

## RISK FACTORS IN PREMATUREITY

By

SHUBHADA KHANDEPARKAR, JYOTI A. BILANEY AND USHA R. KRISHNA

### SUMMARY

Three hundred cases of premature births of weight between 1-2 kg were analysed. The incidence of such babies was 12.1% at the K.E.M. Hospital. Of these 300 patients, 46% had Hb less than 10 gms, 70% were either unbooked or had less than 4 antenatal visits, 42 of the 300 had associated hypertension in pregnancy.

In our study group there were 21 breech presentations and 14 were twins. The frequency of these factors in an equal number of control cases were compared. The incidence of lower segment caesarean section was 4.33%. These were mainly performed for placenta praevia, foetal distress, etc. and not for prematurity per say.

Other contributory factors leading to premature births and their management are discussed.

### Introduction

Prematurity today is one of the most important causes of perinatal mortality and morbidity in our country. However, the factors causing prematurity are as yet not clearly understood. Little in 1862 first called attention to the association between premature birth and the child's corresponding physical and mental condition. Prematurity is shown to be associated with an increased incidence of still births, neonatal deaths, mental retardation, epilepsy, poor school performance and visual field defects according to Lilienfeld and Passamnick.

Incidence of low birth weight babies weighing less than 2.5 kg. in KEM Hospital was 43.7%, whereas in the developed country like France it was 8.8%.

(Rouquette *et al* 1975). However, majority of our perinatal loss was in the weight group of 2 kg. or less. This paper presents 300 cases of premature births between 1 kg to 2 kgs and analyses the possible aetiological factors of prematurity as well as causes of perinatal deaths.

### Materials and Methods

During the period October 1982 to May 1983, there were 2479 deliveries of which 300 cases delivered babies weighing between 1 kg to 2 kgs which formed 12.1% of the total deliveries. These cases were studied to assess the aetiology of prematurity and their associated medical and obstetric complications. The incidence of perinatal morbidity and mortality was noted in the group.

Of these 300 cases there were 14 fresh still births and macerated still births, 14 twin pregnancies and 21 breech presenta-

From: Department of Obstetrics and Gynaecology, K.E.M. Hospital, Parel, Bombay 400 012.

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tions. Data regarding past obstetric history and present medical and obstetric complications were noted.

All patients had Hb, VDRL, blood sugar and urine examinations done. Details regarding labour, mode of delivery, neonatal outcome, weight of the baby and placenta were analysed.

The effects of socio-economic status, age and parity, weight of the patient, Hb levels of the patient and number of antenatal visits were correlated with prematurity. The relationship of antenatal complications such as hypertension, abnormal presentations such as breech and operative interference with prematurity were also assessed.

Three hundred consecutive cases which delivered babies above 2500 gms. were taken as control to compare the results.

### Results

The factors commonly associated with prematurity were young primiparous patients as shown in Tables I and II. One hundred and forty-three (47.66%) of the 300 patients who delivered babies between 1-2 kg., weighed 45 kg. at the 1st antenatal visit which was around 26th week to 28th week of gestation, whereas amongst the 300 control cases 78.6% weighed more than 45 kg. 70% of the total 300 cases were either unbooked or had less than 4 antenatal visits.

TABLE I  
Age and Prematurity

Age	No. of cases	%	Control N = 300 %
<19 yrs.	43	14.34	2
19 yrs. & above	257	83.66	96

TABLE II  
Parity and Prematurity

Parity	No. of cases	%	Control N = 300 %
Primi	121	40.33	32
Multi	171	57.00	67
Grand Multi	8	2.67	1

Forty-two out of 300 patients (14%) who delivered premature babies less than 2 kg had hypertension in pregnancy.

Table III shows that of these 300 patients who delivered premature babies, 137 had a Hb level of between 8-10 gm% and 26 had a Hb level of less than 8 gm%. This was significant compared to the control cases where there were only 7% patients with Hb less than 10 gm%.

TABLE III  
Haemoglobin in Gms

Hb GM%	No. of cases	%	Control N = 300 %
8-10 gms%	137	45.66	6
<8 Gm%	26	8.7	1

Abnormal presentations is one of the most important obstetric complication leading to perinatal mortality and morbidity amongst premature babies. In this series, we had 21 breech presentations, 2 transverse presentations and 2 face presentations. Amongst the above, 2 breech presentations and 1 transverse lie had cord prolapse. The mortality in the 21 breech cases was 38%, whereas both the transverse presentations were delivered with caesarean section of which one baby expired.

There were 12 outlet forceps deliveries of which 4 neonates died within 3 days of birth. There were 13 lower segment

caesarean sections (4.33%). These were performed for the following factors, 1 for central placenta praevia, 4 for foetal distress, 2 for previous two lower segment caesarean sections, 1 for cervical dystocia associated with foetal distress, 2 for breech with cord prolapse, 2 for transverse presentation, 1 for prolonged labour and 1 for severe pregnancy induced hypertension with breech presentation with no progress in labour. Of the 300 control cases where babies weighed 2500 gms. or more at birth the incidence of lower segment caesarean section was 6%. There was no lower segment caesarean section done purely for prematurity or premature breech presentation in our series.

