

A DEMOGRAPHIC STUDY OF LOW BIRTH WEIGHT BABIES

by

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Introduction

One of the most important causes of perinatal mortality is low weight (LBW). Prevention of low birth weight (LBW) babies is very important to achieve a reduction in perinatal mortality rate. As the incidence of LBW babies and perinatal mortality is very high in our country, understanding of the various demographic factors of LBW babies will help to reduce their incidence and mortality.

Material and Methods

All the deliveries resulting in live births or still births weighing from 500 grams to 2499 grams were recorded over a period of about 5 months that is from 18-3-1975 to 9-8-1975 at the K.E.M. Hospital, Parel, Bombay 400 012 and involves 205 such deliveries.

Main emphasis is given to maternal aspect of low birth weight babies. Maternal age, obstetric history, menstrual history, period of gestation, history of other systemic diseases, complications during pregnancy and delivery, mode of delivery, were recorded in all the cases. Maternal height, weight, education and housing con-

ditions were recorded in certain number of cases. Thorough clinical examination was done in all the cases with due importance of general examination, recording of blood pressure and systemic examination. Haemoglobin and urine examination was done in all the cases. In patients who were attending antenatal clinics regularly, blood group (ABO and Rh) and V.D.R.L. were also done. Other relevant important investigations were done according to disease concerned.

In the foetus, history of loss of foetal movements, signs of fetal distress, still-birth or live birth, date and time of birth, sex, birth weight and condition immediately after birth were recorded in all the cases. All the new borns were examined completely and congenital malformations were also recorded.

Incubator care was given to the neonates who required it. These neonates were also looked after by paediatricians. The low birth weight babies were followed till discharged from the hospital. An attempt was made to attribute an exact cause of death if mortality occurred.

To understand the factor of age, parity and ante-natal care, at random 100 control cases delivering normal weight infants were also analysed. Babies are considered as preterm if born prior to 37 weeks of gestation and at "term" if born after 37 weeks of gestation.

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Results and Observations

Table I illustrates the various maternal and foetal factors in these mothers of LBW babies.

Maternal Factors

(I) *Age and Parity of Mother:* The incidence of mothers above 30 years was 3 times higher (18%) in LBW babies compared to the control cases (6%).

The survival rate of these babies was nearly the same in the age groups upto 34 years but was worst when maternal age exceeded 35 years.

The incidence of para I was 29% in control cases, but 46% in mothers delivering LBW cases. The incidence of para II, III and IV was lesser in LBW deliveries than in control cases but the incidence of para V again was higher (10%) in LBW cases. This indicates higher incidence of LBW babies in para I and/or above V.

(II) *Height:* This was measured in a few cases only. However, the babies survival was 1.3 times more when the maternal height was more than 60" with a particular reduction in the neonatal mortality rate.

TABLE I
Demographic Factors of L.B.W. Babies

	Total babies		% survival	S.B. %	Neonatal loss %
	No.	%			
MATERNAL					
(I) Age (yrs)					
Less than 20	39	20	38.4	23.0	38.4
20-29	121	62	41.3	25.6	33.0
30-34	25	18	40.0	28.0	32.0
35 & more	9		—	33.3	66.6
(II) Height					
60% or less	36		50.0	16.0	33.0
More than 60"	30		66.0	13.0	20.0
(III) Weight					
Less than 40 kg.	20		50.0	30.0	20.0
40-50 kg.	47		65.9	12.0	21.0
More than 50 kg.	8		75.0	12.0	25.0
(IV) Antenatal Care					
Booked	78		55.0	12.0	32.0
Emergency	54		50.0	22.0	27.0
(V) Period of Gestation					
wks.					
20-29	40		4.0	44.0	51.0
30-33	81		42.0	24.0	30.0
34-37	21		38.0	14.0	42.0
Total below 37	151 (77.8%)		29.0	29.0	41.0
Above 37	43 (22.2%)		72.0	11.0	16.0

TABLE I—Contd.

