ANALYSIS OF MULTIPLE BIRTHS IN JAPAN

II. WEIGHT AT BIRTH OF TRIPLETS AND QUADRUPLETS

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Summary   Birth weight of 124 sets of triplets and 7 sets of quadruplets was analysed in relation to survival states, sex and birth order.   Mean birth weight was higher in live births than in stillbirths in both triplet and quadruplet individuals.   Males had higher mean birth weight than females among live born triplets and among live and still born quadruplets.   Mean birth weight was larger in unlike-sexed than in like-sexed triplets, suggesting a lower mean birth weight in monozygotic than in dizygotic or trizygotic triplets.   Mean birth weight was decreased in the order of twin, triplet and quadruplet individuals.

INTRODUCTION

The present study deals with birth weight among higher multiple births in relation to survival states, sex, birth order and zygosity.

SUBJECTS AND METHODS

Data were obtained from "Survey A" of "Survey on Socio-economic Aspects of Vital Events—Plural Births in 1975" (Health and Welfare Statistics and Information Division, Ministry of Health and Welfare) (Asaka *et al.*, 1980), including data on 124 sets of triplets, 7 sets of quadruplets and one set of quintuplets, as shown in Table 1.   Here, for example, FMM and LLS stand for the first born triplet is female and live born, the second is male and live born, and the third is male and stillborn.   No information was available as to the birth weight of the quintuplets.   In the following chapter mean birth weight of triplets and quadruplets was analysed according to survival states, sex and birth order.

Table 1.   Sex compositions and survival states in higher multiple births according to birth order.

(1) Triplets

	LLL	LLS LSL SLL	LSS SLS SSL	SSS	Total
M.M.M.	21	—	1	14	36
M.M.F.	5	—	—	1	6
M.F.M.	1	—	—	1	2
F.M.M.	7	1	1	3	12
M.F.F.	2	—	—	4	6
F.M.F.	—	—	—	3	3
F.F.M.	5	—	—	1	6
F.F.F.	31	4	3	10	48
U	—	—	—	5	5
Total	72	5	5	42	124

(2) Quadruplets

	LLLL	LLSS	LSSS	SSSS	Total
M.M.M.M.	1	—	—	1	2
M.M.M.F.	—	—	—	1	1
M.F.M.M.	1	—	—	—	1
F.F.F.M.	—	—	1	—	1
F.F.M.F.	—	1	—	—	1
U	—	—	—	1	1
Total	2	1	1	3	7

(3) Quintuplets

	SSSSS
U	1
Total	1

Notes: M, male; F, female; U, sex of one or more is unknown; L, live birth; S, stillbirth.

RESULTS

Table 2 shows mean birth weight of 124 sets of triplets (372 individuals), according to survival states, sex and birth order.   Mean birth weight was higher in live births than in stillbirths in the first-, second- and third-born individuals in both

Table 2. Weight (g) at birth in 372 triplet individuals.

		Live births			Stillbirths		
		First-born	Second-born	Third-born	First-born	Second-born	Third-born
Male	Number of cases	29	34	35	4	6	6
	Number of missing observations	0	0	0	17	17	15
	Mean	1,810	1,865	1,817	1,125	1,067	1,317
	Standard deviation	377	442	529	465	314	674
Female	Number of cases	51	43	39	3	4	7
	Number of missing observations	0	0	0	15	15	17
	Mean	1,828	1,800	1,726	900	1,200	1,300
	Standard deviation	448	448	406	360	535	535
Total	Number of cases	80	77	74	8*	11*	14*
	Number of missing observations	0	0	0	36*	36*	36*
	Mean	1,821	1,829	1,769	1,025	1,091	1,271
	Standard deviation	421	444	467	377	386	570

* Including sex unknown.

sexes. In the pooled data, males had higher mean birth weight (1,832 g, n=98) than females (1,789 g, n=133) in live births, whereas in stillbirths it was slightly higher in females (1,186 g, n=14) than in males (1,175 g, n=16). If both sexes were combined, mean birth weight of the first-born individuals was almost equal to that of the second-born, and both were higher than that of the third-born among live births. Among stillbirths, however, the highest mean birth weight was seen in the third-born individuals. Coefficients of variation were smaller in live births than in stillbirths among the first-born (0.23 vs. 0.38), the second-born (0.24 vs. 0.35) and the third-born (0.26 vs. 0.45).

In order to see the relationship between the difference of weight among members of a triplet set and survival states, difference between the maximum and the minimum of the members was divided by the sum of three members' weight. Mean of the figures was 0.017 for the group three members live born, and 0.060 for that at least one stillborn. It is thus likely that the difference of weight among members of triplets influences the survival states of triplets.

