

Preterm Birth at Siriraj Hospital: A 9-Year Period Review (2002-2010)

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ABSTRACT

Objective: To determine the preterm birth rate, neonatal birth weight and causes of early neonatal death at Siriraj Hospital over a 9-year period (2002-2010).

Methods: The medical records of preterm birth, threatened preterm labor and neonatal birth weight at Siriraj Hospital from 2002 to 2010 were retrospectively collected and reviewed. The data was analyzed by SPSS version 13.

Results: During a 9-year period, 2002-2010, the birth rate decreased steadily from 2002 to 2006, but increased suddenly from 2007 to 2010. The rate of preterm birth was increased steadily from 2004 to 2010 (9.44%-13.70%). The rate of threatened preterm labor was constantly between 6.0 and 8.9%. Among preterm births, low birth weight infants were mostly found except in the year 2003. Early neonatal death was mostly caused from fetal abnormality. The trend of neonatal death from prematurity had continuously declined and there was no early neonatal death from 2008 to 2010.

Conclusion: Regarding this 9-year review, the preterm birth rate increased from 2007 to 2010 while premature babies mostly survived.

Keywords: Preterm birth, threatened preterm labor, early neonatal death

Siriraj Med J 2011;63:143-146

E-journal: <http://www.sirirajmedj.com>

The major cause of perinatal and neonatal morbidity and mortality is still from preterm labor and delivery. Preterm birth before 24 weeks of gestation may be defined as abortion in some centers. Preterm babies with lowest gestational age and birth weight were correlated with the highest risk of fetal death.^{1,2} However, survival rates for preterm birth in tertiary cares are high because of the highest level of neonatal intensive care which provides mechanical ventilation and well-trained neonatologists.³

Siriraj Hospital is the tertiary center where the complicated cases are referred for intensive care, therefore the preterm birth rate was high. The trend of preterm delivery in Siriraj Hospital has changed for 9 years. The situation of financial problems, social policy and hospital contract insurance were the major issues for the patients to make a decision of the place for delivery. The advanced technique of assisted reproduction, a high prevalence of complicated pregnancies and other related causes have resulted in the

high incidence of preterm birth.^{4,6} This study has analyzed the trend of preterm birth, threatened preterm labor, neonatal birth weight and cause of early neonatal death as the preliminary results for the future improvement and proper management of care for newborns.

Definition

Threatened preterm labor is defined as regular uterine contractions occurring at the frequency of at least 1 time in 10 minutes with no effacement and dilatation of cervix between 20-37 weeks. The examination was taken for at least 30 minutes.⁷

Preterm labor was defined as regular uterine contractions 4 times in 20 minutes or 8 times in 60 minutes with progressive cervical dilatation greater than 1 cm and effacement at least 80%.⁸

Preterm birth was defined as a delivery that occurred before 37 completed weeks (less than 259 days) of gestation.⁹

MATERIALS AND METHODS

The study was approved by the Ethics Committee at the Faculty of Medicine Siriraj Hospital, Mahidol University, approval number SI 008/2011. The medical

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Received 5 April 2011

Revised 11 May 2011

Accepted 18 May 2011

records of preterm birth, threatened preterm labour and neonatal birth weight, causes of early neonatal death at Siriraj Hospital from 2002 to 2010 were collected and reviewed. SPSS version 13 was used to analyze the data.

RESULTS

During the 9-year period, 2002-2010, birth decreased steadily from 2002 to 2006, but increased suddenly in the year 2007 and was then constant from 2008 to 2010 (Table 1). When preterm birth and threatened preterm labor were calculated in percentages, the rate of preterm birth increased steadily from 2004 to 2010 while the threatened preterm labor rate was constantly between 6.0 and 8.9% (Table 1, Fig 1). Among preterm birth, low birth weight infants were mostly found except in the year 2003. (Table 2, Fig 2) Early neonatal death was mostly caused by fetal abnormality while sepsis and chromosome abnormality were the lowest causes of fetal death during these 9 years. However fetal and chromosome abnormalities were the highest causes of early neonatal death from 2009 to 2010 (Table 3). The trend of neonatal death from prematurity has continuously declined and there was no early neonatal death between 2008 and 2010 (Table 3, Fig 3). The cost of newborn care for complicated preterm birth at Siriraj Hospital, Bangkok and Thailand (Table 4) is also cited in this study.¹⁰

DISCUSSION

From this study, the birth rate decreased steadily from 2002 to 2006 and then increased constantly from

TABLE 1. Total birth, preterm birth and threatened preterm labour from 2002 to 2010.

