
OBSTETRICS

Ramathibodi Hospital Standard Growth for Birthweight from 28 to 42 Gestational Weeks

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ABSTRACT

Objective To see the difference in standard growth of to-day compared with that 13 years ago and with other published studies.

Design Retrospective descriptive study.

Setting Department of Obstetrics and Gynaecology, Ramathibodi Hospital.

Subjects and methods Birthweight and gestational age of 15,419 livebirths born in Ramathibodi Hospital between January 1993 to December 1994 were reviewed and presented as mean, 2 standard deviation and in 10, 50, 90 percentile.

Results The birthweights of to-day were similar to those 13 years ago. Birthweights of male were not different from female. Fetal birthweights in Ramathibodi Hospital were lower than American fetuses but higher than those from Chulalongkorn Hospital and Chiangmai Hospital.

Conclusion To-day standard growth curve for Ramathibodi Hospital was not different from 13 years ago. A suitable single standard should be selected and applied to all births in Thailand.

Key words : standard growth, birthweights

Standard growth curve is used to evaluate intrauterine fetal growth and newborn care. Intrauterine fetal growth is effected by many factors such as maternal nutrition, race, socio-economic and environment. It will be of value for each institution to have its own population based

data on growth curve. In Ramathibodi Hospital, the previous study was carried out by Suthutvoravut et al⁽¹⁾ 13 years ago. Since then the country has tremendous economic growth and it would be interesting to see whether there is any change in intrauterine fetal growth curve as

compare to the previous graph over 10 years ago. It is also of interest to compare it with other standard growth curves in different hospitals and regions in Thailand and developed countries.

Materials and Methods

In this retrospective study birthweights of all singletons delivered from January 1, 1993 to December 31, 1994 were analyzed according to their gestational age. In Ramathibodi Hospital, almost all women were booked for antenatal care early, usually within 3 months of pregnancy. This was necessary because Ramathibodi Hospital is relatively small hence the booking is limited to 800 per month. Gestational age in completed weeks were calculated from the first day of the last menstrual period and confirmed by clinical evaluation of uterine size and ultrasonography if

necessary. The cases were included for analysis only if the gestational age determination by various methods were correlated and agreed by obstetricians during antenatal visits. Data on birthweights and gestational ages were recorded in labour summaries. A total of 15,419 deliveries was analysed. The data was presented as mean, standard deviation, 10, 50, 90 percentile.

Results

A total of 15,419 mothers was included in this study. Seventy-seven percent of whom lived in Bangkok and its vicinity. The average age was 29 ± 4.9 years (range 15 to 47 years). Twenty-five percent were housewife, 13.9% in government service, 22.5% employee, 12.2% merchant, 1% agriculture and 19% miscellaneous. The birth weight of singleton at gestational age between

Table 1. Fetal birthweight at Ramathibodi Hospital as 10,50,90 percentile

Gestational age (weeks)	Birthweight (grams)		
	10 percentile	50 percentile	90 percentile
28		1,315	
29	894	1,265	1,742
30	1,170	1,480	2,360
31	1,301	1,720	2,603
32	1,242.5	1,835	2,710
33	1,584	2,225	3,162
34	1,778	2,440	3,238
35	1,950	2,560	3,260
36	2,270	2,820	3,430
37	2,509	2,950	3,450
38	2,630	3,100	3,600
39	2,720	3,170	3,680
40	2,780	3,230	3,760
41	2,790	3,270	3,810
42	2,804	3,200	3,756

Table 2. Fetal birthweight at Ramathibodi Hospital as mean and standard deviation

Gastaional age (weeks)	Birthweight (grams)		
	+2SD	mean	-2SD
28	1559.742	1269.8	979.085
29	2069.796	1321.9	574.004
30	2397.972	1574.5	751.208
31	2754.918	1783.9	812.882
32	2825.048	1878.2	931.352
33	3537.842	2307.8	1077.758
34	3569.426	2491.5	1413.574
35	3593.392	2590.2	1587.008
36	3748.408	2832	1915.592
37	3765.532	2971.8	2178.068
38	3889.584	3109.6	2329.616
39	3966.436	3183.3	2400.164
40	4050.664	3259.1	2467.536
41	4180.896	3296	2411.104
42	4032.944	3260.3	2487.656

28-42 weeks is shown in table 1 and table 2 with mean, standard deviation and percentiles. The birthweight in 10, 50, 90 percentile of all fetuses is shown in figure 1. Figure 2 showed birthweight in mean and 2 standard deviation.

