

## NUTRITION EDUCATION IN PRACTICE \*

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### INTRODUCTION

It is no exaggeration to say that the most important single aim of nutrition education is to persuade mothers in the tropics to make the best possible use of foods already available locally for feeding children in the early years of life.

Although in some places, as in parts of South-East Asia, infantile beriberi and avitaminosis A will be common, the main problem in all tropical countries stems from the various syndromes collectively termed "protein-calorie malnutrition of early childhood", the two principal severe forms being kwashiorkor and nutritional marasmus. *It is with the prevention of these conditions that the present account is principally concerned.* As an example, the pattern in present-day Buganda is given in Table 17, together with speculation concerning future developments.

The syndromes of protein-calorie malnutrition of early childhood are never exclusively of dietary etiology. An "ecological diagnosis" must always be made, and responsible factors will be found to vary from region to region. Appropriate modification of emphasis in nutrition education to suit the particular area is therefore necessary. Of the various "burdens" that contribute to the production of protein-calorie malnutrition, the following always require consideration:

(a) *dietary*: poverty; actual unavailability of protein foods; lack of knowledge; "wrong" knowledge (e.g., cultural attitudes);

(b) *infective*: tuberculosis, whooping cough, measles, infective diarrhoea, etc.;

(c) *parasitic*: intestinal helminths (heavy infestation with roundworm or hookworm), malaria;

(d) *psycho-social*: sudden separation from the breast (especially if "geographical"); family instability (emotional, economic and social); illegitimacy.

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\* Various practical aspects of nutrition education have been dealt with recently by Holmes (1964), Ritchie (1967) and Jelliffe (1968).

TABLE 17  
 MAIN SYNDROMES OF MALNUTRITION IN EARLY CHILDHOOD IN BUGANDA  
 AND POSSIBLE FUTURE DEVELOPMENTS

	Clinical syndrome	Main reasons
<b>Present picture</b>		
Protein-calorie malnutrition	Classical kwashiorkor (children aged 1-3 years)	Protein-poor, mainly carbohydrate "transitional" diet, due to maternal lack of knowledge, "wrong" knowledge, or poverty; there may also be associated infection (hookworm, tuberculosis, whooping cough)
	Nutritional marasmus (first year of life)	Death or desertion of mother, or failure of lactation; associated infection (gastro-enteritis and tuberculosis) often present
Vitamin deficiency syndromes	All very uncommon	Breast feeding supplies vitamins A and C; ultraviolet light prevents rickets
<b>Possible future picture</b>		
Protein-calorie malnutrition	Nutritional marasmus (first year of life)	Increasing failure of breast feeding, with attempts at bottle feeding with overdilute milk and infected utensils, leading to gastro-enteritis
	Classical kwashiorkor (children aged 1-3 years)	Same as present picture
	Infantile kwashiorkor (first year of life)	Increasing failure of breast feeding, with infants fed on carbohydrate gruel (e.g., maize)
Vitamin deficiency syndromes	Vitamin A deficiency (especially xerophthalmia)	Bottle feeding on reconstituted dried skimmed milk powder with no fat-soluble vitamin A
	Infantile scurvy	Bottle feeding on cow's milk with no vitamin supplements

### Methods and media <sup>1</sup>

While these will vary with the kind of group (large or small; individual or family) and with the channels through which the information will flow (e.g., young child clinics, home visits, health centres, community development activities, agricultural extension services, schools, hospital wards and outpatient departments), direct simple informal demonstration and discussion, with active participation by a small group, is probably the most satisfactory method of assisting the learning process (see Annex 12).

<sup>1</sup> The use of audio-visual aids in health education has been described by Holmes (1964), Ritchie (1967) and Jelliffe (1968). Real-life situations, particularly those that offer striking "before and after" comparisons, are the most convincing of all teaching aids.

