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Stunting in African children

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SUMMARY A total of 651 preschool children from rural central Africa were selected by random cluster sampling, weighed, and measured. Two per cent were wasted, but 47% were stunted. As linear growth recovers more slowly than weight repeated infections may give inadequate time for height catch up.

Severe malnutrition is obvious among children in the African Sahael, and the eco-political aetiological factors are familiar and tragic. We set out to establish the nutritional state of children in more stable rural communities of subequatorial Africa.

Patients and methods

Three medical students, during their elective periods, attempted to find out the nutritional state of children in rural communities in subequatorial

Africa by using small numbers but a statistically valid cluster sampling technique in rural Tanzania, Zaire, and Zambia.¹

With local help in each area, the population was divided into 30 groups roughly equal in numbers. In each area, starting at a randomly selected point, a cluster of between seven and 10 children were selected who lived nearest and were aged between 12 and 60 months. Their weights were measured with a CMS MP25 spring balance and their heights against a scale on a vertical board with a spirit level on their heads. Birth dates were recorded.²

Results

Wasting was defined as less than -2 standard deviations (SD) below an international reference population (National Center for Health Statistics) for weight for height and stunting as less than -2 SD height for age (the World Health Organisation-Waterlow classification of malnutrition).³ Of the 612

Table Standard height for age of preschool children (aged 12-69 months) in three rural African communities

Standard height for age	Rural African communities							
	Tanzania		Zambia		Zaire		Total	
	No	(%)	No	(%)	No	(%)	No	(%)
<-3	43	(19.5)	24	(11.1)	58	(28.3)	125	(20.4)
-3 to -2	61	(27.6)	59	(27.3)	58	(28.3)	178	(29.1)
-2 to -1	65	(29.4)	76	(35.2)	21	(24.9)	162	(26.5)
-1 to 0	38	(17.2)	42	(19.4)	18	(8.8)	98	(16.0)
0 to 1	11	(5.0)	10	(4.6)	16	(7.8)	37	(6.0)
1 to 2	1	(0.5)	4	(1.9)	4	(2.0)	9	(1.5)
>2	2	(0.9)	1	(0.5)	0		3	(0.5)
Total	221		216		205		612

Figure Percentages of preschool children from rural communities in Africa who were stunted, severely stunted, or wasted compared with the reference population.

children, 1.4% were wasted, 46% stunted, and only 0.6% wasted and stunted. In this series wasting was less common than in the North American reference population. The pattern was similar in all three countries (Table) and has been reported previously.⁴ Stunting was both prevalent and severe; not only were 47% less than -2 SD but 20% were less than -3 SD of height for age (Figure).

Discussion

Wasting is believed to indicate recent or current malnutrition, has correlated with increased risk of death in subsequent months, and is considered an indication for priority nutrition intervention. Stunting has not been shown to influence life expectancy and physiological function in the same way and may have a different pathological importance. When such a high proportion of children are stunted without being wasted it has to be asked if it is really an aspect of malnutrition or whether it is an adaptation to harsh environmental circumstances.

The cause as well as the importance of stunting is uncertain. Undernutrition certainly results in arrest of linear growth as well as weight loss. If prolonged undernutrition is the main cause for stunting it is surprising that there is so much of it in these populations, which have unappreciable wasting. Moreover, it might be expected that there would be a higher proportion of stunting in older age groups, but this does not seem to be the case in this rather small series (Figure).

Impaired growth during a critical period has also been blamed for shortness of final stature, and possibly the children had a low birth weight. Genetic predisposition and psychosocial deprivation are associated with stunting, and relative growth hormone deficiency may be the cause or a consequence in these circumstances. Recurrent infections with periods of arrested growth may be important in children who live in a heavily pathogen contaminated environment.

Catch up growth studied after coeliac disease may give a clue.⁵ At diagnosis these children were both wasted and stunted. On an adequately nourishing gluten free diet they caught up their weight for height in three months but did not reach their expected height for age until after about 24 months of corrective treatment. Indeed, there is a period in both recovering coeliac disease and protein energy malnutrition when weight overshoots height and there is a degree of obesity.⁶ A reasonable hypothesis is that in tropical Africa children catch up weight adequately after periods of growth faltering but before they have had time to fully catch up linear growth the next infection strikes. If this is the case, even with adequate nutrition, many will not achieve their full potential for height until they are protected from the pathogens in the environment. This is a further reason why the control of infections may be a major contribution to what has been considered a problem of malnutrition.

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