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# **DIETARY MANAGEMENT OF YOUNG CHILDREN WITH ACUTE DIARRHOEA**

*A practical manual for  
district programme managers*



*D.B. Jelliffe & E.F.P. Jelliffe*



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# Preface

The widespread use of oral rehydration therapy has revolutionized the practical treatment of acute dehydrating diarrhoea in young children, and attention has turned increasingly to the need to prevent malnutrition following diarrhoea, particularly by means of early feeding. Recent scientific studies have shown that correct early feeding can improve the digestion of food and absorption of nutrients much more than was previously thought possible.<sup>1</sup>

This manual is principally concerned with how to incorporate modern scientific knowledge of digestion and absorption of foods during and after diarrhoea into traditional feeding practices. It is hoped that the manual will be useful to doctors, nutritionists, nurses and others who are responsible for managing health services and for supervising and training health workers concerned with preventing and treating undernutrition and infection in children.

In order to reconcile traditional practices with scientific knowledge, information is needed on local traditional beliefs and practices. This manual gives suggestions as to how this information can be collected by district programme managers.

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<sup>1</sup> Details of relevant WHO and other publications are given on page 28.



# 1. Introduction

## The combination of diarrhoea and malnutrition

Acute dehydrating diarrhoea is a common condition, which can occur at any age and which causes an estimated 4–5 million deaths each year throughout the world. Young children in the first two years of life are the most commonly and seriously affected particularly in developing countries, where diarrhoea is frequently associated with malnutrition. It is most likely to prove fatal in undernourished infants.

Diarrhoea itself frequently leads to severe malnutrition owing to low food intake resulting from poor appetite, vomiting, and the unnecessary stopping of feeding, as a means of treatment. The risk of malnutrition increases with repeated attacks of diarrhoea in already poorly nourished young children. Various cultural practices can sometimes play a part—for example, the use of enemas and purgatives, and the complete or partial restriction of the child's diet.

Conversely, malnutrition increases the severity of diarrhoea, and poor resistance to infections increases the likelihood of diarrhoea being prolonged, with further worsening of the child's nutritional state.

Where malnutrition and diarrhoea are combined, there are two groups at particular risk:

- infants who are not breast-fed;
- infants and children of weaning age, when foods other than breast milk are being introduced.

This is because these groups are often inadequately fed, their food may be contaminated, and they have not yet developed resistance to infectious organisms.

## Causes of malnutrition and diarrhoea

### Causes of malnutrition

Malnutrition in young children usually has several causes. These include an *inadequate diet*—related to poverty, lack of

appropriate foods, or cultural practices—and *infections*, of which diarrhoeal diseases are among the most important.

The commonest types of malnutrition in which diarrhoea plays an important part are protein-energy malnutrition (PEM)—including the two main severe forms, marasmus and kwashiorkor—and vitamin A deficiency (leading to xerophthalmia).

### Causes of diarrhoea

The most frequent cause of diarrhoea is *intestinal infection* which results from bacteria, viruses or parasites being swallowed by the child. These organisms can be transmitted via unclean food or water, dirty feeding utensils (especially feeding bottles), and dirty or unhygienic surroundings, including the infant's or the mother's fingers.

The age and nutritional status of the child and the type of infection can influence the nature of the illness, for example, as regards the speed of onset and severity of dehydration, and presence of fever or blood in the stools (dysentery). Specialist laboratories are not usually available for bacterial or viral investigations. Sometimes a particular infection may be suspected because of the symptoms produced, or because of knowledge of the common bacteria and viruses present in the area. The main consequences of intestinal infection are always frequent loose or watery stools (diarrhoea), loss of appetite with or without vomiting, and the risk of dehydration.

### Recent findings

#### Nutrition in young children

The nutritional needs of infants and young children are high, because they grow and develop very fast. However, their stomachs are small and frequent feeds must be given to meet their needs. Total calorie intake may be inadequate if: too few meals are given (the adult meal pattern is followed); dilute food preparations are used; and foods rich in energy, such as oils and fats, are too expensive for the family to afford. There is a need to ensure a sufficient intake of all nutrients,<sup>1</sup> particularly protein, carotene (for vitamin A) and iron.

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<sup>1</sup> *Nutrients*: substances in food that are used by the body for growth and health; they include carbohydrates, fats, protein, vitamins and minerals, such as iron. *Calories* in a food or diet refer to the energy provided. Calories come from fats, carbohydrates and proteins.



## Introduction

*Breast milk is important.* It should be the only (or main) source of food and water in early infancy (from birth to 4–6 months). It is also an important additional food during the weaning period (4–6 months to 2 years). Breast milk also helps to prevent diarrhoea because it is clean and contains substances that protect the infant against infection.



Fig. 1. Breast-feeding is clean and provides protection against diarrhoea—it should be continued during diarrhoea.

Mothers need enough food in pregnancy and while breast-feeding: (1) to ensure good nutrient stores in the newborn (adequate birth weight, sufficient liver stores of iron and vitamin A); (2) to ensure a good supply of nutrients for breast milk; and (3) to guard against increasing undernourishment with succeeding pregnancies.

