

WEIGHT OF BANTU BABIES IN THE FIRST 10 DAYS OF LIFE

BY

EVA J. SALBER* and EVELYN BRADSHAW

Institute of Family and Community Health, Durban

The present paper is a preliminary report on the growth of Bantu babies in the first 10 days of life with special reference to the effect of birth rank, sex, and marital status of mother.

MATERIAL AND METHOD

All full-term infants (excluding twins) born at McCord's Zulu Hospital, Durban, between June 1, 1950, and January 31, 1951, were weighed daily by one of us (E.J.S.); 598 babies born by normal vertex delivery, who were well during their stay in hospital, were studied. All were breast-fed on an elastic 3-hourly schedule with a night feed. The babies shared their mothers' beds, day and night.

The weighing was carried out on a beam scale, which was checked before the start of the experiment, several times during the course of it, and again at the end. Babies were weighed naked, except for the first few days when they wore a crepe binder of known weight, and weighing started at 9.30 every morning. As babies were born at all times of the day and night, it was impossible for us to weigh them at birth, and this was done by the Sister or staff-nurse in charge of the ward, or by a midwife under her supervision. The babies were washed before weighing.

The daily gain or loss from birth weight was calculated, and means and standard deviations of these differences were worked out for each of the first ten days. The total initial loss was recorded, showing the amount lost until

the baby's weight became stationary or began to rise, irrespective of whether there was any subsequent loss. The duration of this initial loss was also recorded. Means and standard deviations of these two measures were calculated for married and unmarried mothers.

RESULTS

(1) DAILY GAIN OR LOSS IN WEIGHT.—Table I shows the mean gain or loss from birth weight for each day of life for boys and girls separately and together. It will be seen that there are discrepancies in the number of babies weighed from day to day. A certain number of first-day weights were missed because the time of birth coincided with the time of weighing. There is a marked decrease in numbers from the seventh day because of the departure of the mothers from hospital.

For the whole group, the maximum mean loss occurred on the 3rd day, and amounted to 5.7 oz. (5 per cent. of the mean birth weight of 7.18 lb.). The bulk of this loss occurred in the first 2 days. After the 3rd day they started to gain weight at the rate of over an ounce a day, so that the group had regained birth weight on the 9th day. Most observers agree that babies reach their minimum weight on the 3rd day, and lose 5 to 8 per cent. of their birth weight (Meredith and Brown, 1939; Cole, 1939; Palmer

* Senior Bursar, Council for Scientific and Industrial Research.

TABLE I
MEAN GAIN OR LOSS IN WEIGHT IN THE FIRST 10 DAYS OF LIFE BY SEX

Day	Girls			Boys			Sexes Combined		
	No.	Mean (oz.)	S.D. (oz.)	No.	Mean (oz.)	S.D. (oz.)	No.	Mean (oz.)	S.D. (oz.)
1	258	-2.55	2.48	259	-2.68	2.92	517	-2.61	2.71
2	295	-5.35	3.10	293	-5.57	3.24	589	-5.42	3.20
3	297	-5.59	4.55	298	-5.83	4.53	595	-5.71	4.55
4	294	-4.56	5.75	296	-4.80	5.99	590	-4.68	5.88
5	289	-3.42	6.64	295	-3.42	6.75	584	-3.42	6.70
6	283	-2.51	7.32	290	-2.23	7.20	573	-2.37	7.26
7	247	-1.60	7.97	250	-1.36	7.67	497	-1.48	7.82
8	158	-0.51	8.70	175	-0.25	7.69	333	-0.37	8.19
9	91	+0.56	8.60	99	+1.16	8.05	190	+0.87	8.33
10	32	+2.56	8.03	41	+2.90	8.11	73	+2.75	8.07

and Ciocco, 1945; Parmelee, 1952). Our findings compare favourably with those of other observers.

Table I also shows that for boys and girls the maximum mean loss occurred on the 3rd day. This was 5.6 oz. for the girls and 5.8 oz. for the boys (4.9 and 5 per cent. of the respective mean birth weights of 7.07 lb. for girls and 7.28 lb. for boys). The differences between the daily means for boys and girls were very slight, and none was statistically significant. Both groups regained their birth weight on the 9th day, having grown at almost exactly the same rate. By virtue of their superior birth weight, however, the boys remained heavier than the girls throughout this period. Martin (1931), Kugelmass, Berggren, and Cummings (1933), and Gin (1948), found that boys lost more weight than girls. Griffith and Gittings (1907) found that girls lost more weight but for a shorter time. Our findings agree with those of Meredith and Brown (1939), who found that girls and boys lost the same percentage of birth weight.

