ANALYSIS OF MULTIPLE BIRTHS IN JAPAN

VI. EFFECTS OF GESTATIONAL AGE AND MATERNAL AGE ON GROWTH RATE OF WEIGHT IN TRIPLETS

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Summary   Body weight of triplet individuals at one year of age was analysed.   Mean body weight was heavier in males than in females, and the heaviest in the first-born followed by the second-born and the third-born in this order, which were also seen in that at birth.   The contribution of gestational age was greater than maternal age to the growth rate of total body weight from birth to one year of age.

INTRODUCTION

The present article deals with body weight of triplets at one year of age.   It also analyses factors influencing growth rate of total body weight (sum of the body weight of triplets) from birth to one year of age.

SUBJECTS AND METHODS

Source of data is similar to those reported by Asaka, Imaizumi and Inouye (1980a).   Subjects were taken from "Survey B" of "Survey on Socio-economical Aspects of Vital Events—Plural Births in 1975" (Health and Welfare Statistics and Information Department, Ministry of Health and Welfare).   There were 42 sets of triplets available, and in Table 1 are shown sex compositions, survival states at birth and at one year of age, gestational age in months, maternal age in years at the triplets' births, and body weight of triplet individuals at birth and at one year of age.   For elucidating the effect of gestational age and maternal age on growth rate, multiple regression analysis was performed.   The growth rate was defined as the ratio of the increase of total body weight from birth to one year of age to the total body weight at birth, and the analysis was made for the growth rate as dependent variable and the gestational age and the maternal age as independent variables.

Table 1.   Sex compositions, survival states at birth and at one year of age, gestational age in months, maternal age in years, body weight (g) at birth and at one year of age among 42 sets of triplets.

Sex compositions[a]	Survival states at birth[b]	Survival states at one year[c]	Gestational age (months)	Maternal age (years)	Body weight[d] (g) at birth I	II	III	at one year I	II	III
FFF	LLL	Su Su Su	10	30	1930	2050	2200	9930	9900	9980
FMM	LSS	Su - -	10	28	2300	1500	2300	-	-	-
MFF	SSS	- - -	5	21	-	-	-	-	-	-
FFF	SSS	- - -	5	32	-	-	-	-	-	-
MMF	LLL	Su Su Su	10	32	2350	2200	2300	10500	10700	9500
MMM	SSS	- - -	5	24	-	-	-	-	-	-
FFF	LLL	Su Su Su	10	26	1750	2050	1950	8000	9000	8200
FFF	LLS	Su Su -	9	30	2100	1100	2000	9000	8200	-
MMM	LSL	Su - Su	10	32	2980	2800	2510	10000	-	9500
FFF	LLL	Su Su Su	10	28	3200	3250	2810	-	-	-
FFF	LLL	Su Su Su	9	22	2700	2280	1930	-	-	-
FMM	LLL	Su Su Su	9	30	2220	2520	2180	7900	7950	8500
MMM	LLL	Su Su Su	9	30	1650	1920	1550	9450	9500	9400
FFF	LLL	Su Su De	9	28	2040	2450	-	10000	11000	-
MMF	LLL	De De De	7	29	-	-	-	-	-	-
FMM	SSS	- - -	8	31	-	-	-	-	-	-
U	SSS	- - -	6	26	-	-	-	-	-	-
MFM	LLL	Su Su Su	9	33	1500	1720	1500	7400	7700	7700
FMM	LLL	Su Su Su	9	24	1700	1750	1780	9500	10500	11000
MMF	SSS	- - -	6	25	-	-	-	-	-	-
FFF	LLL	Su Su Su	9	33	1800	1790	1740	8700	8400	8800
MMM	LLL	Su Su Su	9	37	2000	1800	800	10000	9500	6550
FFF	LLL	Su Su Su	10	29	2290	2180	2180	8800	7600	8200
FFF	LLL	Su Su Su	10	26	2060	1700	1730	8100	7300	7500
U	SSS	- - -	4	27	-	-	-	-	-	-
FMM	LLL	Su Su Su	9	24	2100	1770	1570	9500	8700	8000
MMM	LLS	Su De -	10	22	2100	-	-	9200	-	-
FFF	LSS	De - -	7	33	870	750	650	-	-	-
FFF	LLL	Su Su Su	9	29	1900	2080	2240	-	-	-
MMM	LLL	Su Su Su	9	28	1830	2010	1840	-	-	-
MFM	SSS	- - -	7	24	-	-	-	-	-	-
MMM	LLL	Su Su Su	8	24	1850	1800	1900	9000	9800	9600
MFM	LLL	Su Su Su	10	25	3450	2850	2500	13000	12000	11000
FFM	LLS	De Su -	10	24	1500	1000	900	-	6000	-
FMM	LLL	Su Su Su	10	29	2400	2200	2550	9500	9800	10000
FFF	LLL	Su Su Su	9	26	1800	1750	1500	9500	8800	8200
FFF	LLL	Su Su Su	10	28	2490	2530	1900	-	-	-
MMM	LLL	Su Su Su	10	21	1900	1850	2000	9000	9000	10000
FFF	LLL	Su Su Su	9	24	1700	1900	2000	-	-	9000
FFF	LLL	Su Su Su	9	30	1850	1950	1650	7000	6500	6500
FFM	LLL	Su Su Su	9	24	1850	1750	1800	9600	9500	9650
FFF	LLL	Su De De	8	29	1310	1150	1030	10000	-	-

