

# The potential for preventing the delivery and perinatal mortality of low-birth-weight babies in a black urban population

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*Objective.* To determine the potential for preventing the delivery and perinatal mortality of low-birth-weight (LBW) babies in a black urban population.

*Design.* Cross-sectional descriptive study.

*Setting.* All women delivering babies weighing less than 2 500 g at Kalafong Hospital in a 6-month period (December 1991 - May 1992).

*Main outcome measures.* The primary obstetric reason for delivery; whether the labour was of spontaneous onset or iatrogenic; whether labour was theoretically preventable using currently accepted practice; the number of patients in whom suppression of delivery was attempted in the theoretically preventable group; and the perinatal mortality rate of that group.

*Results.* There were 124 perinatal deaths (22.5%) in the 550 LBW babies delivered from 465 singleton pregnancies, 42 twin pregnancies and 1 triplet pregnancy. The primary obstetric reasons for delivery were spontaneous preterm labour (28%), hypertensive diseases (19%), premature rupture of membranes (18%), spontaneous labour in light-for-gestational-age babies (16%), unexplained intra-uterine deaths (8%), antepartum haemorrhage (8%) and other causes (3%). A medical decision to terminate the pregnancy before labour was made in 177 (34.8%) cases, the major reason being hypertensive diseases (84 mothers; 47.5%). In the remaining 331 mothers with spontaneous onset of labour, labour was theoretically preventable in 63 (19%) and prevention was only attempted in 12 (2.4% of the total mothers). The major reason for not attempting to suppress labour in the others was that the patients arrived too late at the hospital for intervention to take place.

*Conclusion.* Hospital staff can do little to prevent the delivery of LBW babies in a black urban population.

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Perinatal care of low-birth-weight (LBW) babies is an acknowledged major problem at Kalafong Hospital, and LBW babies comprise 12% of all our deliveries; 77% of all our perinatal deaths occur in this group.<sup>1</sup>

The obvious solution to this is to decrease the incidence of LBW babies. An audit of LBW babies delivered at Kalafong Hospital was therefore performed to determine the causes of and potential for prevention of the delivery of LBW babies in our black urban population.

## Subjects and methods

A descriptive study was undertaken of all women delivering babies who weighed less than 2 500 g during a 6-month period (December 1991 to May 1992). The outcome and birth weights of all pregnancies in which an attempt was made to suppress labour were also documented, so that the interpretation of data on the success of suppression of labour would not be biased.

A primary obstetric reason for delivery was allocated for each LBW baby. The following facts were documented: (i) whether the labour was of spontaneous onset or iatrogenic (i.e. where a medical decision to terminate the pregnancy was made before the onset of labour); (ii) whether labour was theoretically preventable with currently accepted practice; and (iii) the number of patients in whom suppression of delivery was attempted in the theoretically preventable group. The concept of 'theoretically preventable' is best explained by means of an example. A woman presenting in spontaneous preterm labour whose cervix on admission was 9 cm dilated and who shortly thereafter delivered a baby of 1 500 g, would be considered to be in theoretically preventable labour because, had she presented earlier, the labour might have been suppressed. In a similar set of circumstances but where antepartum haemorrhage was present, the labour would not have been considered theoretically preventable, as suppression of labour in women with antepartum haemorrhage is not accepted obstetric practice.

The primary obstetric reason for delivery was defined according to the major obstetric problem present that was known to result in labour. In those cases where labour or delivery resulted from a medical decision, the obstetric problem which gave rise to that decision was used. LBW babies of more than 37 weeks' gestation, and in whose mothers no other cause of labour other than spontaneous labour was found, were classified as light-for-gestational-age (LiGA) and this was considered the primary cause. Other cases where the baby weighed less than the 10th centile for gestational age and there was no obvious underlying cause of the onset of labour were also classified as LiGA.<sup>2</sup> The gestational age was calculated by means of a combination of last menstrual period and early ultrasound estimation. Where the baby died *in utero* and no cause could be allocated, the reason for labour was classified as intra-uterine death.