The importance of the father's influence on the child's nutrition must never be forgotten, and every attempt should be made to include him in educational efforts. Working with clinic-bound parents is relatively easy, and some positive results can be achieved and assessed—but these parents constitute only a relatively small proportion of the general population and they are usually the converted anyhow. How does one reach the periphery and maintain some scientific control of the situation? All too often, when a relatively untrained community development worker has been left on his own in some remote village, it is discovered that the teaching has been worthless, if not harmful. Too often it has degenerated into a stereotyped talk on the value of beans. It appears that if workers taking part in health education are to maintain a fresh outlook they must be given "research motivation": they must feel that they are part of an exciting experiment and that by continually searching for the correct methods and approaches they can make a great contribution to the welfare of the children of their community.<sup>1</sup>

### Evaluation

This has been discussed in the preceding chapter. In practical terms the efficiency of health education can best be gauged by:

- (a) an increase in knowledge by mothers, as judged by questionnaire;
- (b) a change in behaviour by mothers on return home (as judged by simple pre-defined "indicators", such as the use of a particular legume for infants);
- (c) the long-term alteration in incidence of the particular condition at which prevention is aimed, e.g., kwashiorkor, subnormal growth curve, etc.

### GENERAL PRINCIPLES

It is useful to realise that, although in fact there may be a large number of different ethnic, religious, dietary and socio-economic sub-groups in various parts of a country, all with their own problems, there are, for practical purposes, usually *two main groups in the present-day tropics* as far as the feeding of young children is concerned although, of course, many families fall between these two extremes.

The first of these, the "privileged" group, consists of the usually small, well-to-do minority, who have a house with an adequate kitchen with running water, storage space and occasionally even refrigeration facilities,

<sup>1</sup> Nutrition education, especially group discussion-demonstrations, should be informative, convincing and entertaining. Besides catering for known nutritional needs, it should introduce "non-nutritional motivation", based on considerations of social prestige, economic status, culinary convenience and sex appeal (Jelliffe, 1968).

who earn sufficient money to be able to buy usually high-priced protein foods, such as milk, in sufficient amounts for their young children, and who have received enough modern education to be able to understand and carry out instructions involving the measurement of quantities, dilutions, and especially the need for cleanliness. Infant feeding for this group can, with minor modifications, follow the standard methods employed, for example, in North America and Europe.

The second group, the "underprivileged", who make up the vast majority, either live in villages or scattered homesteads in rural areas, or have flocked to towns where they live in the "septic fringe" slums, or, if more fortunate, in low-rent urban housing estates. It is this group who often have little or no modern education, a very small earning capacity, dirty fly-ridden kitchens with few cooking pots, limited fuel and storage facilities and an inadequate water supply. This is the group whose children develop protein-calorie malnutrition and who require priority attention with regard to practical and practicable advice on infant feeding, although even here important sub-divisions will be found, as, for example, into those with land and those without, and also into those who rapidly accept new ideas and those who are more conservative traditionalists.

Despite the need for a wide approach to the prevention of malnutrition in developing areas of the tropics,<sup>1</sup> as indicated for Buganda in Table 11, the present account will deal with nutrition education concerned with dietary means of preventing protein-calorie malnutrition among "underprivileged" children, with particular attention to (a) breast feeding, (b) artificial feeding and (c) the transitional diet.

#### BREAST-FEEDING

A working hypothesis with regard to breast-feeding for mothers in tropical regions must be based on the following considerations:

##### **Nutritional value**

*Breast milk is the mainstay of protein nutrition for the first six months of life and is usually all that is needed for this period.* It is also the cheapest, cleanest, most easily available protein source. Any other food considered during this early period must be either nutritionally necessary or of real cultural significance, and its alleged advantages weighed against great risks of producing infective diarrhoea as, for example, in relation to the need for orange juice for tropical infants, among whom scurvy is usually absent.

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<sup>1</sup> A basic list of nutrition education topics is given in Annex 13, and suggested guidelines of infant feeding in Annex 14.

After the first six months, breast milk is *never* nutritionally adequate alone ("breast starvation"), and the child always requires additional food. However, at the same time, breast-feeding prolonged for 1-2 years can make a significant partial contribution to protein needs and to the prevention of kwashiorkor or nutritional marasmus.

### **Late lactation**

Among poorly fed mothers in the tropics, the breast milk in "late lactation" (up to two years or more) has a low normal protein content although the yield is not great (p. 162). The nutritional drain on the mother, although difficult to measure, is cumulative with successive pregnancies and protracted lactation ("maternal depletion"), which emphasizes the need for attention to her diet.