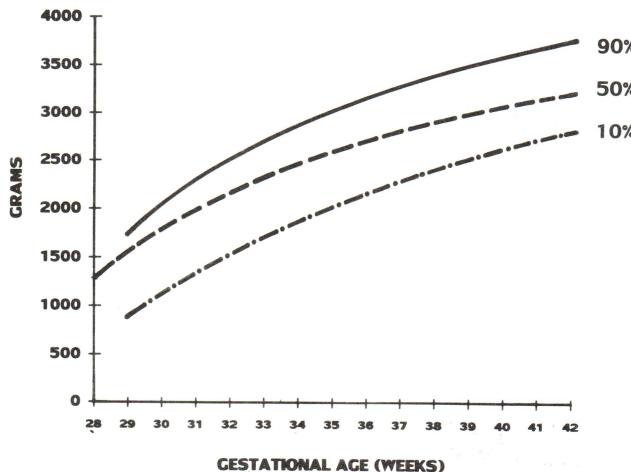


Fig. 1. Birthweight in 10, 50, 90 percentiles.

Birthweight of male and female fetuses was not different as shown in figure 3. Fetal birthweight in Ramathibodi Hospital was less than American fetuses (compared to Denver's growth chart) as shown in figure 4 but was higher than fetal

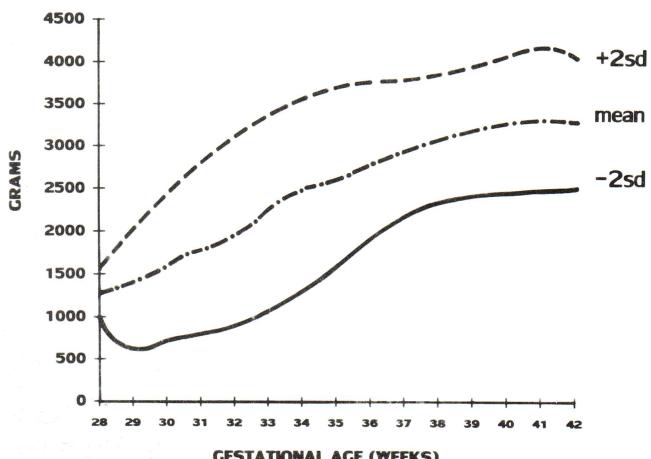


Fig. 2. Birthweight in mean ± 2 standard deviation.

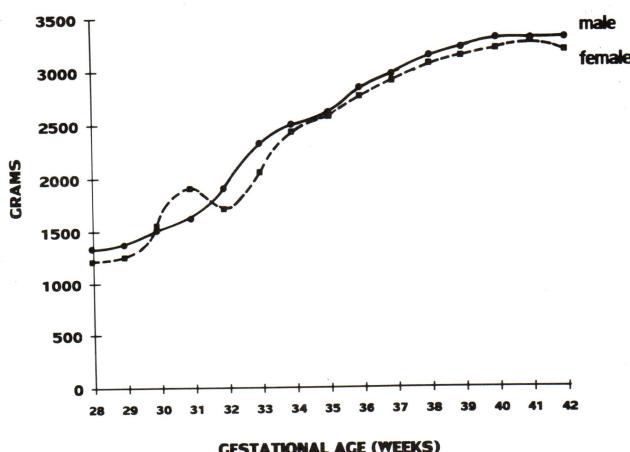


Fig. 3. Birthweight as 50 percentile (Male and Female).