Year	Total birth	Number of preterm birth (%)	Number of threatened preterm labor (%)
2002	10,034	1,098 (10.94)	780 (7.7)
2003	9,816	1,193 (12.15)	590 (6.0)
2004	9,104	859 (9.44)	675 (7.4)
2005	8,712	919 (10.55)	695 (7.9)
2006	7,078	738 (10.43)	630 (8.9)
2007	9,080	1,001 (11.02)	710 (7.8)
2008	8,920	1,158 (12.98)	640 (7.1)
2009	8,920	1,168 (13.09)	695 (7.8)
2010	8,957	1,228 (13.70)	727 (8.1)

2007 to 2010. However, the rate of preterm birth increased steadily from 2004 to 2010 (9.44%-13.7%). The rate of threatened preterm labor was about 6.0 -8.9%. Low birth weight infants were mostly found among preterm births. The sepsis and chromosome abnormality were the lowest causes of fetal death between 2002 and 2008, whereas fetal and chromosome abnormality were the highest causes of fetal death from 2009 to 2010. The trend of neonatal death from prematurity had continuously declined and there was no early neonatal death from 2008 to 2010.

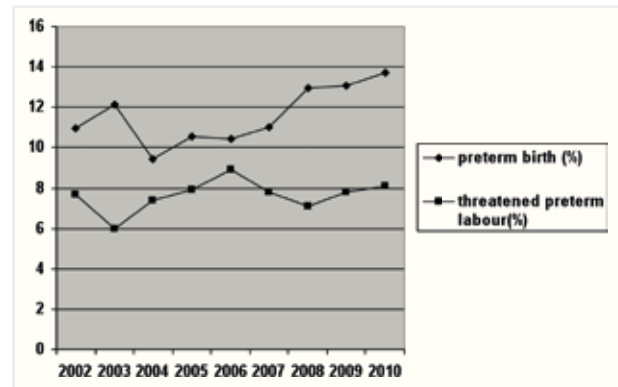


Fig 1. Trends of percentage of preterm birth and threatened preterm labor from 2002 to 2010.

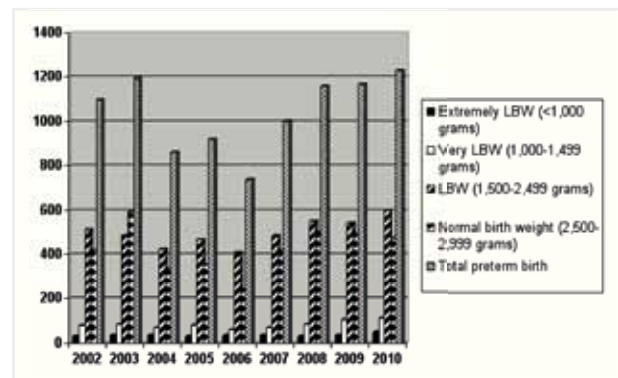


Fig 2. Graph of neonatal birth weight which was classified as extremely low birth weight, very low birth weight, low birth weight and normal birth weight from 2002 to 2010.

TABLE 2. Neonatal birth weight of the preterm delivery from 2002 to 2010.

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
Extremely LBW: <1,000 grams (%)	29 (2.6)	33 (2.8)	35 (4.1)	27 (2.9)	31 (4.2)	34 (3.4)	28 (2.4)	35 (3.0)	47 (3.8)
Very LBW: 1,000-1,499 grams (%)	76 (6.9)	82 (6.9)	66 (7.7)	78 (8.5)	58 (7.9)	68 (6.8)	81 (7.0)	102 (8.7)	109 (8.8)
LBW: 1,500-2,499 grams (%)	512 (46.6)	527 (44.2)	425 (49.5)	466 (50.7)	410 (55.6)	484 (48.4)	550 (47.5)	543 (46.5)	598 (48.8)
Normal birth weight: 2,500-2,999 grams (%)	418 (38.1)	551 (46.2)	333 (38.8)	353 (38.4)	237 (32.1)	415 (41.5)	499 (43.1)	488 (41.8)	474 (38.6)
Total	1,098	1,193	859	919	738	1,001	1,158	1,168	1,228

*LBW = Low birth weight

TABLE 3. Causes of early neonatal death from 2002 to 2010.