The babies were divided into first babies (Rank 1) and later born (Rank 2+). Rank 1 babies lost more weight over a longer period than the Rank 2+ babies, and they gained more slowly; they lost 7.2 oz. in 3 days (6.5 per cent. of the mean birth weight of 6.86 lb.), and gained just less than an ounce a day to regain their birth weight on the 10th day. Rank 2+ babies only lost 5.4 oz. in 2 days (4.6 per cent. of the mean birth weight of 7.28 lb.). They then gained at the rate of nearly 1½ ounces a day to regain their birth weight on the 8th day. (See Table II and Figure.)

The differences in mean loss between the ranks

TABLE II

MEAN GAIN OR LOSS IN WEIGHT IN THE FIRST 10 DAYS OF LIFE BY BIRTH RANK (SEXES COMBINED)

Day	Rank 1			Rank 2+		
	No.	Mean (oz.)	S.D. (oz.)	No.	Mean (oz.)	S.D. (oz.)
1	135	-2.80	3.22	381	-2.55	2.50
2	150	-5.69	3.48	438	-5.39	3.07
3	152	-7.18	4.78	442	-5.22	4.34
4	151	-7.07	6.13	438	-3.88	5.54
5	149	-6.21	7.11	434	-2.48	6.26
6	145	-5.32	7.53	427	-1.38	6.89
7	133	-4.35	8.17	362	-0.43	7.43
8	101	-3.30	8.61	230	+0.90	7.67
9	72	-1.25	9.16	116	+2.14	7.51
10	27	+2.41	8.09	45	+3.00	8.14

were small for the first 2 days and not statistically significant, but from the 3rd to the 8th day the differences were larger, and were statistically significant. On the 9th day the difference approached significance ($\frac{D}{S.E.} : 2.6$) and on the 10th day there was very little difference. When the boys and girls were examined separately, these rank differences were found to remain the same (see Appendix I). Meredith and Brown (1939) found the loss to be slightly greater with increasing birth order. Longridge (1905) and Cole (1939) found no difference in the behaviour of first-born and later-born babies. Kugelmass, Berggren, and Cummings (1933) found that first-born infants tended to lose more than siblings, and Griffith and Gittings (1907) state that "in children of primiparae the average loss is greater, the duration of loss is longer and day of regain of birth weight is later than in those of multiparae". Our findings are in exact agreement with those of Griffith and Gittings.

(2) DURATION OF LOSS OF WEIGHT.—Although the average duration of loss of weight was 3 days, there was great variation among the individual babies; seven lost no weight and one went on losing for as long as 8 days: 55.6 per cent. lost for 2 days or less, 18.7 per cent. for 4 days or more, and only 25.7 per cent. lost for 3 full days. There was practically no difference between the sexes.

As there were so many unmarried mothers at this hospital (about 32 per cent.), it was decided to examine the effect of marital status on the duration

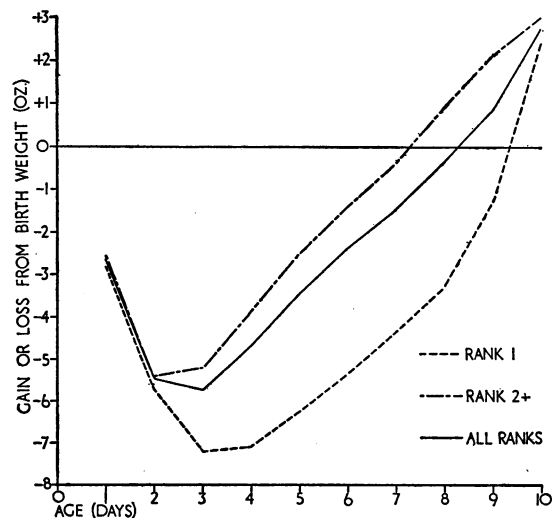


Figure.—Mean gain or loss in weight in the first 10 days of life, by birth rank (sexes combined).

of loss of weight. Table III shows the mean duration of loss for married and unmarried mothers, and also the effect of sex and rank. The mean duration of loss for the total group was 3·15 days.