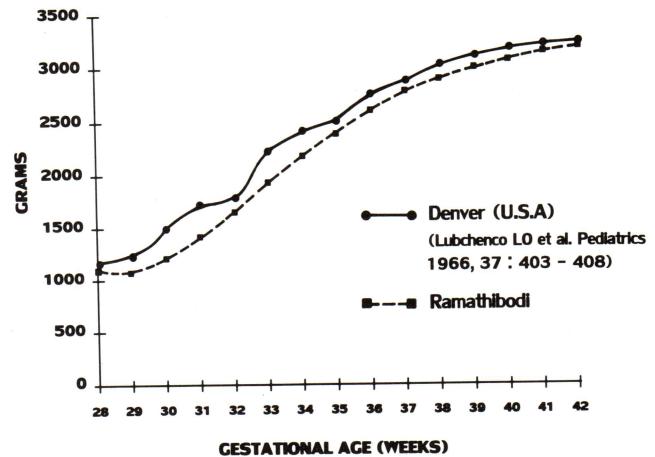


Fig. 4. Birthweight at Ramathibodi Hospital compared to Denver's Growth Chart.

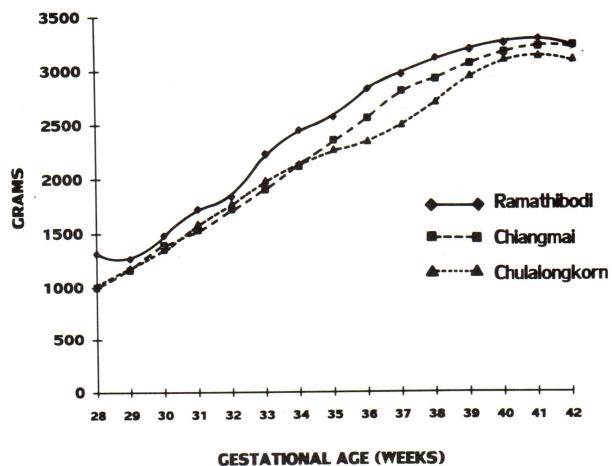


Fig. 5. Birthweight at Ramathibodi Hospital, Maharaj Nakorn Chiangmai Hospital and Chulalongkorn Hospital.

birthweight in Maharaj Nakorn Chiangmai Hospital and Chulalongkorn Hospital (figure 5). When it was compared to growth curve of Suthutvoravut et al, there was no difference (figure 6).

Discussion

Many studies have shown that factors such as race, socioeconomic, nutrition, environment exert influence on different birthweight seen in different countries,⁽²⁻⁶⁾ but Wen et al⁽⁷⁾ showed

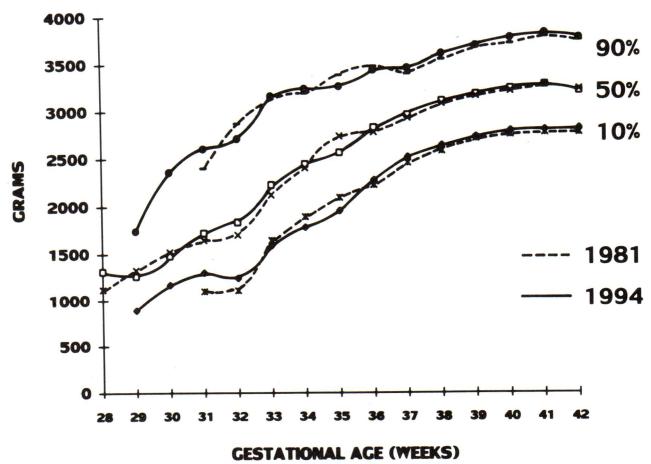


Fig. 6. Birthweight at Ramathibodi Hospital, (1994) compared to Growth Curve of Suthutvoravut et al (1981).