Where an attempt to suppress labour was attempted, hexoprenaline and indomethacin were used along with ampicillin and metronidazole. Labour was considered too far advanced to suppress if the cervical dilatation was greater than 4 cm.

## Results

During the period studied, 550 LBW babies were delivered from 508 mothers (466 singletons, 81 twins and 1 set of triplets). Twenty-eight per cent of the mothers came from Saulsville and Atteridgeville (areas served directly by Kalafong Hospital), 46% from Pretoria and its suburbs including Mamelodi, and 23% from outside the Pretoria area. The median parity was 2 and gravidity 3, the mean birth weight 1 825 g and 'best-guess' gestational age 33 weeks. Twenty-four per cent of babies were delivered by caesarean section.

There were 124 deaths: 80 were stillbirths, 35 were early neonatal deaths, 5 were late neonatal deaths, and 4 were perinatally related infant deaths. A breakdown of the deaths with relation to time of death and weight category is shown in Table I. In 3 twin pregnancies, one of the babies weighed more than 2 500 g.

**Table I. Timing of deaths in relation to birth weight categories of LBW babies.**

	500 - 999 g	1 000 - 1 499 g	1 500 - 1 999 g	2 000 - 2 500 g	Total
<b>Singleton pregnancies</b>					
Macerated SB	19	12	17	6	54
Fresh SB	12	6	4	3	25
ENND	11	8	5	4	28
LNND	1	-	3	-	4
PRID	-	-	-	2	2
Survivors	<u>8</u>	<u>39</u>	<u>85</u>	<u>221</u>	<u>353</u>
Total	51	65	114	236	466
PNM/1 000	843	400	254	63.5	242
<b>Neonatal</b>					
deaths/1 000	545	170	86	26	88
<b>Multiple pregnancies</b>					
Macerated SB	-	-	-	-	-
Fresh SB	-	1	-	-	1
ENND	5	2	-	-	7
LNND	1	-	-	-	1
PRID	-	2	-	-	2
Survivors	<u>2</u>	<u>14</u>	<u>22</u>	<u>35</u>	<u>73</u>
Total	8	19	22	35	84
PNM/1 000	750	73.7	0	0	86.9

SB = stillbirth; ENND = early neonatal death; LNND = late neonatal death; PRID = perinatally related infant death; PNM = perinatal mortality rate.

The primary obstetric cause of delivery with the number of deaths per category is given in Table II. Kalafong Hospital is a referral hospital and the pattern of causes of LBW babies may be biased by this. The only hospital or clinic providing labour ward facilities for the Saulsville and Atteridgeville area is Kalafong Hospital. When the data from this area only were examined (148 mothers), the pattern was similar to the whole group, with 31% having spontaneous preterm labour, 19% premature rupture of membranes, 14% hypertensive diseases, 7% antepartum haemorrhage, 7% intra-uterine deaths and 2% congenital abnormalities.

**Table II. Primary obstetric causes of death in LBW babies**

	Singletons		Twins	
	No.	%	No.	%
Spontaneous preterm labour	17/129	13	4/35	11
Premature rupture of membranes	14/86	16	0/15	
Hypertensive conditions	15/87	17	0/10	
Antepartum haemorrhage	21/36	58	7/15	47
Light for gestational age	1/77	1	0/9	
Congenital abnormalities	9/10	90	-	
Maternal diseases	1/6	17	-	
Intra-uterine death	35/35	100	-	
Total	113/466	24.2	11/84	13.0

The primary obstetric causes of delivery in those mothers whose babies were below 2 000 g and those whose were 2 000 g and above are shown in Table III. It is important to note that 85 babies were older than 37 weeks but weighed less than 2 500 g. Eighty of these weighed more than 2 000 g at birth; term babies therefore comprised 29.5% of babies over 2 000 g. Of the babies weighing less than 2 000 g, spontaneous preterm labour (27.2%), premature rupture of membranes (19.9%), hypertensive conditions (21.1%) and antepartum haemorrhage (15%) were by far the most common causes of delivery.

