

# Factors Associated with Term Infant's Birthweight of $\geq 3000$ g at Ramathibodi Hospital

Sompol Pongthai MD, MPH,\*  
Kulsuda Jiamsuchon MSc.#

\*Department of Obstetrics and Gynaecology,

#Division of Medical Statistics,

Faculty of Medicine, Ramathibodi Hospital,  
Mahidol University, Bangkok 10400, Thailand

**Abstract :** The aim of the National Economic and Social Development Plan (Phase VI) is to have at least 60% of infants born with a birthweight of  $\geq 3000$  g throughout the country. Biological, socio-economic and medical factors are all well known to be associated with infant's birthweight. This retrospective study, carried out during the first two years of the National Plan, was to find out the incidence and determine the association of maternal age, gravidity, weight at the time of labour, height, educational level, occupation, and complications during pregnancy with single liveborn infant weighing  $\geq 3000$  g at 37 weeks of gestation or more. The incidence of infant's birthweight of  $\geq 3000$  g was 68.1% and was significantly associated with all mentioned factors. Other than medical factors i.e. socio-economic and biological factors were also strongly associated. Reduction of teenage pregnancy as well as improvement of nutritional status are highly recommended and of great priority in reaching the target set in the National Plan. (Thai J Obstet Gynaecol 1990;2:67-72.)

**Key words :** birthweight, associated factors, term infant birthweight of  $\geq 3000$  g

The aim of the National Economic and Social Plan, Phase VI (NESP VI) concerning maternal and child health is to have at least 60% of infants born with a birthweight of equal or more than 3000 g for the whole of Thailand<sup>(1)</sup>. To implement this, associated factors with infant's birthweight of  $\geq 3000$  g and  $< 3000$  g should be determined and then a strat-

egy should be worked out to decrease the number of infant's weighing less than 3000 g at birth.

Many factors are well known to be associated with infant's birthweight, that is to say biological factors such as maternal age, parity, gravidity, weight, height, etc.; socio-economic factors such as maternal education, occupation, etc.; medical factors

such as diseases, complications during pregnancy, etc.<sup>(2-4)</sup>. According to infant with low birthweight, small for gestational age is the most frequent contributor<sup>(5)</sup>, while little is known about associated factors of infants weighing  $\geq 3000$  g at birth.

The aim of this study is to find out the incidence and to determine the association of some biological, socio-economic as well as medical factors with infants weighing  $\geq 3000$  g at birth at 37 weeks of gestation or more at Ramathibodi Hospital. The factors under study were maternal age, gravidity, weight at labour, height, educational level, occupation, medical and obstetric complications during pregnancy.

## Materials and Methods

This was a 2-year retrospective study of all parturients who delivered single liveborn infants with a gestational age of 37 weeks or more (calculated from last menstrual period) at the Department of Obstetrics and Gynaecology, Faculty of Medicine Ramathibodi Hospital, from January 1, 1988 to December 31, 1989. The data were extracted from labour and delivery records. Incidence was reported in percentage. Association of maternal age, gravidity, weight at labour, height, educational level, occupation, medical and obstetric complications during pregnancy were tested by using *Chi-square test* and the statistical significance was determined at  $p < 0.05$ .

## Results

The total livebirths were 14922 with 63.9% weighing 3000 g or more. There were 13613 parturients who delivered single liveborn infants with a gestational age of  $\geq 37$  weeks (92.5% of total single livebirths) and 9271 (68.1%) infants were  $\geq 3000$  g and 486 (3.6%) were  $< 2500$  g, mean ( $\mu$ ) birthweight  $\pm 1$  standard deviation (SD) was  $3181 \pm 401$  g (range 1220-5420 g).

Maternal age ranged from 15 to 46 years with  $\mu \pm 1$  SD being  $28.3 \pm 4.5$  years. Most of them were multi-gravidae (56.9%). Their mean weight at the time of labour  $\pm 1$  SD was  $63.2 \pm 8.3$  kg (range 36-120 kg). Their height was 136.5-177.5 cm range and  $154.3 \pm 5.1$  cm ( $\mu \pm 1$  SD). Ninety one per cent stated their education, that is to say 0.1% had no formal education, 32.0% primary school level, 12.0% secondary school level, 24.1% high school level or professional school and 31.6% with higher professional education or university degree. Ninety nine per cent mentioned their occupation i.e. 27.3% housewives, 8.7% traders, 26.5% office workers, managers, academicians and administrators, 37.2% labourers and farmers.

