416ns |
| <20 -?30 | 51 | 42.9 | 47 | |
| Occupation(wife) | | | | |
| Housewife | 86.3 | 79.6 | 83 | 0.375 ns |
| others | 13.7 | 20.4 | 17 | |
| Occupation(husband) | | | | |
| Manual job | 17.6 | 22.4 | 20 | 0.548 ns |
| Non manual job | 82.4 | 77.6 | 80 | |
| Socioeconomic condition | | | | |
| Poor | 45.1 | 42.9 | 44 | 0.821ns |
| Average and higher | 54.9 | 57.1 | 56 | |
| Parity | | | | |
| Primi | 43.1 | 53.1 | 48 | 0.321ns |
| multipara | 56.9 | 46.9 | 52 | |
| Contraceptive use | | | | |
| Yes | 29.4 | 36.7 | 33 | 0.43 ns |
| No | 70.6 | 63.3 | 67 | |
| Hypertension | | | | |
| Yes | 60.8 | 53.1 | 57 | 0.435ns |
| No | 39.2 | 46.9 | 43 | |
| Diabetes mellitus | | | | |
| Yes | 19.6 | 12.2 | 16 | 0.315ns |
| No | 80.4 | 87.8 | 83 | |
| Past medical history | | | | |
| Yes | 52.9 | 32.7 | 43 | 0.041s |
| No | 47.1 | 67.3 | 57 | |
| Past surgical history | | | | |
| Yes | 2 | 6.1 | 4 | 0.268 ns |
| No | 98 | 93.9 | 96 | |
| Past obst. History | | | | |
| Yes | 39.2 | 24.5 | 32 | 0.115ns |
| No | 60.8 | 55.5 | 68 | |
| Haemoglobin (gm) | | | | |
| ?10gm | 58.6 | 32.7 | 37 | 0.008s |
| <10gm | 41.2 | 67.3 | 63 | |
| Oedema | | | | |
| Yes | 88.2 | 98 | 93 | 0.112 ns |
| No | 11.8 | 2 | 7 | |
| Body built | | | | |
| Good | 29.4 | 22.4 | 26 | 0.427ns |
| Poor | 70.6 | 77.6 | 74 | |
| Type of PET | | | | |
| Uncomplicated PET | 88.2 | 51 | 70 | 0.001s RR=7.01 |
| Complicated PET | 11.8 | 49 | 30 | |
| | | | (95% CI=2.5-19.9) | |
| Mode of delivery | | | | |
| LUCS | 78.4 | 93.9 | 86 | 0.026s |
| Vaginal delivery | 21.6 | 6.1 | 14 | |
| Gestational age (wks) | | | | |
| >37 | 98 | 67.3 | 83 | 0.001S |
| <37 | 2 | 32.7 | 17 | |

bad obstetrical history, body built and maternal oedema ($p>0.05$). In anaemic mothers, a statistically significant association was found between foetal outcome and level of haemoglobin ($p<0.01$). Similarly, the foetal outcome was significantly associated with, mode of delivery and gestational age ($p<0.05$). The analysis of relative risk indicated that the abnormal foetal outcome was 7.1 times higher in complicated pre-eclamptic mothers than only pre-eclamptic mothers ($p<0.001$; 95% CI=2.598-19.957).

Discussion:

Worldwide, each year, more than four million women develop pre-eclampsia and approximately 100,000 women would have eclamptic convulsions, with over 90% occurring in developing countries. Pre-eclampsia complicates 2–3% of all pregnancies (5–7% in nulliparous women) and 2% of women with pre-eclampsia would develop eclampsia⁵. Pre-eclampsia is associated with significant morbidity and mortality for mother and baby. Despite a steady reduction in maternal mortality from the disorder in more developed countries, it remains one of the most common reasons for a woman to die during pregnancy in developing countries. The disorder starts with a placental trigger followed by a maternal systemic response. Because both this systemic response and the woman's reaction to it are inconsistent, the clinical presentation varies in time and substance, with many different organ systems affected⁶.

Foetal complications resulting from prematurity occur following early delivery which may have to be done in many cases to save the mother. In severe cases there may be intrapartum foetal distress, or stillbirth. Intrauterine growth retardation (IUGR) is a well known foetal complication of pre-eclampsia⁷. The low birth weight infants have a higher risk of mortality as they are likely to die especially during their neonatal period⁸. This study was done with an objective to assess the foetal outcome in pre-eclamptic mothers and to identify the risk factors associated with the adverse foetal outcome.

The study results also revealed that the foetal outcome was significantly associated with few factors which may be highlighted as pre-eclampsia with complications (eclampsia, abruptio placentae,

HELLP syndrome, renal failure, cardiac failure etc), past history of chronic hypertension, diabetes mellitus etc. Maternal anaemia was also found to be a significant factor influencing outcome of the foetus⁹. Keeping all these factors in mind one should deal the patients with pre-eclampsia with utmost importance to control those factors. Neonatal complications occurring in babies of pre-eclamptic mothers are closely related to the severity of the hypertension and proteinuria (though the present study could not find out the exact correlation between foetal outcome and proteinuria)¹⁰. There is a strong association between perinatal loss and both prematurity and low birth weight and pre-eclampsia and it is often associated with premature termination of pregnancy to save the mother. The study revealed that majority of the patients delivered their baby through lower uterine caesarean section. This might be due to the fact that in the study hospital, majority of the patients came with complications such as severe PIH, impending eclampsia, oligohydramnios, or other bad obstetrical history. As a result, the operative interference was relatively more than normal vaginal delivery. The foetal outcome is greatly influenced by the mode of treatment of pre-eclampsia. This abnormal outcome can be changed to a normal acceptable one by optimum antenatal care, adequate screening of the risk factors followed by proper and timely use of obstetric interventions^{11,12}. The incidence of pre-eclampsia or pregnancy induced hypertension with abnormal foetal outcome can be reduced by strengthening antenatal monitoring, prevention of complications, early diagnosis and appropriate and adequate treatment of pregnancy induced hypertension¹³.

The risk of abnormal foetal outcome is higher in complicated pre-eclamptic mothers. So, it needs special care in antenatal, intranatal as well as in postnatal period. As pre-eclampsia itself is not preventable and the foetal outcome is poor in complicated pre-eclampsia, early measures may be taken to prevent its complications that will greatly help to improve the foetal outcome.

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