**Table III. The distribution of the primary obstetric causes of delivery of LBW babies above and below 2 000 g**

	< 2 000 g		> 2 000 g	
	No.	%	No.	%
Singleton pregnancies				
Spontaneous preterm labour	57	20.4	72	26.6
Premature rupture of membranes	40	14.3	46	17.0
Hypertensive conditions	55	19.7	32	11.8
Antepartum haemorrhage	29	10.4	7	2.6
Light for gestational age	6	2.2	71	26.2
Congenital abnormalities	9	3.2	1	0.4
Maternal diseases	3	1.1	3	1.1
Intra-uterine death	31	11.1	4	1.5
Multiple pregnancies				
Spontaneous preterm labour	19	6.8	16	5.9
Premature rupture of membranes	13	4.7	2	0.7
Hypertensive conditions	4	1.4	6	2.2
Antepartum haemorrhage	13	4.7	2	0.7
Light for gestational age	0		9	3.3
Total	279	100	271	100

A medical decision to terminate the pregnancy before labour was made in 177 mothers (34.8%), the majority of whom were women with hypertensive disease in pregnancy (47.4%, Table IV). The most important primary obstetric causes of delivery of LBW babies born spontaneously were spontaneous preterm labour (44.4%), spontaneous labour in LiGA babies (21.2%) and premature rupture of membranes (17.6%, Table IV).

**Table IV. The distribution of primary obstetric causes of delivery of LBW babies according to whether the onset of labour was spontaneous or iatrogenic**

	Iatrogenic		Spontaneous	
	No.	%	No.	%
Spontaneous preterm labour	0		147	44.4
Premature rupture of membranes	36	20.3	58	17.6
Hypertensive conditions	84	47.4	8	2.4
Antepartum haemorrhage	17	9.6	26	7.8
Light for gestational age	11	6.3	70	21.2
Congenital abnormalities	8	4.5	2	0.6
Maternal diseases	3	1.7	3	0.9
Intra-uterine death	18	10.2	17	5.1
Total	177	100	331	100

In the group of 364 babies born spontaneously from 331 mothers, labour was theoretically preventable in 63 (19%) mothers, but prevention was only attempted in 12 (2.4%) of the total of mothers. Of the 51 remaining mothers, the major reason for not attempting to suppress labour was that 42 of the patients' cervixes were too far dilated, in 6 the baby's weight was overestimated, 2 developed rupture of membranes before suppression was commenced and 1 developed chorio-amnionitis. In those patients in whom suppression was attempted, labour was prolonged for more than 48 hours in 6 mothers, but only 1 baby delivered weighed more than 2 500 g.

Of the group born spontaneously, labour was not theoretically preventable in 268 mothers. The major reasons for non-suppression of labour were estimated weight of more than 2 000 g or gestational age of more than 34 weeks (167; 62%), premature rupture of membranes (42; 15.6%), antepartum haemorrhage (21; 7.8%) and intra-uterine death (26; 9.7%).

The number of neonatal deaths per liveborn babies relative to the onset of labour and primary obstetric cause of delivery is shown in Table V. In the spontaneous preterm labour group, there were 12 neonatal deaths of 157 liveborn babies. Of these, 46 singleton pregnancies were theoretically preventable; in 5 suppression of labour was attempted, and 1 baby died; of the remaining 41, 7 babies died. In the 9 mothers with multiple pregnancies in whom suppression of labour was theoretically possible, it was not attempted in 8 and 2 babies died. The ninth mother's contractions were suppressed and both her babies survived. A summary of the results is shown in Fig. 1.

**Table V. The distribution of neonatal deaths per liveborn babies in relation to the onset of labour and the primary obstetric cause thereof**

Reason for delivery	Iatrogenic		Spontaneous		Total	
	No.	%	No.	%	No.	%
Spont PTL	-	-	12/157	8	12/157	8
PROM	4/36	11	5/56	9	9/92	10
HT	6/78	8	0/10		6/88	7
APH	4/13	31	9/26	35	13/39	33
LiGA	0/13		1/76	1	1/89	1
Other	2/6	33	1/2	50	3/8	38

Spont PTL = spontaneous preterm labour; PROM = premature rupture of membranes; HT = hypertensive conditions; LiGA = light for gestational age.