that birthweight of the same race in different countries was not different. Nondasuta et al⁽⁸⁾ showed that in different parts of the country birthweight was different. In the past, American standard growth curve was used to evaluate Thai infants.⁽⁹⁾ Thaithumyanon et al⁽¹⁰⁾ compared fetal birthweight in Chulalongkorn Hospital to Denver's growth curve. They found that Thai fetuses were smaller than American fetuses, especially at the 90 percentile of birthweight but

growth patterns were similar. Tongsong et al⁽¹¹⁾ also had the same outcome. In this study, the mean birthweight of male and female fetuses was not different until near term when male fetuses tend to be slightly heavier. The results of this study shows no different in growth curve when compared to that of Suthutvoravut et al⁽¹⁾ fetal growth curve done 13 years ago at this institute. This showed that the socioeconomic of pregnant women, who confined here, has not changed in spite of the up growing economic wealth. It is important to revise the growth curve from time to time to see if there is any changes. The 50 percentile of fetal birthweights in this study was higher than those in Chulalongkorn and Chiangmai studies. This could be due to different group of population and different environment. Almost all pregnant women in Ramathibodi Hospital attended antenatal care early due to the restriction imposed. These women must have the motivation to deliver here, and by booking early, advice on nutrition together with regular attendant on the average 8 times had helped to maintain the proper balance of pregnancy. In contrast to Chulalongkorn and Chiangmai Hospitals with no limit to booking, there would be considerable number of deliveries that were seen once or twice and often late in pregnancy. Compared to study in Chiangmai Hospital, socioeconomic status was different. In Ramathibodi's study, their occupations were mostly housewife and government official 39.3% with employee accounted for 23%, but in Chiangmai's study government official was 15%, agriculture and employee 67%. This result showed that fetal birthweight was effected by many factors and it was different in different regions in Thailand and other countries. The more

suitable and well balance standard should be selected and applied to all births in Thailand.

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References

1. Suthutvoravut S, Tansatiya C, Chaturachinda K. Standard growth curve. *J Med Assoc Thai* 1984 ; 67 : 36-41.
2. Babson S, Behrman R, Lessel R. Liveborn birthweights for gestational age of white middle class infants. *Pediatrics* 1970 ; 45 : 937-44.
3. Freeman MG, Graves WL, Thompson RL. Indigent negro and Caucasian birthweight-gestational age tables. *Pediatrics* 1970 ; 46 : 9-15.
4. Sterky G. Swedish standard curves for intrauterine growth. *Pediatrics* 1970 ; 46 : 7-8.
5. Brenner WE, Edelman DA, Hendricks CH. A standard of fetal growth for the United States of America. *Am J Obstet Gynecol* 1976 ; 126 : 555-64.
6. Keen DV, Pearse RG. Birthweight between 14 and 42 weeks gestation. *Arch Dis Child* 1985 ; 60 : 440-6.
7. Wen SW, Kramer MS, Usher RH. Comparison of birthweight distributions between Chinese and Caucasian infants. *Am J Epidemiol* 1995 ; 141 : 1177-87.
8. Nondasuta A, Chaturachinda K, Wattanakasestr S. Birthweight distribution: a baseline data for Thailand. *J Med Assoc Thai* 1986 ; 69 : 197-202.
9. Lubchenco LO, Hansman C, Dressler M. Intrauterine growth as estimated from liveborn birthweight data at 24 to 42 wks of gestation. *Pediatrics* 1963 ; 32 : 793-800.
10. Thaithumyanon P, Bhongvej S, Chitinand S. Intrauterine growth in Thai population. *J Pediatr Soc Thai* 1984 ; 23 : 99-106.
11. Tongsong T, Simaraks S, Sirivatanapa P, Sudasna J, Wanapirak C. Study of intrauterine growth from birthweight at Maharaj Nakorn Chiangmai Hospital. *J Med Assoc Thai* 1991 ; 76 : 482-6.