

## GROWING UP IN WESTERN AUSTRALIA : IF YOU ARE ABORIGINAL

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Summary

Some degree of growth retardation is not an uncommon finding in Aboriginal preschool children.

In some children an inadequate intrauterine environment results in a low birth weight.

Subsequent to this a high proportion of children are exposed to one or more unfavourable environmental conditions and this is reflected in a high prevalence of illness, particularly gastroenteritis.

Nutritional practices are closely related to environmental conditions. Recent findings from Western Australia and other parts of the world suggest that often poor nutritional status, as evidenced by a low weight and height for age, is not the result primarily of an inadequate diet but the consequence of repeated dietary restrictions associated with frequent illness.

## I. INTRODUCTION

We have in Western Australia a considerable amount of information about the weight and height of Aboriginal children during their first 5 years of life. During this time the children are weighed and measured regularly by Community Health staff and the information recorded.

What is the purpose of collecting and recording this information? The obvious answer is that it provides us with information about the growth of the children - but what does this really tell us?

Some extracts from a review lecture by R.A. McCance (1974) provide the answer.

"An animal can only achieve its full genetic potential if it has lived all its life in an ideal environment. Few environments are ideal; they may be unfavourable for numerous reasons and for different lengths of time. Indeed variations on these themes are almost infinitely possible."

"Some environments are so hostile that survival becomes impossible in them and the ideal environment for most species has yet to be defined. Most consist of favourable and unfavourable influences, and the final effect on growth and function may be thought of as the sum of them all acting together. Among these influences nutrition is certainly an important one, but so are temperature, rainfall, altitude and all that go with them."

Thus measurements of weight and height in children provide an integral assessment of the children's environment. They cannot by themselves tell us which aspects of the environment are favourable and

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which unfavourable, only what is the net overall balance.

## II. UNDERNUTRITION AND MALNUTRITION

Children who receive insufficient food, for whatever reason, fail to grow and are said to be undernourished. If at the same time their food supply is imbalanced they may in addition show one or more signs of nutrient deficiencies, and are said to be malnourished.

Varying degrees of growth retardation are a common finding in preschool children in developing countries and it is conventional to describe such children as suffering from protein-energy malnutrition.

Most systems for the classification of protein-energy malnutrition are based on measurements of weight and height for age and on weight for height (Waterlow 1972). Varying cut off points have been suggested for use in different circumstances but it is generally accepted that a weight for age or height of less than 80%, or a height less than 90% of a reference standard (Stuart & Stevenson, 1959) fall outside the normal range and indicate undernutrition.

Waterlow and Rutishauser (1974) pointed out that weight for age alone is an inadequate measure of undernutrition and does not enable one to differentiate between present and past malnutrition or to assess the severity of current undernutrition, whereas a combination of height for age and weight for height allow one to do this.

Table 1 shows the results of applying such a classification to Aboriginal children in Western Australia.

TABLE 1. Percentage of Aboriginal children with weight for height and height for age below the normal range of a standard of reference (Stuart and Stevenson 1959).

Age (yr.)	No.	Weight for height <80%	Height for age <90%
0-1	942	7%	12%
1-2	1170	5%	25%
2-3	1167	6%	27%
3-4	1270	4%	20%
4-5	1083	6%	18%

About 5% of children in each age group fall below the normal range of weight for height and thus about 2% of them might be expected to be undernourished.

Many more children fall below the normal range for height. In the first year of life about 10% could be considered to be retarded in height, but by the third year this figure rises to 25%, after which it again falls.

It is difficult to interpret the significance of this data in the first year, but subsequently it seems clear that an increasing number of children experience continuing retardation in height at least until the third year of life.

In the majority of these children the retardation in height is associated with a proportionate reduction in weight so that body proportions remain essentially normal. This suggests a pattern of chronic growth retardation during the first 3 years of life.

### III. ENVIRONMENT AND GROWTH

In an attempt to find out more about the environmental factors affecting growth in Aboriginal children in Western Australia information available from the Health Records of two groups of children was compared.

The first group comprised children whose weight at one year of age had been 90% or more (114) and the second, children whose weight at one year of age had been less than 80% (59). All children for whom data was available were included in the analysis.

A number of differences were found to exist between these two groups and the more important of these are shown in Table 2.

TABLE 2. Differences between children with satisfactory and unsatisfactory weight status at one year of age.

Environmental Factor	Weight for age	
	>90%	<80%
Birthweight <2500g	2%	22%
Mother with no formal education	11%	24%
Sibling <24 months older	25%	41%
Communal or no piped water	34%	44%
Communal or no toilet facilities	37%	48%
Gastrointestinal illness	49%	70%
Respiratory illness	61%	59%
Episodes of recorded illness	3.7	5.2
Never breastfed	17%	14%
Breastfed <6 months	36%	20%
Solids before 4 months	25%	16%

A significant proportion of children in the low weight group already had a weight deficit at birth, 22% weighing less than 2500g and 47% less than 3000g, whereas in the group with a normal weight for age only 2% weighed less than 2500g and only 27% less than 3000g at birth.

Secondly more than 80% of the low weight group were born into an environment with one or more of the following disadvantages; a communal or no piped water supply, communal or no toilet facilities, a mother with no formal education and/or a sibling less than 2 years older. Only 55% of the group with a normal weight for age experienced similar circumstances.