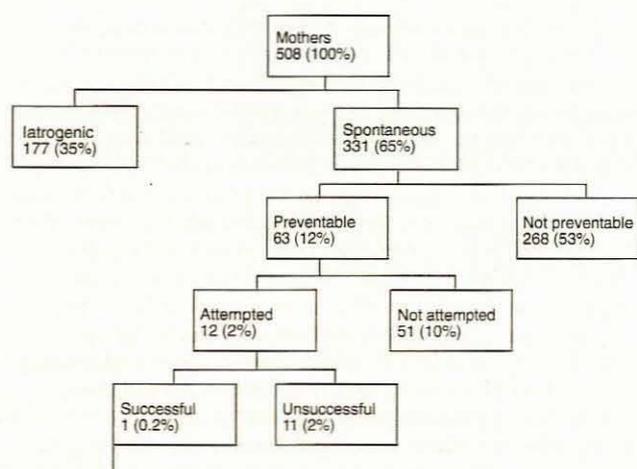


Fig. 1. Summary of the distribution of mothers in relation to the potential for prevention of delivery of LBW babies.

## Discussion

Obstetric indications for delivery of LBW babies were present in 34% of cases, the most common being hypertensive diseases. To make an impact on the incidence of LBW babies in this group, methods of preventing hypertension in pregnancy will need to be developed. The use of low-dose aspirin in women with a high risk of developing proteinuric hypertension will have some impact on this.<sup>3</sup> However, earlier attendance at antenatal clinics than is the custom at present will be necessary to achieve this.

Suppression of labour could theoretically have been attempted in 63 (19%) of the 331 mothers where labour started spontaneously, but in only 12 mothers was suppression of labour attempted and only 1 fetus subsequently weighed more than 2 500 g at delivery. These 12 mothers represent only 19% of the mothers in whom labour could have been suppressed and just 3.6% of the mothers in whom labour started spontaneously. This finding is similar to that of Tucker *et al.*<sup>4</sup> who found that in only 23.2% of mothers from an indigent population in Birmingham, Alabama, USA, was suppression of labour theoretically preventable; however, it was attempted in only one-quarter of this 23.2% and was successful in none.

Babies weighing more than 2 000 g rarely have neonatal problems and comprise 49.2% of the LBW babies. Most of the LiGA group fell into this category and most of these were term infants. This provides a convincing reason for not suppressing labour in those women in whom the gestational age is unknown and the fetus is estimated to weigh more than 2 000 g. Spontaneous preterm labour was responsible for 24.8%, hypertensive conditions for 23.9%, premature rupture of membranes for 17.4% and antepartum haemorrhage for 12.6% of singleton babies who were delivered weighing less than 2 000 g (Table III). These conditions must be priorities in research because babies less than 2 000 g are those most likely to die (Table I). To accentuate this, perhaps, the definition of LBW babies should be changed to denote those weighing less than 2 000 g, or the group of babies weighing less than 2 000 g should be called the clinically important group of LBW

babies. A mother is not necessarily worried if her baby is small so long as it is healthy. Definitions and descriptive statistics should reflect this. Inclusion of babies weighing more than 2 000 g in the LBW definition tends to minimise the severity of some conditions and overemphasise the importance of others. The importance of an infant's being LiGA has clearly been overemphasised as a problem in LBW babies, because they generally weigh over 2 000 g, tend to do well and experience minimal morbidity (Tables II and III).

Suppression of labour and treatment of hypertension are the only methods available to hospital-based obstetricians to postpone delivery and thereby reduce the prevalence of LBW baby deliveries. From this study, this will clearly not make an impact under present conditions in black urban mothers because the mothers arrive at the hospitals with their conditions too far advanced. To make an impact on the prevalence of LBW babies, and thereby improve perinatal mortality and morbidity rates, strategies that involve the community will need to be developed. Methods of preventing or postponing the onset of hypertension in pregnancy, preterm premature membrane rupture, spontaneous preterm labour and antepartum haemorrhage need to be identified and introduced. These can only be successful if early attendance at antenatal clinics is achieved and personnel at the clinics implement the methods with support from the community.

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