### **Urbanization and breast-feeding**

Among unsophisticated village mothers in the tropics, breast-feeding is usually carried on as naturally as other physiological functions. Conscious, planned "technique", such as nipple preparation, positioning regularity, full emptying of the breast, and "bringing up wind" is minimal or non-existent. Success is due to the mother's unconscious imitation of female relatives observed during her own childhood, and to the unruffled, unthinking normality of the whole process, in which doubts or hopes as to success or failure figure not at all.

Unfortunately, in the last decade or so, the failure of breast feeding—so prominent a feature of the more developed countries, in the present century—has increasingly affected the tropics, especially in urban areas. The reasons for this, and for the complementary rise of bottle-feeding, are, as anywhere, manifold, but the most important are the complex socio-financial factors associated with urbanization and industrialization. These include the imitation, among all ethnic groups, of those regarded as financially and educationally superior (and the prestige and "modernity" that are thereby acquired); the increasing pressure of misdirected advertising of milk foods; the fact that the breasts are considered as a sex symbol, which leads to "modesty" in relation to feeding a baby at the breast; and the tendency of women to go to work in towns, leaving the baby at home. As everywhere, the common denominator of lactation failure under these circumstances appears to be principally interference with a psychosomatic "let-down" reflex (p. 21), resulting from anxiety and lack of certainty.

### **Dangers of bottle-feeding**

Bottle-feeding is increasingly becoming the competitor of breast-feeding, especially in tropical towns. The standard paediatric textbook arguments

concerning the relative merits of human and cow's milk are entirely secondary and academic, as far as infant feeding of the underprivileged is concerned.<sup>1</sup> With few exceptions, the majority of mothers have neither the money, nor the education, nor the kitchen facilities, so that bottle feeding inevitably means the giving of an over-dilute, contaminated mixture, low in nutrients, and high in bacteria, resulting in the triad of infective diarrhoea, nutritional marasmus and oral moniliasis, often with a fatal outcome.

### Content of nutrition education

The content of nutrition education concerning breast-feeding can be extracted from the above basic facts and can be summarized as follows :

1. *Maternal nutrition* : Attempts must be made to persuade mothers to feed themselves better during pregnancy and prolonged lactation, especially on locally available protein foods, particularly legumes, cereals, and dark green leafy vegetables.

2. *First six months of life* : Breast-feeding alone should be practised, unless there is a *definite* nutritional need or strong culture pressure for additional food ; pre-lacteal feeds, unnecessary fruit juice, and dangerous bottle feeds should be avoided.

3. *After six months of age* : Breast-feeding should be continued for at least one year, and preferably for two years, as a small, but significant protein supplement ; semi-solids, based especially on available protein foods, should be introduced so that the diet includes all items of the adult diet by the time the child is one year old.

### Breast-feeding among the traditional and the semi-sophisticated

As noted, the situation is considerably complicated by the fact that in more traditional parts of the tropics breast-feeding is carried on easily by the vast majority whereas, among the semi-sophisticated populations of urban areas, breast-feeding is becoming less common and attempts to replace it by bottle-feeding are being made, usually unsuccessfully.

Plainly, education concerning breast-feeding will differ in emphasis in these two social circumstances.<sup>2</sup>

<sup>1</sup> In this connexion, it should be noted that widespread change from breast-milk to animal milk would present formidable production problems. In India, for example, it is estimated that the present consumption of breast-milk is over twenty-five million litres daily. If this were replaced by cow's milk, the output of some five million lactating cattle would be needed.

The consequences of replacing breast-milk by animal milk have also to be viewed in the context of the rapidly increasing world population and the widening "protein-gap" between global needs and world food production. This particularly affects tropical regions and has its main impact on young children (Jelliffe, 1968 b).

<sup>2</sup> The evaluation of the efficiency and extent of breast-feeding in a community is not difficult and can be obtained by prevalence surveys and welfare clinic records. Negative evaluation by recording the increasing use of the bottle and powdered milk (and gastro-enteritis occurrence) is also important, as it provides an early warning of the need for action in re-establishing lactation.

*Traditional communities*

When breast-feeding is already an unqualified success, it is unnecessary, presumptuous and dangerous (in that it may sow seeds of doubt) to give advice on what, in many highly industrialized countries, are regarded as *the* techniques of breast-feeding. It is quite incorrect to try to teach nipple preparation, regularity of feeds, positioning, need for complete emptying of the breasts, and "bringing up wind".

