Methionine Concentration in South African Bantu Breast Milk

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Although going under different names, the disease commonly referred to as kwashiorkor is of world-wide distribution affecting infants and young children fed on diets habitually deficient in amino-acids. According to Brock & Autret (1952), the syndrome usually includes fatty infiltration, cellular necrosis, or fibrosis of the liver. These authors have reported that in West Africa, fibrosis of the liver may develop in infants at the age of 6 months and possibly even earlier while they are still getting the whole of their food from the breast. It has, therefore, been postulated that a factor or factors may be missing from, or deficient in, the breast milk during the first 6 months of lactation. The fact that experimental methionine deficiency in the rat results in a fatty liver (McHenry & Patterson, 1944) raises the question whether a deficiency of this amino-acid may be involved in the causation of kwashiorkor. It is thus of interest that Auffret & Tanguy (1949) have reported that the breast milk of West African mothers of Dakar is low in methionine. They found a mean value of 16 mg/100 ml., which is unusually low in comparison to the mean value of 29 mg/100 ml. quoted by them for American mothers examined by Block (1945). However, more recently, Srinivasan & Ramanathan (1954) have examined the milks of twenty-five Indian mothers, both mothers and babies being apparently healthy, and also of six Indian mothers whose children were suffering from kwashiorkor. No abnormality was apparent; for the milks from the two groups of mothers, they found average values of 29·1 and 30·4 mg methionine/100 ml. respectively. In South Africa we have found no abnormality in the mean protein concentration of Bantu breast milk (Walker, Arvidsson & Draper, 1954); moreover, the stigmata of kwashiorkor are not observed in exclusively breast-fed infants. But in view of the report from West Africa, it was thought worth while to carry out determinations of methionine in the breast milk of both Bantu and South African European mothers.

EXPERIMENTAL

Subjects and methods

'Spot' samples of breast milk were collected from twenty-nine Bantu mothers at urban and rural health clinics while mothers were waiting, mainly for the routine examination of their babies. Periods of lactation varied from 1 to 27 months. The mothers, whom the clinic medical officers judged to be representative, were in apparent good health. For purposes of comparison, twenty-five samples of breast milk were

collected from South African European mothers, also in apparent good health, by municipal health visitors during their periodic visits to mothers' homes. Periods of lactation varied from 2 weeks to 10 months.

Methionine was determined by the chemical method described by McCarthy & Sullivan (1941).

RESULTS

Our results are summarized in Table 1. Values for the methionine concentration in breast milk from groups of other mothers are included for comparison.

Table 1. *Mean methionine concentration in the breast milk of groups of Bantu and other mothers*

(Results expressed as mg methionine/100 ml. milk)

Group of mothers	Method of determination	No. of samples	Mean value and its standard deviation	Range
	Present work			
Bantu mothers	McCarthy & Sullivan (1941)	29	29·7 ± 5·1	19·6–39·0
South African European mothers	McCarthy & Sullivan (1941)	25	26·2 ± 3·2	19·3–33·4
	Other data			
Indian mothers, apparently healthy	McCarthy & Sullivan (1941)	25	29·1	—
Indian mothers with kwashiorkor babies (Srinivasan & Ramanathan, 1954)	McCarthy & Sullivan (1941)	6	30·4	—
American mothers (Williamson, 1944)	McCarthy & Sullivan (1941)	500	29	—
American mothers (Block, 1945)	McCarthy & Sullivan (1941)	—	29	—
American mothers (Beach, Bernstein, Hoffman, Teague & Macy, 1941)	Baernstein (1936)	—	18·1	—
American mothers (Macy, 1949)	Microbiological (details unpublished)	24	11·6 ± 2·3	6·5–16·0
Dakar West African mothers (Auffret & Tanguy, 1949)	Polonovski & Issartel (1948)	10	16·4	12·0–26·0

DISCUSSION

Our results show that the mean concentration of methionine in Bantu breast milk, although closely similar to, is significantly higher ($P < 0{\cdot}01$) than, the mean value for the milk of South African European mothers. Mean values are in close agreement with those given for Indian mothers, also for the American mothers studied by Williamson (1944) and Block (1945). The same method of determination, i.e. that of McCarthy & Sullivan (1941), was used in all these studies. The disagreement with the mean values reported by other groups of workers may well be due to the different methods of determination employed. It is possible, therefore, that the low mean value for the Dakar African mothers' milks is apparent rather than real. It would be illuminating to know the corresponding mean value for European mothers resident in Dakar, using the method of determination employed by Auffret & Tanguy (1949); but such determinations apparently were not done.

SUMMARY

1. The reported deficiency of methionine in the breast milk of West African mothers appears to be of relevance in regard to (1) the hepatic fibrosis which occasionally occurs while infants are still exclusively breast fed, and (2) the high incidence of kwashiorkor at weaning time and thereafter. In South Africa kwashiorkor is common although it does not affect wholly breast-fed infants.

2. Determinations of methionine concentration in the breast milk of twenty-nine Bantu compared with twenty-five local South African European mothers revealed no abnormality in this respect, mean values obtained being 29·7 mg and 26·2 mg/100 ml. respectively.

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