Thirdly the amount of illness recorded was slightly higher in the low weight for age group and considerably more children in this group experienced one or more episodes of gastrointestinal illness.

The pattern of early feeding was closely related to living conditions.

All except five of the children who were breast fed for less than 6 months lived in housing with private water and toilet facilities, and their recorded illness was less than that of children who were breastfed for longer, but lived in housing without these facilities. Among these children the amount of recorded illness was slightly higher in those children given solids before the age of 6 months than in those who were given solids later. This suggests that the earlier introduction of solids, which may be necessary to maintain a normal rate of growth, under unfavourable environmental conditions may lead to an increase in illness.

#### IV. DISCUSSION

These findings provide a number of clues to aspects of the children's environment which could have a significant effect on their rate of growth.

##### (a) Low Birthweight

The fact that 1 in 5 of the children with a low weight for age at 1 year had a birthweight less than 2500g, combined with an incidence of low birthweight of 12% in the Aboriginal population of Western Australia suggests that infants with a low birthweight make a significant contribution to those subsequently classified as undernourished. Inadequate nutrition of the mother during pregnancy, smoking and excessive alcohol intake may all play a role and need to be assessed.

##### (b) Diet

That a much higher proportion of the low weight group were born into an environment with one or more obvious disadvantages is hardly surprising and might be expected to be reflected in an increased amount of illness and in less adequate feeding practices. In this study early infant feeding patterns were found to be markedly influenced by the environment. Similarly, Hitchcock and Gracey (1975) in a study of families living in a small town in Western Australia found that dietary patterns were closely related to living conditions and social factors.

Little, however, is known about differences in the consumption of foods and nutrients by Aboriginal communities and other Australians. The nutrients available from all food purchased, over a period of 7 days, by an Aboriginal community of 170 people in the Goldfields region of Western Australia are compared in Table 3 with apparent consumption data for Australia for 1976-77 (Australian Bureau of Statistics 1979).

TABLE 3. Estimated nutrients available per head per day.

Nutrient	Aboriginal community	Australia 1976-77
Energy (kcal)	4000	3250
Protein (g)	104	101
Iron (mg)	13	16
Calcium (mg)	560	860
Retinol ( $\mu$ g)	610	1580
Ascorbic acid (mg)	33	68

These figures do not indicate any lack of food in the Aboriginal community but they do suggest a difference in the type of food consumed. The nature of this difference is clearly seen in Table 4 which compares the amount of energy available from different sources.

TABLE 4. Estimated energy available from different foods in kcal per head per day.

Food	Aboriginal community	Australia 1976-77
Grain products	1365	820
Meat, poultry, fish, eggs	720	750
Sugar and syrups	1210	570
Milk and milk products	260	345
Fats and oils	290	330
Fruit and vegetables	155	240
Beverages	-	195
Total	4000	3250

The most striking difference is a very high apparent consumption of sugar by the Aboriginal community. In other respects, the differences are small with the exception that grain products contribute more and fruits and vegetables less energy than in the Australian diet.

How the available food is distributed within the family is not known. A study of the food intake of 8 families and 14 preschool children (Hitchcock and Gracey 1975), however, provides no evidence for the view that the amount of energy and protein available to preschool children is less adequate than for other members of the family although it is frequently suggested that traditionally in Aboriginal society young children are at a disadvantage in relation to the distribution of food.

#### (c) Illness

The proportion of children with recorded illness was high in both weight groups (> 80%), although the proportion of children with gastrointestinal illness and the total number of episodes of recorded illness per child were somewhat higher in the low weight group. That Aboriginal children suffer a high burden of illness is well known from hospital statistics (Western Australian Government 1975). Table 5 shows that young Aborigines, in particular, account for a disproportionate number of hospital discharges especially in respect of infective and parasitic diseases and those associated with the respiratory system.

TABLE 5. Hospital discharge rates for Western Australia in 1975, per thousand of the population aged 0-4 years.

Principal condition	Aboriginal	Non-Aboriginal
Infective and parasitic	315	28
Respiratory system	372	62
Nervous system and sense organs	93	15
Symptoms and ill defined conditions	85	20
Accidents, poisoning and violence	68	29
All conditions	1090	209

In South America, Mata *et al* (1977) have studied the effects of infections on food intake and have found that morbidity and calorie intake are inversely correlated, particularly during the second year of life. They consider the cumulative effects of calorie restrictions, as a consequence of infection, to be an important obstacle to good nutritional status.

A similar sequence of events appears to occur in Aboriginal children and might thus be expected to influence their nutritional status as judged by weight and height.

The principal reason for admission of Aboriginal children to Princess Margaret Hospital in 1974 was gastroenteritis (Shannon and Gracey 1977) and as many as 40% of these children may be classified as undernourished (Gracey 1973). Recent work in Guatemala, The Gambia and Uganda (Mattorell *et al* 1975; Cole and Parkin 1977; Whitehead 1977) has shown that gastroenteritis is significantly negatively correlated with gain in weight and height.

In the light of these findings measures to increase patient use of ante-natal care, improved living conditions and other measures for the control of disease appear to be at least as necessary as specific dietary intervention in creating a more favourable environment for Aboriginal children.

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