In such communities, breast-feeding alone is usually adequate for the first six months or so. Nutrition education is really unnecessary, but with the rapid culture change characteristic of the world at the moment, it may be considered advisable as a "situational prophylactic" to underscore in an unobtrusive way the value of breast-feeding and the dangers of bottle-feeding, rather than to discuss questions of technique. This type of advice could be disseminated through various channels, including young child clinics, antenatal clinics, and parents' clubs; but the most important group to reach are the schoolchildren who are likely to be affected by the anti-breast feeding trend by the time they themselves become parents. In some cultures, breast-feeding is terminated prematurely because of beliefs about the milk becoming bad or poisonous. Sometimes, as amongst the Zulu, this is attributed to witchcraft (and sometimes only one breast may be considered affected), while in other tribes the milk is believed to be bad if the mother has become pregnant again.

In groups stopping lactation prematurely because of such beliefs, education must be directed towards attempting to alter these attitudes. Among women who become pregnant (a not inconsiderable percentage of all lactating women), some directive is usually asked for, if there is no existing positive idea about the dangers of continuing lactation. Education in this situation should be individual and also related to the particular community circumstances.

*Semi-sophisticated communities*

The problem among the underprivileged in semi-sophisticated, usually urban, communities is complicated by the fact that the trend away from breast-feeding towards the bottle has usually already begun; at the same time, nutrition education is made more difficult by the widespread advertising of infant foods and milks by commercial companies, and by the patent success of artificial feeding carried out by privileged mothers of all ethnic groups living in the same region.

Under these circumstances, health education for schoolchildren, and in parents' clubs and antenatal and child welfare clinics, must stress the positive value of breast-feeding and the dangers of bottle-feeding, with emphasis on the association between the bottle and gastro-enteritis and marasmus. Medical students appear to grasp this quickly, and the same

effort should be made to make mothers in hospital wards aware of the danger, so that the train of events is not repeated with subsequent babies.

Convincing education is difficult to devise. In some regions it is perhaps possible to appeal to national sentiment and stress breast-feeding as a feature of the ancient culture of pre-colonial times. At the same time, it could and should be emphasized that in such an "advanced" country as the USA there is a present-day move among more educated mothers to return to breast-feeding, as exemplified by the "La Leche League", while in the USSR, breast-feeding is still the usual method of rearing infants.

Perhaps the greatest need for education in respect of breast-feeding is among the staff of medical and other social agencies. Many come from more highly developed countries with temperate climates and do not realise the need for breast-feeding in the tropics. Their own behaviour gives no example as they are often either spinsters or working mothers who themselves use bottle-feeding. Much of the unnecessary early introduction of cow's milk and the too easy acceptance of the "not-enough-milk" story have come from expatriate staff, or staff taught by expatriates uneducated in the normal practice of human lactation.

#### ARTIFICIAL FEEDING

Nutrition education with regard to artificial feeding requires especially careful handling. As a rule it should *not* be included in routine series of child welfare demonstrations, but confined to those who need it.

Among underprivileged, semi-sophisticated mothers the bacteriological risks of using a feeding bottle are great. In many parts of the tropics, it may be considered less dangerous to advise the use of the cup and spoon, or metal (or plastic) feeding cup, either temporarily—if complementary feeds are needed—or continuously, if there is *real* need, especially if the mother is not available because of death or desertion.

If this philosophy is adopted, it is particularly important to avoid using feeding bottles in children's wards of hospitals, as this implies tacit approval. Thus, for a period of six years, the feeding bottle *was not used at all* in the Paediatric Division of Mulago Hospital, Kampala. If artificial feeds were required, temporarily or continuously, they were given by cup and spoon, or by feeding cup.

If artificial feeding with animal milk has to be undertaken, the technique to be suggested has to be carefully considered (see Annex 15).