### Maternal age

Table 1 shows the incidence of infant's birthweight of  $\geq 3000$  g among each maternal age group. The teenagers ( $\leq 19$  years) gave an incidence of 55.5% while the other age

groups gave more than 60%. The difference was statistically significant ( $X^2 = 14728.38, df=5$ ).

**Table 1** Infant's birthweight and maternal age

Maternal age (years)	Birthweight (g)			
	< 3000		≥ 3000	
	n	(%)	n	(%)
≤ 19	114	(44.5)	114	(55.5)
20-24	493	(37.0)	1607	(63.0)
25-29	1762	(32.2)	3700	(67.8)
30-34	1161	(28.7)	2877	(71.3)
35-39	326	(27.4)	861	(72.6)
≥ 40	36	(30.5)	82	(69.5)

### Gravidity

As seen in Table 2, all groups show an incidence of more than 60% with infant's birthweight of  $\geq 3000$  g. The difference of these occurrences was statistically significant ( $X^2 = 7921.37, df=5$ ).

**Table 2** Infant's birthweight and gravidity

Gravidity	Birthweight (g)			
	< 3000		≥ 3000	
	n	(%)	n	(%)
1	2107	(35.8)	3769	(64.2)
2	1470	(30.8)	3299	(69.2)
3	540	(26.2)	1523	(73.8)
4	157	(25.3)	464	(74.7)
5	46	(23.3)	151	(76.7)
≥ 6	22	(25.3)	65	(74.7)

### Weight at the time of labour

The incidence of infant's birthweight of  $\geq 3000$  g among all weight groups was significantly different ( $X^2 = 14233.80, df=8$ ). The incidence was 32.0, 34.3, 48.7, 58.9, 71.2, 77.1, 80.0, 86.9, and 85.4% for each weight group of  $\leq 44$ , 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79 and  $\geq 80$  kg, respectively (Table 3).

**Table 3** Infant's birthweight and maternal weight at labour

Maternal weight (kg)	Birthweight (g)			
	< 3000		≥ 3000	
	n	(%)	n	(%)
≤ 44	36	(35.8)	17	(32.0)
45-49	230	(30.8)	120	(34.3)
50-54	777	(26.2)	739	(48.7)
55-59	1177	(25.3)	1681	(58.9)
60-64	1021	(23.3)	2527	(71.2)
65-69	597	(22.9)	2006	(77.1)
70-74	277	(20.0)	1109	(80.0)
75-79	82	(13.1)	542	(86.9)
≥ 80	73	(14.6)	426	(85.4)

### Height

As seen in Table 4, the association of maternal height and incidence of infant's birthweight of  $\geq 3000$  g was statistically significant ( $X^2=15236.82, df=7$ ). There were 37.6, 50.1, 58.5, 65.9, 72.2, 77.6, 81.4 and 76.0% of mothers whose height was  $\leq 139$ , 140-144, 145-149, 150-154, 155-159, 160-164, 165-169 and  $\geq$

170 cm, respectively.

### *Educational levels*

The educational level shows significant association with the incidence of infant's birthweight of  $\geq 3000$  g ( $X^2=18467.88$ , df=3). As seen in Table 5, infant's birthweight of  $\geq 3000$  g accounted for 65.8% among no formal education or at primary school level, secondary school level 66.3%, high school level and professional school 68.5%, higher professional education or university degree 70.2%.

### *Occupations*

The incidences of infant's birthweight of  $\geq 3000$  g among each occupational group (Table 6) i.e. labourers, housewives, traders and office workers were 66.8, 67.2, 68.3 and 70.7%, respectively. This difference was statistically significant ( $X^2=10330.46$ , df=3).

**Table 4** Infant's birthweight and maternal height

Maternal height (cm)	Birthweight (g)			
	< 3000		$\geq 3000$	
	n	(%)	n	(%)
135-139	10	(62.4)	6	(37.6)
140-144	159	(49.9)	160	(50.1)
145-149	805	(41.5)	1130	(58.5)
150-154	1678	(34.1)	3237	(65.9)
155-159	1188	(27.8)	3077	(72.2)
160-164	375	(22.4)	1300	(77.6)
165-169	54	(18.6)	236	(81.4)
$\geq 170$	10	(27.1)	27	(72.9)

**Table 5** Infant's birthweight and maternal education

Maternal education	Birthweight (g)			
	< 3000		$\geq 3000$	
	n	(%)	n	(%)
None and Primary school	1366	(34.2)	2638	(65.8)
Secondary school	504	(33.7)	971	(66.3)
High school and professional school	947	(31.5)	2055	(68.5)
Higher professional education and university	1172	(29.8)	2765	(70.2)