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
Causes									
*SGA, **LBW	1	3	2	2	3	3	3	1	1
Prematurity	3	1	0	1	2	1	0	0	0
Asphyxia	6	5	3	0	2	2	2	2	1
Sepsis	2	1	0	0	1	0	1	1	0
Fetal abnormality	13	13	7	7	7	6	4	6	5
Chromosome abnormality	1	0	0	1	1	1	1	3	5

*SGA = small for gestational age

**LBW = low birth weight

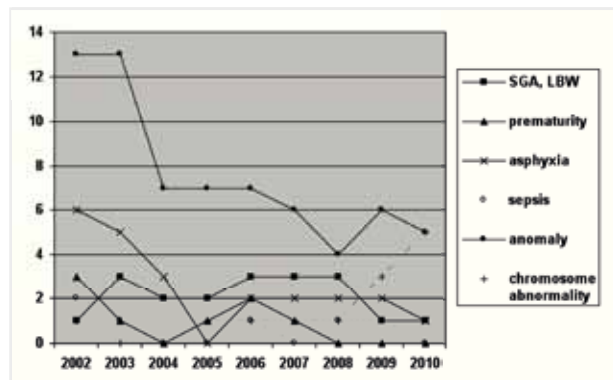


Fig 3. Trends of the causes of neonatal death from 2002 to 2010

For the last 10 years, the perinatal mortality rate has continuously declined and was less than 10%.¹¹ No premature baby died from 2008 to 2010. According to the policy of contract insurance in the year 2006, the total births decreased because most pregnant women preferred to deliver at their local hospitals. The survival rate of premature babies has been increased due to the improvement of obstetric and newborn care. The well-trained neonatologists and excellent equipment result in the best care for newborns. The extremely high costs of newborn care around 22,925,000 baht/year or 175,000 baht / case at Siriraj Hospital were simultaneously recorded.¹⁰

Premature infants with major congenital anomalies have higher mortalities and morbidity rates. Premature survivors with major congenital anomalies were twice as likely to have neurodevelopmental impairment, have poor growth, and were at three times greater risk of re-hospitalization when compared with extremely low birth weight infants without major anomalies.¹² From this study, fetal abnormality was the highest mortality which included the referred cases to Siriraj Hospital.

The limit of viability is defined as the stage of maturity, that would ensure a reasonable chance of survival without severe deficits. Determining the limit of viability is desirable in order to avoid the interventions that are costly in the extremely low birth weight infants who do not have a chance of survival.¹³⁻¹⁵ At Siriraj Hospital, the fetal gestational age below 24-26 weeks or birth weight less than 650 grams is defined as abortion that resulted in no fetal dead from 2008 to 2010.

The management of infants at the threshold of viability is challenging as it is uncertain which extremely preterm infant has a reasonable chance of survival without severe deficits especially those born between 23 and 24 weeks gestation.¹⁶ Survival rates in extremely premature

TABLE 4. Cost of newborn care for complicated preterm birth.

Place	Neonatal birth/year	Preterm birth	Cost (Bahts)
Siriraj Hospital	9,198	131	22,925,000 (175,000/cases)
Bangkok	117,601	1,646	288,050,000
Thailand	813,069	11,383	1,992,025,000

*Courtesy: Coratat T. Preterm birth: recent situation and effect. 2008

infants depend on many factors such as gestational age, birth weight, gender, plurality, etc. In making management decisions, these factors especially the gestational age should be considered when estimating the probability of a reasonable outcome in infants at or below 25 weeks gestation.^{13,17}

In conclusion, this study showed that the preterm birth rate increased during the 9 -year period studied and premature babies mostly survived. Improvement in preterm care resulted in the good neonatal outcome.

ACKNOWLEDGMENTS

We would like to thank the staff of the statistical unit, Siriraj Hospital, who provided the data for this study.

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