#### Commercial advertising

While with many commodities an increasing awareness of beneficial modern ways of life may result from advertising in developing countries, the situation with regard to infant foods and medication deserves close

scrutiny. Many tinned milk firms when marketing their costly, high-grade wares in tropical countries use the same pattern of advertising as for the educated populations of their affluent homelands. The results may not be serious for the privileged minority, but are disastrous for the infants of uneducated poor parents, who are increasingly impelled by the glossy glamour of this type of advertising to make ill-advised, excessively expensive<sup>1</sup> and frequently fatal attempts at bottle-feeding, mainly for reasons of prestige. There is little doubt that what is most needed is a re-orientation of commercial thinking in relation to infant feeding products to be marketed in developing tropical regions. In fact, for the poorer segment of the population what is needed is :

(a) a cheap or subsidized full-cream milk,<sup>2</sup> preferably given with a cup and spoon or a feeding cup, to be used, in special circumstances only, for babies whose mothers are dead or unavailable ; and

(b) an inexpensive high-protein food for infants over six months of age ; this could be of animal origin (e.g., dried skimmed milk), or it could be a vegetable protein food or mixed animal and vegetable protein (e.g., skimmed milk and vegetable protein ingredients) and it would not need to be reconstituted as a liquid, but would be employed either in powder form mixed in with the rest of the diet, or made into a gruel.

It is usually neither a liquid milk nor a " milk substitute " that is needed, but a high-protein food, which can be a true supplement either to breast milk or to a locally available toddler diet, and not a replacement for breast milk at an early age.

Liquid milk should be handled as a potentially harmful medicine and proper instruction in its use must be given. Even then, as Oomen & Malcolm (1958) have pointed out, it can be used safely only if a reliable piped water is available and if cooking equipment is adequate.

#### TRANSITIONAL DIET

In most tropical regions, nutrition education for the transitional dietary (weaning) period must be directed primarily towards the prevention of protein-calorie malnutrition, especially kwashiorkor :

(a) by encouraging the best use of the protein foods available from local cultivation, from shops or from health services, together with an adequate intake of carbohydrate calories ;

<sup>1</sup> To bottle feed a four-month old baby in Kampala correctly, with full cream milk, costs about EA Sh 30 (US \$ 10.70) per month, or about one-third to one-quarter of a labourer's earnings.

<sup>2</sup> Possibly a *strongly* acidified milk has certain advantages, including an antibacterial activity while, in addition, it cannot usually be used for adults' tea or coffee.

(b) by attempting to decrease the incidence of such "conditioning" diseases as hookworm, tuberculosis, etc.;

(c) by considering ways of minimizing or changing psycho-social situations of nutritional importance (e.g., the sudden "geographic" separation of the baby from the mother when breast-feeding is stopped);

(d) by encouraging attendance at young-child clinics for periodic surveillance, especially by serial weighing (see Annex 1).

### **Mixed diet in the second six months of life**

One of the main principles in the prevention of kwashiorkor, and similar less clear-cut syndromes, is *gradually to introduce the full mixed diet of the particular community, and especially its protein foods, during the second six months of life*. Failure to do this is often the result of traditional feeding practices. Kwashiorkor usually has its main incidence in the second year of life; its prevention under present-day tropical circumstances usually lies principally in breast-feeding alone for the first six months, and in the introduction of the available mixed diet, including animal and vegetable proteins, *together* with human milk from the seventh month onwards.

### **Local concepts of nutrition and infant foods**

Major difficulties with nutrition education among uneducated tropical populations are a lack of realization of the correlation between good health and good feeding or, conversely, between an ill-balanced diet and malnutrition. Foods are usually classified culturally, sometimes on a complicated basis, but only rarely, and accidentally, is there an overlap with scientific divisions. The main purpose of food in tropical communities is to satisfy hunger and to fill, if possible, to repletion.

As far as the young child is concerned, only too often the first foods given, apart from breast milk, consist of portions of the adult dietary, fed to the infant at the one or two daily meals. Health education should emphasize the young child's priority as far as protein foods are concerned, and recommend that, as far as practicable, he should have four meals a day comprising gradually increasing quantities of soft, easily masticated and digestible foods, possibly especially cooked for him.

### **Other local factors**

As noted earlier (p. 225), many factors in the local ecology and way of life have to be known and nutrition education adapted accordingly. Of paramount importance are the actual local methods of cooking and the

range of possibilities in simple home economics (e.g., costs of foods, pots likely to be available, fuel supplies, storage, etc.).

As protein is almost always the critical nutrient, it is valuable for health educators to have a "protein sources list" available for the region. Such a list should include the protein foods, both animal and vegetable, that are found in the area, whether cultivated, on sale in shops or available at child welfare centres, together with their seasonal variations in supply and cost and possibly some simple form of nutritional rating. Ideally, it should also include protein foods that may become available in the near future, and should preferably be revised at intervals, perhaps six-monthly or annually.