As for birth weight according to sex compositions, mean was 1,729 g in 75 males of the like-sexed sets and 1,759 g in 39 males of the unlike-sexed sets. Mean was 1,717 g in 117 females of the like-sexed sets and 1,787 g in 30 females of the unlike-sexed sets. In both sexes lower mean birth weight in the like-sexed triplets may be due to the presence of monozygotic triplets.

Birth weight of quadruplet individuals is shown in Table 3, according to sur-

Table 3. Weight (g) at birth in 21 quadruplet individuals.

		1st-born	2nd-born	3rd-born	4th-born
M.M.M.M.	LLLL	1,200	2,600	2,200	2,100
M.F.M.M.	LLLL	1,500	1,000	1,600	1,600
F.F.M.F.	LLSS	1,300	1,300	1,200	1,000
F.F.F.M.	LSSS	800	800	600	1,000
M.M.M.F.	SSSS	900	900	1,000	900
M.M.M.M.	SSSS	—	—	—	—
U	SSSS	—	—	—	—

vival states, sex compositions and birth order. Mean birth weight was 1,725 g in the group where all members were live born (n = 8), and it was 975 g where one or more were stillborn (n = 12). Mean birth weight was higher in 7 males than in 4 females (1,829 g vs. 1,100 g) among the live born and in 5 males than in 4 females (1,000 g vs. 825 g) among the stillborn. If both survival states were combined, mean birth weight was 1,483 g in 12 males and 963 g in 8 females, and it was 1,140, 1,320, 1,320 and 1,320 g for the first-, the second-, the third- and the fourth-borns, respectively. Mean weight of the total of 20 quadruplet individuals was 1,275 g, compared to 1,725 g in 264 triplet individuals.

DISCUSSION

Among live born triplets mean birth weight was higher in males than in females, which was in accordance with the result reported by Itzkowic (1979). He mentioned that among 53 sets of live born triplets mean birth weight was 1,888 g for males and 1,766 g for females. Itzkowic (1979) reported that among live births the highest mean birth weight was seen in the first-borns (1,991 g) followed by the second-borns (1,822 g) and the third-borns (1,774 g). In the present study the weight of the third-borns was also lower than the first- and the second-borns, but the latter two indicated no difference.

It was seen that mean birth weight of triplets was lower in stillbirths than in liver births, and that coefficients of variation were larger in the former than in the latter. It was indicated that the difference of birth weight was greater among the members of triplets in the sets one or more stillborn than those where all three live born. The similar tendency was found in birth weight of twins reported before (Asaka et al., 1980).

Mean birth weight was higher in the unlike-sexed than in the like-sexed triplets for both sexes. McKeown and Record (1952) reported, as is shown in Table 4, that differences of mean birth weight were seen in both twins and triplets according to sex compositions, and that it was not due to gestational age. As is

Table 4. Mean birth weight and gestational age according to sex compositions.

			Mean birth weight (g)		Mean gestational age (days)	
			(1)	(2)	(1)	(2)
Male	Twins	M.F.	2,563	2,523 (n=1,770)	262	294 (n=1,729)
		M.M.	2,368	2,402 (n=8,962)	262	293 (n=8,664)
	Triplets	M.F.F.	1,918	2,000 (n=7)	246	273 (n=7)
		M.M.F.	1,823	1,706 (n=32)	247	273 (n=32)
		M.M.M.	1,782	1,729 (n=75)	245	279 (n=75)
Female	Twins	F.M.	2,390	2,418 (n=1,784)	262	294 (n=1,729)
		F.F.	2,322	2,326 (n=8,935)	261	293 (n=8,664)
	Triplets	F.M.M.	1,904	1,744 (n=16)	245	276 (n=16)
		F.F.M.	1,791	1,836 (n=14)	246	273 (n=14)
		F.F.F.	1,763	1,717 (n=117)	250	276 (n=117)

(1) After McKeown and Record (1952) (all births).
(2) Twins: after Asaka et al. (1980) (live births).
   Triplets: the present study (all births).

shown in Table 4, the present study concerning mean birth weight of triplets supports the above findings, as does the previous study on twins (Asaka et al., 1980). Thus, it seems that mean birth weight is smaller in monozygotic than in dizygotic or trizygotic triplets.

Mean birth weight of triplet individuals was 1,725 g (n=264) and that of quadruplet ones was 1,275 g (n=20). It was 2,343 g for 22,628 twin individuals (Asaka et al., 1980). According to McKeown and Record (1952) mean birth weight was 2,395 g (n=650) for twins, 1,818 g (n=747) for triplets and 1,395 g (n=108) for quadruplets. Both results indicate that mean birth weights decrease in the order of twin, triplet and quadruplet deliveries. The similar tendency was found in twin and triplet deliveries by Daw (1978).

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