In no case was a significant difference found between married and unmarried mothers, although in most cases the babies of unmarried mothers lost for slightly longer than those of married mothers. The difference between boys and girls was not significant, although the girls lost for slightly longer than the boys. However, the Rank 1 babies lost for a significantly longer time than the Rank 2+ babies, and this was seen more clearly in the boys.

Griffiths and Gittings (1907), Meredith and Brown (1939), and Parmelee (1952) all emphasize the variation in duration of weight loss in individual babies. Meredith and Brown's findings are in agreement with ours as regards sex, but they found very little difference associated with rank. The findings of Griffith and Gittings agree with ours in regard to

rank, but in their series the girls lost for a shorter time.

(3) TOTAL INITIAL LOSS.—It has been shown above that the maximum mean loss occurred on the 3rd day, but that because the duration of loss was so variable only 26 per cent. of the babies reached their minimum weight on that day. It was necessary therefore, to examine the mean amount of weight lost, regardless of when this occurred. Sex, rank, and marital status were taken into account. The results are shown in Table IV. The total initial loss ranged from 0 to 27 oz. (mean of 7·47 oz., 6·5 per cent. of body weight), and the percentage of weight loss remained constant for boys and girls. No significant difference could be related to marital status, or to sex. However, a marked difference was again found between babies of Rank 1 and Rank 2+; Rank 1 lost significantly more weight than Rank 2+ (8·2 per cent. of body weight as against 5·9 per cent.).

This weight loss is lower than that reported by

TABLE III
DURATION OF LOSS OF WEIGHT, BY SEX, BIRTH RANK, AND MARITAL STATUS OF MOTHER

Sex	Marital Status of Mother	Rank 1			Rank 2+			All Ranks		
		No.	Mean (days)	S.D. (days)	No.	Mean (days)	S.D. (days)	No.	Mean (days)	S.D. (days)
Girls	Married	35	3·44	1·55	176	3·07	1·24	211	3·13	1·30
	Unmarried	38	3·82	1·58	45	3·08	1·18	83	3·42	1·42
	Total	74	3·64	1·56	222	3·07	1·22	296	3·21	1·34
Boys	Married	33	3·80	1·40	152	2·87	0·87	185	3·04	1·05
	Unmarried	44	3·41	1·18	67	3·08	1·14	111	3·21	1·17
	Total	78	3·56	1·29	221	2·93	0·96	299	3·10	1·09
Sexes Combined	Married	68	3·62	1·49	328	2·98	1·09	396	3·09	1·19
	Unmarried	82	3·60	1·39	112	3·08	1·16	194	3·30	1·29
	Total	152	3·60	1·43	443	3·00	1·10	595	3·15	1·22

TABLE IV
TOTAL INITIAL LOSS OF WEIGHT, BY SEX, BIRTH RANK, AND MARITAL STATUS OF MOTHER

Sex	Marital Status of Mother	Rank 1			Rank 2+			All Ranks		
		No.	Mean (oz.)	S.D. (oz.)	No.	Mean (oz.)	S.D. (oz.)	No.	Mean (oz.)	S.D. (oz.)
Girls	Married	35	7·84	4·86	176	6·86	4·06	211	7·02	4·22
	Unmarried	38	8·79	5·41	45	7·59	5·16	83	8·14	5·31
	Total	74	8·28	5·16	222	7·03	4·32	296	7·34	4·58
Boys	Married	33	10·23	6·18	151	6·69	3·85	184	7·32	4·56
	Unmarried	44	9·52	5·61	67	7·22	4·56	111	8·13	5·13
	Total	78	9·78	5·85	220	6·83	4·08	298	7·60	4·79
Sexes Combined	Married	68	9·00	5·66	327	6·78	3·96	395	7·16	4·39
	Unmarried	82	8·18	5·53	112	7·37	4·81	194	8·13	5·21
	Total	152	9·05	5·57	442	6·93	4·20	594	7·47	4·69

Meredith and Brown (1939), Ramsey and Alley (1918), Tyson (1928), and Griffith and Gittings (1907). The two last-mentioned found the loss to be greater in girls than in boys, but Meredith and Brown found no difference. Our findings with regard to rank differ from those of Tyson and Meredith and Brown, who found weight loss to be greater in the higher birth ranks.