### **Best use of available protein**

In most tropical circumstances, animal protein cannot be found for the young, rapidly growing child, and means have to be considered of making best use of what is, in fact, available.

This may often be attempted by multimixes (see Annex 5)—in which the staple is prepared together with a local rich source of plant protein (usually a legume), small quantities of expensive animal protein, and, if feasible, dark green leafy vegetables.

An example of this among the Baganda of Uganda is the use of the traditional cooking in plantain leaf packets to prepare high-protein infant foods, so-called "ettu" pastes (Jelliffe, Morton & Nansubuga, 1962).

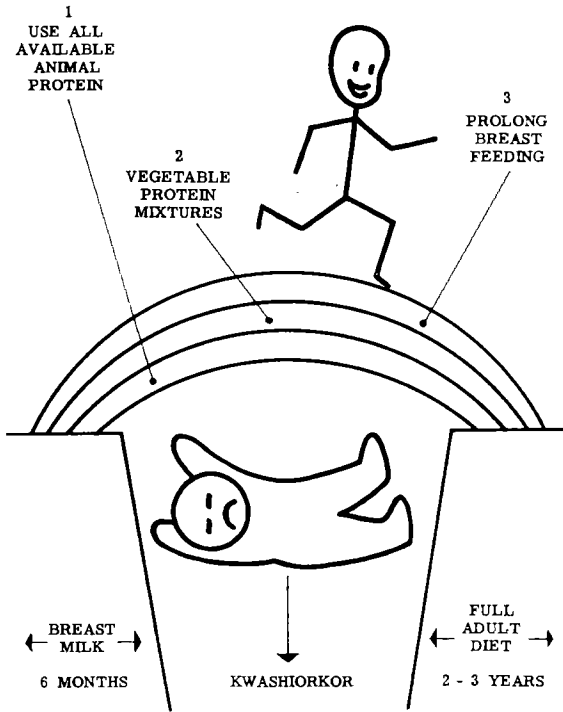
As protein is the critical need in the feeding of young children in most developing tropical regions, the concept of the "three-plank protein bridge" (Fig. 3) is useful for teaching students and junior medical personnel, although too sophisticated for the ordinary mother. It has the value of simplification and emphasizes the need for the use of *all protein sources*, represented pictorially by the three "planks" of prolonged breast feeding, and of animal and vegetable protein foods, if the child is to bridge the nutritional divide between the ages of six months and 2-3 years without succumbing to kwashiorkor.

### **Content of nutrition education**

The content of nutrition education concerning the transitional diet, based on the above considerations, can be summarized as follows :

*First food* : Usually the first dish introduced to the infant is, and should be, a gruel, a paste, or a soft portion of some local staple food (i.e., maize gruel, soft boiled rice, soft outer part of baked sweet potatoes, portion of steamed plantain, mashed ripe banana). This seems to be a common practice in many parts of the world, including Europe and North America. In

FIG. 3. THREE-PLANK PROTEIN BRIDGE



tropical regions, the first feed should preferably be in the form of a gruel or paste with more animal protein (such as milk or egg) admixed.

*Subsequent foods:* Later, a multimix infant protein food (Annex 5) should be aimed at, based on locally available and acceptable foods and adapted to the limited culinary possibilities. Small portions should be offered at first once daily, and then gradually increasing up to four times per day.

Most usually this type of dish requires special preparation, apart from the adult foods, so that the availability of cheap, lidded, small cooking pots at child welfare clinics may be an important aid to practical infant feeding.

Sometimes this may not be necessary, as with the Baganda who cook their staple food in plantain leaf packets in a large pot, to which a special packet for young children can easily be added (Annex 4).

*Adult diet*

In those communities that have neither the facilities nor incentive to prepare separate dishes for their young children, and in all tropical groups

later during the second semester of life, the softer, more protein-rich portions of the adult diet should be given to infants as the first food apart from breast milk.

Nutrition education must, therefore, be guided by a detailed knowledge of the indigenous meal pattern and intrafamilial food priorities. In Buganda, for example, it would be based on trying to ensure that the older infant received a share of the "enva" (groundnut and vegetable "sauce") and "bijanjalo" (beans, which could be mashed and have the skins removed), mixed with the universal and dominant, but protein-poor, staple "matoke" (steamed plantain).

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