There were 14 cases of twin pregnancies compared to only 2 cases in the control group. The survival rate of these cases was as shown in Table IV. Of the total 300 cases, 14 patients had fresh still birth or macerated still birth and 64 prematures had neonatal deaths as shown in Table V. Thus the over all perinatal mortality was 273.3/1000.

TABLE IV  
Incidence of Twin Deliveries

		%	Control %
Total cases	300		
Twin:	14	4.66	0.75
Of these 14 cases			
Both expired	1	7.14	
One expired	8	57.16	
Both survived	5	35.70	

Of the 300 control cases there were 4 perinatal deaths. (A perinatal mortality of 13.3/1000 live births). Of 314 babies delivered inclusive of twins there were 14 still births, 115 out of the 300 live born prematures were transferred to the Inten-

TABLE V  
Still Births, Macerated Still Births, Neonatal Deaths

	No. of cases	%	Control %
Total No. of Premature Deliveries	300	100	
Fresh Still births and Macerated still births	14	4.66	—
Neonatal deaths	64	22.33	2

sive Paediatric Care Unit of which 42 expired due to causes such as septicemia and respiratory distress syndrome. Thus young, malnourished, and anaemic primigravidae who received poor antenatal care were prone to premature births. Associated hypertension, breech presentation and twin pregnancy have shown to have a significant perinatal loss.

#### Discussion

A multitude of factors contribute to prematurity. The incidence of perinatal loss in prematurity ranges from 10-68% as shown by the studies done by Ambekar *et al* at Wadia Maternity Hospital, Bombay, and by Dr. Indra *et al* 1982 at Calcutta.

Low socio-economic status, primigravidae, low pregravid weight, inadequate weight gain, bleeding during 1st and 2nd trimesters of pregnancy and heavy manual work, can well contribute to premature delivery. There may be an association of poor nutrition with the strength of the membranes which would correlate with premature rupture of membranes. Varieties of perinatal infections, parasitic, bacterial, viral or fungal are also important contributory factors with or without placentitis and chorioamnionitis, which may lead to premature labour.

The neonatal death rate in India today, of premature babies is as high as 286/1000 live births, whereas in developed countries it has become down to as low as 12/1000 live births. Early neonatal mortality (per 1000 live births) by birth weight of the new born according to various studies in India is shown in Table VI.

anaemia could alter the course and outcome of pregnancy.

For twins, a gestational age of 262 days is the mean and hence half of the twin pregnancies will be defined as preterm labour. Of the 14 twin deliveries in the study group in 8 pairs, one expired of which 7 were second born despite similar perinatal conditions for both. The second

TABLE VI  
Birth Weight and Neonatal Mortality

Author	Bhardari	Glosh	Gupta	Karan	Kasturilal	Singh
Yr. of Study	1982	1969-70	1970	1969-70	1972-73	1974-77
Area	Raipur- Orissa	N. Delhi	N. Delhi	Hyder- abad	Gulbarga	N. Delhi
Bt. Wt. Gms.						
<1000	1000	971				
1001-1500	328	474	286	500	862	637
1501-2000		160		188	251	153

Good antenatal care is a keystone to prevention of prematurity. In our study, this was highlighted as 70% of our cases were either unbooked or had less than 4 antenatal visits. Detection and timely management of incompetent os could also play an important role in avoiding premature delivery. Hypertension could lead to intrauterine growth retardation associated with prematurity and a higher perinatal loss. In our 42 cases the perinatal loss was 27.

Anemia was an important associated factor in our study group. It has been shown that anemia is associated with a decrease in T and B lymphocytes leading to immune depression. (Prema *et al* 1982). This in turn could predispose to increased susceptibility to infection and hence increased maternal morbidity. Routine screening of bacteruria in pregnancy has brought to light the association between asymptomatic bacteruria and anaemia refractory to treatment with poor intra-uterine growth, prematurity and low birth weight, hence, adverse effects of

born twin has greater susceptibility to hypoxia and trauma and therefore needs a more diligent vigilance during delivery.

Breech presentation was as high as 7% in the study group as compared to 2% in the control group. Associated cord prolapse was seen in 2 of the 21 cases in our study group. Our study shows a high perinatal loss of 48%. The high perinatal loss in breech deliveries is due to the associated complications such as cord accidents, cervical entrapment of the after coming head, tentorial tears and injuries to the abdominal viscera. These complications are associated with increased foetal morbidity and mortality. Goldenberg and Nelson (1972) concluded that the mortality of preterm vaginal breech delivery was greater than could be accounted for by prematurity alone.