## Digestion and absorption in diarrhoea

Digestion of foods and absorption of nutrients are maintained during diarrhoea. Both digestion and absorption, even of fats, are only slightly decreased, despite frequent watery stools. This appears to be partly due to the very high levels of digestive enzymes and the large area normally available for absorption in the small intestine. Feeding in diarrhoea is, therefore, beneficial and prevents malnutrition.

*Absorption of water and salt can be increased.* Glucose, or substances that are broken down into glucose in the intestines, such as starches or cane sugar (sucrose), increase the absorption of water and salt (sodium chloride). Therefore, dehydration can often be prevented if the child drinks a solution containing glucose and salt at regular intervals.<sup>1</sup>

*Starvation during treatment is dangerous,* as this makes the child's nutritional status worse. It can also damage the intestinal wall and impair the ability to produce enzymes. The worsened nutritional status and damaged intestine delay recovery and the regaining of normal weight, increase the chance of severe malnutrition, and may sometimes lead to other ill effects, such as long-lasting poor food absorption and/or chronic diarrhoea.

*The number or volume of stools in acute diarrhoea can be decreased* by feeding certain foods, especially some rice preparations (which release glucose slowly along the intestine) and breast milk.

*Rehydration and early feeding should be combined.* Rehydration, including oral rehydration therapy, supplies water, sodium, potassium and chloride which are nutrients, although often not recognized as such. Rehydration also produces a return of appetite. Early feeding provides calories, protein, and other nutrients, thus preventing malnutrition, prevents damage to the intestinal wall, and may help to prevent chronic diarrhoea. Rehydration and early feeding should be combined in the management of acute diarrhoea. Starch-based home-made solutions, such as those made with cooked rice water, are well digested during acute diarrhoea, and may well decrease the number and volume of stools.

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<sup>1</sup> For more information, see: *The treatment and prevention of acute diarrhoea*. 2nd ed. Geneva, World Health Organization, 1989.

### The importance of traditional beliefs, attitudes and practices

Traditional beliefs, attitudes, and practices may influence the incidence and severity of malnutrition and diarrhoea. For example, customs in breast-feeding vary as to whether colostrum<sup>1</sup> is used, how long breast-feeding is continued, and the reasons for and methods of stopping. Similarly, with artificial feeding,<sup>2</sup> there are variations in the methods employed, the foods used (animal milk, infant formula), and the methods of preparation (dilution, cleanliness). Weaning practices also vary as to the age at which semi-solid and solid foods are introduced, their preparation and consistency, and the number of feeds given per day. There may also be traditional beliefs about the dietary causes of diarrhoea, and accepted practices concerning the feeding or treatment of children with diarrhoea, all of which may have an influence on the home management of these children.

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<sup>1</sup> *Colostrum*: the first yellowish secretion from the breast, which is particularly rich in substances that protect against intestinal infections.

<sup>2</sup> *Artificial feeding*: feeding of young infants with liquid foods other than breast milk, often animal milk or commercial infant formula given by bottle.

## 2. Selection of foods during and after diarrhoea

### Basic considerations in feeding young children

The following factors influence the choice of foods to be recommended for young children up to two years of age.

*The age of the child.* Young infants (0 to 4–6 months) need milk (preferably exclusive breast-feeding). Older infants and young children (6 months to 2 years) need semi-solid food and continuing breast-feeding.

*Availability of foods.* This is frequently related to seasonal supply. Home-grown foods may be available. The ability to purchase foods will depend on supply and costs.

*Methods of food preparation.* The type of kitchen, fuel, utensils and water supply, and the time available to the mother, will also influence the choice of food.

*Nutritional value of food.* While the food given should contain all nutrients, special attention should be given to high-calorie (high-energy) foods. Emphasis should be placed on foods containing nutrients known to be in limited supply locally, such as vitamin A in some areas.

*Stage of diarrhoea.* Choice of foods will depend on the stage of diarrhoea the child is in. Four stages can be recognized: before dehydration; with dehydration; immediately after rehydration; and convalescence (recovery) (see p. 23 for more details).

*Cultural beliefs and practices.* Some foods may be believed to be appropriate, while others are considered harmful, especially during diarrhoea.

The desired consistency of foods is as follows:

- liquid for young infants;
- semi-solid or softened solid (usually the staple<sup>1</sup> preparation

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<sup>1</sup> *Staple*: the main food of the community as regards provision of calories and many other nutrients (for example, rice, wheat, yam, potato).

## **Selection of foods during and after diarrhoea**

to start with) for older infants and young children during the early weaning period;

- increasing thickness, with added oil or sugar, as weaning continues (to meet high energy needs but keeping the volume small enough for the small stomachs of young children).

Meals should be given more frequently (4–6 times a day) than is usual for adults.

Cooked foods should be freshly prepared or well reheated. Clean water should be used. Frequent hand-washing is important.

## **Relevant traditional beliefs, attitudes and practices**

All cultures have systems of beliefs and practices concerning various aspects of life, including the causes and management of illness, such as diarrhoea, and the classification of foods, for example those thought to be useful in preventing or treating diarrhoea. There is much variation in different areas, even within a country. For instance, some communities may believe that certain fruits and vegetables or particular animal products should not be given to a child who has diarrhoea, while other communities may believe that the same products are beneficial during diarrhoea.