(4) RETURN TO BIRTH WEIGHT.—By the 7th day, 17 per cent. of the babies had already left hospital, and by the 10th day only 12 per cent. still remained.

By the 7th day the percentage who had regained or exceeded their birth weight was 47.7 per cent. (Table V). The figure is significantly greater for Rank 2+ than for Rank 1 (52 per cent. as against 34 per cent.). The slight differences between boys and girls are not significant.

TABLE V
PERCENTAGE OF BABIES WHO REGAINED OR EXCEEDED THEIR BIRTH WEIGHT BY THE SEVENTH DAY, BY SEX AND BIRTH RANK

Sex	Rank 1		Rank 2+		All Ranks	
	No. of Cases	Per-centage	No. of Cases	Per-centage	No. of Cases	Per-centage
Girls ..	74	33.8	224	49.6	298	45.6
Boys ..	78	34.6	220	55.0	298	49.7
Sexes Combined	152	34.2	444	52.3	596	47.7

This figure (47.7 per cent.) underestimates the true position, as babies leaving hospital on the 4th, 5th, and 6th days whilst still under birth weight, were included as not having regained their birth

weight by the 7th day, although they might well have done so. By the method employed in survival tables, a cumulative percentage of those regaining birth weight each day was calculated for sexes and ranks separately and combined (Table VI). By this method 49.2 per cent. of the babies are shown to have regained their birth weight by the 7th day, and 65.1 per cent. by the 10th day. Again, there is no sex difference when the ranks are combined, although the girls do slightly better in Rank 1, and the boys are a little ahead in Rank 2+. There is a marked difference between the ranks, 49.7 per cent. of Rank 1 and 70.8 per cent. of Rank 2+ regaining their birth weight by the 10th day.

It has been generally accepted by most observers that babies regain their birth weight between 10 and 14 days after birth (Parmelee, 1952). Palmer and Ciocco (1945) state that about 25 per cent. of infants regain their birth weight by the 7th day, and 50 per cent. by the 10th day. This is confirmed by the work of Griffith and Gittings (1907), Ramsey and Alley (1918), Meredith and Brown (1939), and Chalmers (1952). Illingworth and others (1952) reported that 49 per cent. of babies on "self-demand" feeding had regained their birth weight on the 9th day, as compared with 36 per cent. of babies fed on a rigid 4-hourly schedule. Our figure of 59 per cent. on the 9th day compares very favourably with Illingworth's "demand" group, and is better than those of other series previously reported.

Both Griffith and Gittings and Meredith and Brown found little difference between boys and girls in this respect and our findings are similar. Meredith and Brown found a tendency for first-born infants to regain birth weight earlier, while Griffith and Gittings found the opposite. We found a significant difference between Rank 1 and Rank 2+.

TABLE VI
CUMULATIVE PERCENTAGE OF BABIES REGAINING THEIR BIRTH WEIGHT EACH DAY, BY SEX AND BIRTH RANK

Day	Girls			Boys			Sexes Combined		
	Rank 1	Rank 2+	All Ranks	Rank 1	Rank 2+	All Ranks	Rank 1	Rank 2+	All Ranks
1	1.4	1.8	1.7	1.3	0.5	0.7	1.3	1.1	1.2
2	1.4	3.2	2.7	3.9	2.3	2.7	2.6	2.7	2.7
3	10.9	12.1	11.7	6.5	10.0	9.1	8.5	11.1	10.4
4	14.9	24.6	22.1	11.7	24.1	20.9	13.2	24.3	21.5
5	19.0	36.9	32.4	22.1	41.9	36.7	20.6	39.3	34.5
6	27.5	44.8	40.4	28.7	51.1	45.2	28.1	47.9	42.8
7	35.2	51.4	47.3	36.1	56.5	51.1	35.6	53.9	49.2
8	42.1	57.6	53.6	36.1	61.7	54.9	38.6	59.8	54.2
9	49.8	63.7	60.1	38.7	65.2	58.7	44.7	64.6	59.3
10	49.8	67.7	64.5	44.3	73.9	65.2	49.7	70.8	65.1