The incidence of lower segment caesarean section in premature breech varies from 14-60%. Comparison of mortality rates for vaginal delivery or caesarean

section among infants  $\leq 1500$  gms and presenting by the breech is as shown in Table VII.

TABLE VII  
*Mortality Rates for Vaginal Deliveries and L.S.C.S.*

Source	Vaginal delivery %	Caesarean section %
Goldenberg and Nelson	77	57
Bowes et al	68	25
Duenholder	55	0
Kaupilla et al	74	14

General agreement is emerging that the outcome for the very low birth weight babies less than 1500 gms is better following abdominal delivery than after vaginal breech delivery. There are 40% less chances of intra-ventricular haemorrhage after lower segment caesarean section for breech than after vaginal breech delivery.

In a comparative study of two separate time periods Westergreen and Ingemarsson (1978) found that early caesarean section for all preterm babies improved results, reducing neonatal asphyxia and subsequent neurological abnormalities.

This liberal attitude to lower segment caesarean section is unlikely to be acceptable in our country yet, as the neonate's chances of survival after birth are rather poor, due to the limitations of availability of neonatal intensive care units. However, lower segment caesarean section was resorted to in our study group when there were other associated obstetric factors like cord prolapse, foetal distress, cervical dystocia etc.

In our study group there were 9 cases of placenta praevia which is a fairly common cause of preterm labour. Of these one had lower segment caesarean section. According to our study the factors

which affected prematurity were age, less than 19, primigravidae, maternal weight less than 45 kgs, irregular antenatal care, Hb less than 10 gms%, abnormal presentation like breech or transverse lie, twin pregnancy, incompetent cervical os and pregnancy hypertension.

Douglas in 1950, Biard in 1962, Butler and Bonham in 1963 and Janssan in 1966 have shown principle predictive factors contributory to prematurity and increased risk of preterm labour as previous preterm birth, previous still birth and previous spontaneous and induced abortions (more than 2). During pregnancy, uterine bleeding, multiple pregnancy, placenta praevia or pre-eclampsia, urinary infection and vaginal infection can contribute to premature delivery. Low socio-economic levels, maternal age less than 18 and more than 35, multiparity (4 or more) unmarried primis, as well as smokers were significant social and demographic factors.

Improvement in socio-economic levels, regular antenatal care, suspicion and detection of incompetent cervical os and its proper management, early antenatal booking and adequate vitamins, calcium and minerals to correct malnutrition and anaemia are mandatory. Good amount of rest, prevention and early detection of pregnancy induced hypertension, conservative management of placenta praevia to achieve foetal maturity and preventive health measures can save more infants from preterm births.

Almost half of the women who go into preterm labour show no obvious reasons for doing so. Early detection and management of asymptomatic bacteruria, correction of perinatal infections such as chlamydia, mycoplasma and streptococci group of organisms, suspicion and detection of uterine irritability and hypertoni-

city and its management with tocolytic agents and timely detection and correction of incompetent os would perhaps help to decrease the incidence of prematurity. At the same time better facilities of established care neonatal units have to be established to prevent neonatal mortality in the unavoidable premature births.

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#### References

1. Ambekar, A. H. and Mehta, A. C.: *J. Obstet. Gynec. India.* 35: 482, 1975.
2. Baird, D.: *Bulletin of World Health Organisation.* 26: 291, 1962.
3. Banerjee Bholanath: *Fundamental Obstetrics*, New Delhi, 1982, Prentice Hall of India Private Limited, p. 648.
4. Butler, N. R. and Bonham, D. G.: *First Report of the 1958 British Perinatal Mortality Survey*, London & Edinburgh, Livingstone, 1963.
5. Douglas, J. W.: *J. Obstet. Gynec. Brit. Emp.* 57: 143, 1950.
6. Goldenberg, R. L. and Nelson, K. G.: *The American Journal of Obstetrics & Gynaecology*, Vol. 127, p. 240-244, 1977.
7. Indra, S. Roy Chowdhury, N. N. and Pal, S.: *J. Obstet. Gynec. India.* 33: 21, 1982.
8. Ingemarsson, I., Westgran, M. and Svenningsen, N. W.: *Lancet*, 2: 172, 1978.
9. Jansson, I.: *Acta Obstetrica Gynaecologica Scandinavica.* 45: 279-301, 1966.
10. Prema, K., Ramalakshmi, B. A., Madhavapeddi and Baby, S.: *Brit. J. Obstet. Gynec.* 89: 222, 1982.
11. Rouquette, Ramcau, C., Marendaz, R., Daniel, M., Mazaubrun Du M., Breart, C.: *Perinatal Medicine 1975*, 4th European Congress of Perinatal Medicine, Prague, August 1974. Georg Thieme Publishers, Stuttgart, p. 236.
12. Spellacy W. N.: *Management of High Risk Pregnancy*. University Park Press, USA, 1976, p. 1-2.
13. Visaria, L.: *Infant Mortality in India. Economic & Political Weekly*, Vol. 20, No. 32, p. 1357, 1985.