	Total babies		% survival	S.B. %	Neonatal loss %
	No.	%			
(VI) Haemoglobin					
Less than 10 gms%	102		21.5	37.0	42.0
More than 10 gms%	93		57.0	14.0	30.0
(VII) Cause of L.B.W.					
Maternal complications	81	41.5	39.5	22.0	38.0
Congenital Malformation	8	6.72	—	75.0	25.0
No specific cause	105	52.1	40.9	24.0	34.0
FOETAL FACTORS					
Male	95		36.8	21.0	42.0
Female	99		40.4	30.0	29.0
Single or Multiple pregnancy					
Single	194		38.6	25.0	35.0
Multiple	22		27.2	18.0	54.0

(III) *Weight*: Survival rate of the LBW babies is directly proportional to maternal weight. Incidence of S.B. is particularly high in mothers with low weight or less than 40 Kg.

(IV) *Antenatal care and Education*: Perinatal survival rate is nearly the same in these booked and emergency cases. However, the incidence of booked cases was higher as the maternal education increases. Incidence of booked cases was 59% in LBW group mothers as compared to 91% in control cases. Most of the booked cases had only one or two antenatal visits.

(V) *Period of Gestation*: Perinatal mortality increases as gestational age decreases. Survival rate in these LBW babies was 2.5 times more (72%) when the gestational age was above 37 weeks. However, 77.8% of these LBW babies were premature i.e. below 37 weeks.

(VI) *Maternal Haemoglobin*: The incidence of anaemia in these LBW babies'

mothers was nearly 50%. However, the babies survival was 2.5 times higher (57%) when the maternal Hb. was above 10 gms%.

(VIII) *Cause of LBW*: No specific cause could be accounted for LBW babies in 52% of cases. However, perinatal mortality was nearly the same with or without maternal complication. The perinatal mortality was particularly higher in multiple pregnancy, and in congenital malformation. The incidence of congenital malformations was 3.9%.

Foetal Factors

(I) *Sex of the Baby*: The incidence of males and females is nearly the same in these LBW babies. The incidence of neonatal loss is higher in males. The incidence of males in babies below 37 weeks was 70% and above 37 weeks it was 30% whereas the incidence of females in these two groups was 85% and 15% respectively. Thus in these LBW babies born after

37 weeks males were twice more common than the females.

(II) *Type of Pregnancy*: The survival rate is comparatively less in multiple pregnancy and they have a higher neonatal loss (54%) which is 3 times their S.B. rate. The incidence of multiple pregnancies in this series was 5.37%.

Table II illustrates the maternal complications and the survival rate of LBW babies in single pregnancies. Toxaemia, BOM and APH were the commonest complications. The survival rate of babies was least in APH cases. APH was also associated with a highest S.B. rate. The incidence of preterm babies was 55% in pre-eclampsia and 77% in eclampsia. The other 45% and 23% of the babies in these two groups were LBW but were born after 37 weeks. The incidence of preterm babies was 80% in APH group.

All the babies with maternal complication of anaemia, syphilis, viral infection, Diabetes, pyelonephritis and Rh incom-

patibility survived in this series while all the 4 babies of mothers with hypertension were lost. There was no S.B. in cases with heart disease. On the whole, there was a survival rate of 39.5% in these LBW babies with maternal complications.

Table III indicates the mortality of LBW babies in relation to birth weight. All the babies with birth weight below 1 kg. were also preterm and could not be survived. The survival rate was 12% in preterm babies but 71% in term babies with birth weight of 1 kg. to 1.499 kg. The same trend is shown in the group of birth weight of 1.5 to 1.999 kg. Even in babies weighing more than 2 kg. the incidence of survival is definitely higher (81.5%) if the babies are at term than if they are preterm (50% survival). This table clearly shows the importance of maturity in relation to birth weight.

The incidence of preterm babies was 78% and at term babies was 22%.

Table IV shows the neonatal loss in

TABLE II
Maternal Complications and LBW Babies (Single Pregnancies)

	Total Babies		Survival rate	S.B. %	Neonatal loss %
	No.	%			
Toxaemia	27	33.0	37	18	44.0
B O H	14	16.0	28	21	50.0
A.P.H.	11	14.0	18	63	18.0
Heart disease	6	7.5	66	—	33.0
Hypertension	4	4.9	—	50	50.0
Anaemia	4	4.9	100	—	—
Jaundice	3	18.0	33.3	—	66.6
Threatened abortion	3		33.3	33.3	33.3
Pulmonary tuberculosis	3		33	—	66
Syphilis	2		100	—	—
Viral infection	1		100	—	—
Diabetes	1		100	—	—
Pyelonephritis	1		100	—	—
Rh Incompatibility	1	100	—	—	
Total	81		32 39.5%)	22	38