**Table 6** Infant's birthweight and maternal occupation

Occupation	Birthweight (g)			
	< 3000		$\geq 3000$	
	n	(%)	n	(%)
Labourers	1680	(33.2)	3385	(66.8)
Housewives	1219	(32.8)	2495	(67.2)
Traders	379	(31.7)	815	(68.3)
Office workers	1054	(29.3)	2552	(70.7)

### *Medical and obstetric complications during pregnancy*

Table 7 shows that 65.2% of those who had complications had infant's birthweight of  $\geq 3000$  g while those without complications had 68.6%. The difference was statistically significant ( $X^2 = 9.75$ , df=1).

**Table 7** Infant's birthweight and complications during pregnancy

Complications during pregnancy	Birthweight (g)			
	< 3000		≥ 3000	
	n	(%)	n	(%)
No	3593	(31.4)	7866	(68.6)
Yes	749	(34.8)	1405	(65.2)

## Discussion

As aimed by the National Health Plan, 60% of infant's birthweight throughout the country should be  $\geq 3000$  g by the end of the 5-year NESDP VI in 1992, the Ramathibodi figure was found to be 68.1% for infants born at  $\geq 37$  weeks of gestation during the first two years of this plan. Since Ramathibodi Hospital is a University Hospital in Bangkok, the maternal characteristics are so typical and are much different from the general parturients of the country<sup>(6)</sup> i.e. mean age was 28.3 years, 50.1% was of second and third gravidae, mean weight at labour was 63.2 kg, mean height was 154.3 cm, 55.7% finished high school, 62% were housewives, traders and office workers, 83% had no complications during pregnancy. All these factors can contribute to the higher proportion of infant's birthweight of  $\geq 3000$  g at this institute. Furthermore, when these factors were divided into subgroups, increased incidence of birthweight of  $\geq 3000$  g was also clearly demonstrated. Maternal

age of 30-39 years, gravidity of  $\geq 3$ , weight at labour of  $\geq 60$  kg, and height of  $\geq 155$  cm gave an incidence of more than 70%.

It is interesting to note that teenage mothers, those who weighed less than 60 kg at labour and whose height was less than 150 cm, not more than 60% could significantly deliver infants with a birthweight of  $\geq 3000$  g. These factors, although specifically biological, are still under socio-economic influence. The maternal height is mainly determined by nutrition at the time of the growth spurt period as well as genetic, inadequate nutrition or malnourish can result in a low height. The adequacy of nutrition is the result of combining influences from politics and socio-economics. Maternal weight at the time of labour depends on adequate nutrition prior to and during pregnancy. This is also under the influence of politics, socio-economics and good antenatal care. Teenage pregnancy, meanwhile, can be one indicator of the country's social development. The higher the education is, the fewer the teenage marriages and pregnancy.

It can be concluded that factors beyond medical care play an important role in increasing the rate of infant's birthweight of  $\geq 3000$  g at 37 weeks of gestation or more. Reducing teenage pregnancy and improving nutritional status of the population are the major needs to accomplish this aim set in the National Development Plan.

## Acknowledgements

The authors wish to thank the staff members of the Ramathibodi Medical Statistics Division for their assistance in collecting and processing the data, and also to Dr. Yongyoth Herabutya for correcting the manuscript.

## References

1. Maternal and Child Health Plan, 1987-1991. Division of Family Health, Department of Health, Ministry of Public Health, September 1986.
2. Pongthai S, Piyapinyo P, Suthutvoravut S, Hiranrak A, Chaturachinda K. Relationship of maternal weight at first prenatal visit and maternal height with infant birth weight. *J Med Assoc Thailand* 1988;71 (Suppl) : 63-7.
3. Berg BJ. Maternal variables of affecting fetal growth. *Am J Clin Nutr* 1981; 34: 722-6.
4. Perinatal mortality and morbidity including low birthweight. A South-East Asia Regional Profile. *SEARO Regional Health Papers No.3. WHO* 1984.
5. Moo-Suwan L. Predictors of low birth-weight delivery : A study of factors influencing birthweights. *J Med Assoc Thailand* 1989;72 (Suppl 1) : 52-6.
6. Nondasuta A, Chaturachinda K, Wattana-Kaasetr S. Reproductive profile of Thai mothers : A regional analysis 1982-1983. *J Med Assoc Thailand* 1987;70:74-8.