COMMENT

We should like to emphasize both the similarities and the differences displayed by our Bantu group as compared with previous studies. Like all other babies, these lost weight for the first 3 days after birth, and then started to gain. The difference here is that their loss falls at the lower limit of the accepted range of loss, and their rate of gain is very much faster, so that a far greater percentage regain their birth weight by the 7th and 10th days than those previously reported. There is, also, the unequivocal superiority of the second and later-born over the first-born. Although this group of Bantu mothers may be on a slightly higher economic level than the general Bantu population, in that they were able to afford the small hospital charges, their general economic level was still very low. A striking feature, however, of Bantu mothers, including this group, is their abundance of breast-milk, their complete acceptance of breast-feeding, and the ease with which lactation is established, and maintained. The accepted Bantu method of breast-feeding, outside the hospitals, is by self-demand. Although this method could not be completely followed in hospital, owing to the 3-hourly routine, the babies shared their mothers' beds, and it was observed that they were fed at other times, particularly at night.

SUMMARY

598 healthy breast-fed babies were studied at McCord's Zulu Hospital in Durban for the first 10 days of life. They were all full-term, single births, of normal vertex delivery. They shared their mothers' beds, and were fed on an elastic 3-hourly schedule with a night feed.

(1) The maximum mean loss of weight occurred on the 3rd day after birth and amounted to 5.7 oz. (5.0 per cent. of the mean birth weight of 7.18 lb.).

(2) After the 3rd day they started to gain weight at a rate of over an ounce a day, so that they had regained birth weight on the 9th day.

(3) No difference was found between boys and girls.

(4) Rank 1 babies lost for 3 days, and regained their birth weight by the 10th day. Rank 2+ babies lost for 2 days only, lost less weight, and regained their birth weight by the 8th day.

(5) There was great individual variation in the duration of loss of weight (0-8 days, mean 3.15). There was no difference between boys and girls, but Rank 1 babies lost for a significantly longer time than Rank 2+ babies.

(6) The total initial loss, irrespective of the day the minimum weight was reached, ranged from 0-27 oz. (mean 7.47 oz., 6.5 per cent. of birth weight). There was no difference between the sexes, but Rank 1 lost 8.2 per cent. of birth weight as against 5.9 per cent. for Rank 2+.

(7) The marital status of the mothers appeared to have no effect on either duration or amount of loss.

(8) By the method employed in survival tables it was found that 49.2 per cent. regained birth weight by the 7th day, and 65.1 per cent. by the 10th day. No difference was found in sex, but 70.8 per cent. of Rank 2+ babies as opposed to 49.7 per cent. of Rank 1 babies had regained their birth weight by the 10th day.

It is thought that the excellence of Bantu mothers as breast-feeders and their method of breast-feeding account for the good progress made by the babies.

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APPENDIX

DAILY GAIN OR LOSS OF WEIGHT IN THE FIRST 10 DAYS OF LIFE, BY SEX AND BIRTH RANK

Day	Girls						Boys					
	Rank 1			Rank 2+			Rank 1			Rank 2+		
	No.	Mean (oz.)	S.D. (oz.)	No.	Mean (oz.)	S.D. (oz.)	No.	Mean (oz.)	S.D. (oz.)	No.	Mean (oz.)	S.D. (oz.)
1	65	-2.55	2.34	193	-2.55	2.52	70	-3.01	3.84	188	-2.56	2.48
2	73	-5.14	2.70	222	-5.42	3.22	77	-6.30	3.91	216	-5.36	2.92
3	74	-6.49	4.56	223	-5.30	4.51	78	-7.85	4.89	219	-5.15	4.16
4	74	-6.43	6.01	220	-3.93	5.52	77	-7.68	6.17	218	-3.83	5.57
5	72	-5.69	6.82	217	-2.67	6.41	77	-6.69	7.34	217	-2.30	6.11
6	70	-4.86	7.54	213	-1.72	7.09	75	-5.72	7.52	204	-0.95	6.82
7	63	-4.40	8.14	183	-0.62	7.69	70	-4.31	8.20	179	-0.24	7.15
8	44	-3.27	9.33	113	+0.61	8.22	57	-3.32	8.01	117	+1.19	7.08
9	31	-1.13	10.22	59	+1.47	7.54	41	-1.34	8.27	57	+2.82	7.42
10	9	—	—	22	+0.73	8.56	18	—	—	23	+5.17	7.08