It is important to determine the local traditional practices regarding feeding during diarrhoea, since it will then be possible to:

- encourage useful practices;
- discourage harmful practices;
- understand how local beliefs and practices may prevent or make more difficult the acceptance of medical advice, including advice on oral rehydration and feeding;
- determine how a combination of traditional practices and medical advice can be made practicable (“cultural integration”);
- gain new ideas for treatment, for example, the rice preparations used traditionally in Asian and other cultures;
- develop educational programmes in the context of the local culture.

## **Classification of foods**

Foods may be classified in different ways in different cultures, as the following examples show:

*Food and non-food.* Certain edible items are never eaten in certain communities and are not considered as food (for instance, dogs in Europe, or pork in Muslim communities).

*Food appropriate or inappropriate for different groups.* Certain foods may be considered as particularly suitable or unsuitable for young children, pregnant women, the elderly, etc. For example, in parts of West Africa, eggs are considered inappropriate for young children.

*Cultural “super-food”.* This is usually a staple food which has a deep historical and often religious significance, and is the main source of energy and nutrients; examples are rice in parts of Asia, maize (corn) in Central America, and yams in parts of Africa.

*Special occasion foods.* These are usually animal products, such as meat, fish or milk dishes; they are often unlikely to be given to children.

*Foods related to ideas concerning physiology.* Some cultures consider the body to consist of several elements (humours). In health, these are in balance; during illness, one or more may be in excess. For example, the body may be considered to be made up of “hot” and “cold” elements. Diarrhoea may be considered a “hot” illness—that is with “hot” elements predominant—and so, foods that are classified as “hot” are avoided and those that are considered “cold” are given.

*Beliefs concerning the causes of diarrhoea.* These vary widely in different cultures. Diarrhoea may be considered as a “normal” occurrence in young children or as the direct result of eating certain foods, perhaps because of the special properties of those foods (for example, “hot” or “cold” foods as described above in relation to humours). Other supposed causes include: magic, for example, the effects of the “evil eye” or bewitchment; special cultural conditions;<sup>1</sup> teething; and worms.

*Practices in the management of diarrhoea.* These too vary widely and include:

- complete food restriction for a variable period;
- partial food restriction with avoidance or dilution of certain foods (especially animal milk);

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<sup>1</sup> For example, “fallen fontanelle” (*caída de la mollera*) is believed to be a cause of diarrhoea in some countries in South America. In fact, it is a consequence of the dehydration caused by diarrhoea.

### **Selection of foods during and after diarrhoea**

- continuation, stopping or restriction of breast-feeding;
- feeding of certain foods, giving food at particular times, giving food of particular composition and quantity;
- ingestion of herbal drinks and plant infusions;
- other treatment including purgatives, emetics<sup>1</sup> and measures to deal with magical causes.

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<sup>1</sup> *Emetics*: substances given to produce vomiting.

### 3. Collecting information in communities

#### Information needed

It is important to collect as much relevant information as possible regarding the causes of malnutrition and diarrhoea, the ways young children with diarrhoea are fed and traditional beliefs, attitudes and practices in these areas. The most important questions that need to be answered are outlined below. For each community, additional special information will need to be collected, depending on the particular situation.

Which is the age group most commonly affected by diarrhoea?

Young infants (0 to 4–6 months)

Older infants and young children (4–6 months to 2 years)

What is the usual type of milk feeding for young children from birth to 2 years of age?

Breast-feeding

Artificial feeding

What are the practices in breast-feeding?

Is colostrum given?

Are galactagogues<sup>1</sup> used?

When is breast-feeding stopped?

Why is it stopped?

How is it stopped?

What are the practices in artificial feeding?

What foods are used? (e.g., animal milk, infant formula)

How is the food prepared? (Is dilution involved? Are the rules of hygiene observed?)

What feeding utensils are used? (e.g., bottle, cup and spoon)

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<sup>1</sup> *Galactagogues*: herbal medicines, foods or practices believed to increase production and flow of breast milk.



What are the practices in weaning (introduction of semi-solid and solid foods)?

At what age are weaning foods introduced?

What foods are used?

How are they prepared?

What are the main sources of drinking-water?

What cooking facilities are available in typical kitchens? (e.g., utensils, type of stove or other means of cooking, fuel, ways of storing cooked food)

What are the main ways in which infection may be introduced? (e.g., unclean water, cold cooked food, lack of hand-washing)

What foods are available?

Are these available foods:

common?

economical?

easily digestible?

culturally acceptable?

Do the available foods contain the main nutrients?<sup>1</sup>

What do people believe about foods and diarrhoea?

How are foods classified locally?

Which foods are believed to cause diarrhoea and why?

What other causes of diarrhoea are believed to exist?

What are the main food habits during diarrhoea?

Is food restriction practised?

If so, is it complete or partial and for how long is it continued?

Is breast-feeding continued, stopped, or given less frequently?

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<sup>1</sup> See Table 2 on page 22 for lists of foods rich in certain nutrients.