THE FIRST YEAR OF LIFE OF THE JOHANNESBURG BANTU

II. TRIBAL GROUPS AND NUTRITION

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I recently found retarded physical development in a sample of Bantu infants in Johannesburg.[1] This sample included all 4 main groups of the South African Bantu. From the same population Kahn and Freedman[2] selected a group of privileged Bantu children and found that their physical development was comparable with White samples of American children of good economic background.

Recent studies of growth have emphasized the importance of the environment on the development of infants. Greulich[3] has shown that Japanese children born in California are heavier and taller than those in Japan and comparable with White American children.

It was therefore thought to be of interest to compare the tribes in the sample of Johannesburg Bantu infants, in order to discover if any tribe showed physical superiority while living with other tribes in a similar urban environment.

MATERIAL

During 1957 and 1958, 1,216 Bantu infants of 1 year or under were medically examined and measured. Seventy-one infants were newly born and were delivered in Baragwanath Hospital, situated between Orlando Township and the City of Johannesburg; 475 infants were living in the municipally-controlled Bantu township of Orlando, and 670 babies were living in Alexandra Township, a residential area for Bantu situated about 8 miles from the centre of Johannesburg, but not controlled by the Johannesburg Municipality.

METHODS

1. *Selection of Sample*

Only babies whose exact birth-dates were known were used in the sample, and in no case was the mother's memory relied upon. Twins were excluded.

(*a*) *Newborns*. All the babies were born in Baragwanath Hospital, and were examined within 3 hours of birth. If the baby was considered distressed or sick it was not examined, otherwise consecutive births were examined while the examiner was attending daily at the maternity section of the hospital.

(*b*) *Orlando Township*. The register of births attended by the district midwifery services was used for obtaining accurate birth dates, and for addresses from which to fetch the babies. Appointments were made at the patients' homes and, with a very occasional exception, all the mothers who were approached were willing to attend for examination. The babies were fetched by car from their homes, and returned by car after the examination was complete.

(*c*) *Alexandra Township*. Approximately half these babies were interviewed and examined while voluntarily attending the infant-welfare clinic run by the Alexandra Health Centre and the University Clinic. Birth dates were checked in the register of the clinic's district midwifery service, and from this register the addresses were obtained for the rest of the sample, who were babies fetched from their homes and were not necessarily regular infant-welfare clinic attenders.

2. *The Examination*

All babies were examined, measured and weighed by me personally, with the exception of 64 infants who were seen by another medical officer using the same method and equipment. Items of information from the mothers were obtained by an African graduate assistant using the mothers' own language. These assistants consciously tried to avoid, by tone of voice, suggesting to the mothers that certain information was, or was not, 'approved'.

An attempt was made on purely clinical grounds, without knowledge of tribe or diet, to assess the nutritional status of the baby. Kahn's[4] criteria were chiefly followed:

(*a*) *Excellent nutrition*. Where the clinical state was such that it was considered unlikely that the nutrition of the child could be improved by additions to the diet.

(*b*) *Good nutrition*. Where it was considered that the clinical state might improve with additions to the diet, the nutrition was judged suboptimal.

(*c*) *Fair nutrition*. Where mild signs of malnutrition (atrophic scalp hair, receding hairline at temples, depigmented patches on cheeks, mild cheilosis) and/or rickets were present.

(*d*) *Poor nutrition*. Where (*i*) there were signs of advanced malnutrition (nutritional oedema, nutritional dermatosis, severe muscular wasting); or (*ii*) where the body weight was less than 60% of the expected average weight for length, even though there were no clinical signs of malnutrition (the table of expected average weight for height which was used was given by Evans and MacKeith,[5] adapted from Grandprey's data given in Brenneman's book[6]).

3. *Age and Race*

Age was calculated to the nearest week, midweek cases being assigned alternately to the lesser or greater age. The racial group to which the infant belonged was assessed by allotting the cases according to the language spoken at home; this was not known by the examiner at the time of the examination.

RESULTS

Table I shows the tribal distribution of the babies in the sample, including newborns.

Table II shows the clinical assessment of nutritional status of the sample, excluding newborns. Signs of malnutrition were shown by 13·55%, in that they were classified as 'fair' or 'poor', while 31·22% were classified as 'excellent'.

Table III shows the nutritional assessment of those tribes who were represented in the sample in fairly large numbers. Of these, 13·79% showed signs of malnutrition, and 30·32% were classified as 'excellent'.

Table IV shows the influence of the type of feeding on the nutritional assessment.

Retarded physical development, described more fully elsewhere,[1] was found. The mean stature of the babies was consistently shorter than that in series of American or British White babies. The mean weight of the babies was lighter at birth than that of those in the White series, actually heavier from 4 - 7 weeks, similar thereafter until 3 months of age, and for the rest of the first year lighter.