[a] M, male; F, female; U, sex compositions unknown.   [b] L, live birth; S, stillbirth.   [c] Su, surviving; D, dead.   [d] I, first-born; II, second-born; III, third-born.

RESULTS AND DISCUSSIONS

As is shown in Table 2, mean body weight at birth and at one year of age of triplet individuals was higher in males than in females in all of the birth order, excepting that of the third born at birth.   In both sexes, mean body weight was the heaviest in the first-born followed by the second-born and the third-born in

Table 2. Body weight (g) at birth and at one year of age in triplet individuals.

		At birth		At one year of age	
		Mean	SD	Mean	SD
First-born	Male	2,160	610 (n=10)	9,730	1,510 (n=9)
	Female	1,990	470 (n=23)	9,000	900 (n=15)
Second-born	Male	2,010	360 (n=12)	9,490	860 (n=9)
	Female	1,900	620 (n=20)	8,610	1,710 (n=13)
Third-born	Male	1,850	530 (n=15)	9,240	1,330 (n=12)
	Female	1,860	510 (n=16)	8,430	1,050 (n=9)

Table 3. Interclass correlation coefficients between body weight at birth and
at one year of age, both sexes combined.

Body weight	Coefficient	Number of sets
First-born	0.5813	24
Second-born	0.6413	22
Third-born	0.6363	21

Table 4. Interclass correlation coefficients among growth rate, gestational age maternal
age and total weight at birth and at one year of age.

	Gestational age	Maternal age	Total weight at birth	Total weight at one year of age
Growth rate	−0.4716	−0.0533	−0.6150	0.2799
	(19)	(19)	(19)	(19)
	p=0.021	p=0.414	p=0.003	p=0.125
Gestational age		0.0949	0.6368	0.2178
		(42)	(31)	(19)
		p=0.275	p=0.001	p=0.185
Maternal age			−0.1172	−0.2950
			(31)	(19)
Total weight at birth				0.5806
				(19)
				p=0.005

Note: Figure in parentheses indicates number of triplet sets available.

this order at birth as well as at one year of age.   The above effects of sex and birth order were also seen in twin individuals (Asaka *et al.*, 1980a).

Table 3 shows interclass correlation coefficients between the body weight at

birth and that at one year of age of triplet individuals according to birth order, which are all statistically significant.

Table 4 shows interclass correlation coefficients table among growth rate, gestational age, maternal age and total weight at birth and at one year of age. The negatively significant coefficients were seen in those between the growth rate and either of the gestational (−0.4716) and the total weight at birth (−0.6150). The correlation coefficient between the gestational age and the total weight at birth (0.6368) was highly significant. Similar tendencies were also noted in twins (Asaka *et al.*, 1980a, b).

In order to reveal the relative contribution of the gestational age and the maternal age on the growth rate, multiple regression analysis was carried out, and the following formula was obtained: $GR = -53.94 \times GESTAT - 1.31 \times MAGE + 916.62$ (GR, growth rate; GESTAT, gestational age in months; MAGE, maternal age in years). Standardized regression coefficient was −0.4759 for the gestational age and −0.0790 for the maternal age, indicating a greater contribution of the gestational age than the maternal age to the growth rate of the total weight of triplets. The similar effects of the gestational age and the maternal age on the growth rate were also indicated in twins (Asaka *et al.*, 1980b).

REFERENCES

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