TABLE III
Mortality of Low Weight Babies in Relation to Birth Weight

Weight (in gms)	Before 37 weeks					Above 37 weeks				
	Still Birth	Expired	Loss	Survival	Total	Still Birth	Expired	Loss	Survival	Total
500-999	No. 2	14	16	—	16	—	—	—	—	—
	% 12.5	87.5	100.0	—	100.0	—	—	—	—	—
1000-1499	No. 20	24	44	6	50	2	—	2	5	7
	% 40	48	88	12	100	28.57	—	28.57	71.43	100.0
1500-1999	No. 20	23	43	34	77	3	6	9	19	28
	% 25.97	29.87	55.84	34.16	100	10.71	21.43	32.14	67.86	100
2000-2500	No. 3	1	4	4	8	—	1	1	7	8
	% 37.50	12.5	50.0	50.0	100	—	12.5	12.5	87.5	100

single born LBW infants in relation to time.

Among these 205 mothers delivering LBW babies, 194 had a single baby and multiple pregnancy was present in 11 cases. Out of these 194 single babies, 119 (61%) were lost with a S.B. rate of 25% and a neonatal mortality rate of 35%. Among these 69 babies lost in the neonatal period, 50% expired in first 24 hours. Foetal anoxia due to various maternal complications like toxæmia or pregnancy, APH, complications of labour, congenital malformations and aspiration pneumonia resulted in these neonatal deaths within first 24 hours.

After one week, gastrointestinal tract infection and septicaemia were the main causes of neonatal deaths.

Out of 50 still-births in single pregnancy, 7 were fresh. This included 2 cases of cord accidents, one of hydrocephalus, two of APH and no specific cause could be accounted in other two cases. The remaining 43 still births were macerated and single factor of toxæmia, anencephaly or APH was responsible in 10 cases where as the other 33 macerated S.B. had multiple aetiological factors.

Discussion

The relationship between the birth weight and perinatal mortality was well established (Butler and Bonham), however the factor of gestational age is equally important (Butler and Alberman, Pernoll, M. L., Usher *et al*).

The incidence of LBW babies in this series was 9.8%. The incidence of LBW babies (< 2 kg) in Rupani *et al's* series was 9% and in U.S.A. quoted by Pernoll it was 7-8% of all live births.

Peak perinatal death rate was recorded at the extremes of maternal age and parity (Baird and Thompson). They have also corelated maternal height with socio-

TABLE IV
Neonatal Loss in Single Born Low Weight Infants in Relation to Time

	0-24 hrs.	25-48 hrs.	49-72 hrs.	73 hrs.- 1 week	After 1 week	Total
No.	35	7	7	10	10	69
%	50.72	10.14	10.14	14.49	14.49	100

economic and nutritional condition of the mother. The family income was recorded in 66 cases in this series and it was below Rs. 100 per month in 52% and was below Rs. 300 per month in all these 66 cases. Poor environment in mothers childhood is associated with lowered fetal growth (Drillien). Maternal weight is also associated with the nutritional status of the mother.

Poor prenatal care is associated with an increased incidence of LBW babies (Douglas, Permele, Butler and Bonham).

Illegitimate children also have a high incidence of LBW babies (Butler and Bonham) but in this series only 3 mothers (1.46%) were unmarried.

Improvement of socio-economic conditions, continuous prenatal care, preventive or preterm labour, proper monitoring of small for dates babies, proper intranatal and postnatal care for LBW babies will help to reduce the incidence and mortality in these babies (WHO Report No. 217).

Long term prognosis for LBW babies is not studied in this paper.

Summary and Conclusions

(1) In this series 205 cases delivering L.B.W. babies were studied. This included 194 single pregnancies and 11 cases of multiple pregnancies.

(2) LBW was related to age and parity. The survival of these LBW babies was related to maternal age, height, weight,

period of gestation, maternal haemoglobin, birth weight and type of pregnancy.

(3) The incidence of preterm babies was 78% and at term babies was 22%. The perinatal mortality in these two groups was 71% and 28% respectively. The overall perinatal mortality in single pregnancy was 61%.

(4) In multiple pregnancies, the perinatal mortality was 73%. The incidence of preterm and term babies was nearly the same (82%) and (18%) in term babies.

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