DISCUSSION

The numbers of babies in each tribe were not sufficient to construct measurement curves for comparison, so the

TABLE I. TRIBAL DISTRIBUTION OF 1,197 BANTU BABIES

Nguni		*Sotho*		*Venda*		*Tsongo*		*Nyasa*		*Kalanga*	
Xhosa	111	Sotho	189	Venda	83	Shangaan	103	Nyasa	3	Kalanga	4
Zulu	369	Chuana	121								
Swazi	17	Pedi	144								
Ndebele	7	Kgatla	46								
Total	504		500		83		103		3		4
% of total	42·11		41·77		6·93		8·60		0·25		0·33

TABLE II. CLINICAL ASSESSMENT OF NUTRITIONAL STATUS OF BABIES UNDER 1 YEAR (SEXES COMBINED)

Excellent		*Good*		*Fair*		*Poor*		*Total*
No.	%	*No.*	%	*No.*	%	*No.*	%	
355	31·22	628	55·23	146	12·84	8	0·71	1,137

TABLE III. NUTRITIONAL ASSESSMENT OF VARIOUS TRIBES

Tribe	*No.*	*Excellent* %	*Good* %	*Fair* %	*Poor* %
Zulu ..	341	30·20	56·60	12·61	0·59
Chuana ..	114	29·82	53·51	15·79	0·88
Pedi ..	139	31·65	51·08	16·55	0·72
Sotho ..	182	31·87	53·30	14·83	0
Shangaan	99	33·33	61·62	4·04	1·01
Venda ..	80	22·50	67·50	8·75	1·25
Xhosa ..	97	29·90	52·58	16·49	1·03
Total ..	1,052	30·32	55·89	13·12	0·67

TABLE IV. RELATIONSHIP OF NUTRITIONAL ASSESSMENT TO TYPE OF FEEDING

	Breast-fed		*Partly breast-fed*		*Artificially fed*		*Total*
	No.	%	*No.*	%	*No.*	%	
Not assessed ..	0	0	3	75·00	1	25·00	4
Excellent ..	113	47·88	104	44·07	19	8·05	236
Good	156	30·77	264	52·07	87	17·16	507
Fair	11	8·87	72	58·06	41	33·06	124
Poor	1	20·00	2	40·00	2	40·00	5
Total	281	32·08	445	50·80	150	17·12	876

clinical assessment of the nutritional state was used. As shown in Table III, there was a marked similarity among the tribes. The X^2 test was applied with the columns 'fair' and 'poor' combined, and $X^2 = 15{\cdot}2288$, showing no statistically significant difference between the nutritional status of the tribal samples in Table III.

In the sample as a whole, nutritional status deteriorated with age, the older babies showing a lesser incidence of excellent nutrition and a greater incidence of objective signs of early malnutrition. The age composition of the various tribes was similar to the sample as a whole.

Type of feeding also affected the nutritional status in the sample as a whole, deprivation of breast milk affecting it adversely (Table IV). In assessing the statistical significance of the relation between type of feeding and nutritional assessment, categories 'good' and 'excellent', and categories 'fair' and 'poor' were combined, and the percentages of each category for each type of feeding were calculated. The 95% confidence limits were applied, and in no case did the limits overlap, showing that the percentages differed significantly. Unfortunately, the incidence of breast feeding in the various tribes could not be compared with the general sample, since there were insufficient data. The finding among the Johannesburg Bantu that breast-fed babies do much better than artificially fed ones is different from recent experience in England. In English samples there is little difference between the weights of breast- and bottle-fed babies in the early months, but later the bottle-fed babies are heavier.[7] Also, Hammond[8] observed no consistent differences up to the age of 1 year between the weight gains of children of the various social classes.

It will be noticed that nutritional-status assessment was made on objective signs in the categories 'fair' and 'poor', but were largely subjective in the categories 'good' and 'excellent'. Many babies whose nutritional status was assessed as 'good' because there were no objective signs of early malnutrition, were felt by the examiner not to warrant this adjective. Such babies may have had the 'first grade malnutrition' of Gómez and his colleagues.[9] Those categorized as 'fair' were babies with borderline undernutrition and would certainly fit into the category of 'first-degree' and many probably into 'second-degree' malnutrition, or would variously be termed as having 'mild protein malnutrition', or 'pre-kwashiorkor'. Such cases have been much less studied than frank kwashiorkor, which is the final stage.

It was not possible during this stage of the research project to carry out serum-protein estimations or other tests to confirm the clinical evidence of early malnutrition. The team working in the Bantu area was anxious to promote goodwill, and getting samples of venous blood was thought likely to antagonize parents. Judging by the acquiescence with which mothers accepted invitations to come for examination, the research clinic had a good name. Early in the investigation, while we were working in Alexandra Township, several women had the macabre thought that when the children were measured on the measuring board it looked as though they were being fitted for coffins. They wondered if it was 'lucky' to come for examination. However, these rumours then seemed to abate, and the mothers, both in Alexandra and Orlando, on the whole seemed to enjoy watching their babies being examined.

The similarity in the nutritional assessment of the various tribes suggests that the factors operating in the retardation of growth in this sample of Johannesburg Bantu infants are not likely to be tribal or racial in origin. Socio-economic factors, with the emphasis on lack of education and the ability to cope with artificial feeding, are probably of great importance.

SUMMARY

The tribal groups in a sample of Bantu infants are compared by assessment of nutritional status, and do not differ significantly from each other. If the nutritional status of the babies on different types of feeding is compared, however, there is a significant difference.

The sample showed retardation of growth and it is concluded that this is unlikely to be the result of racial or tribal factors.

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