

THE MANAGEMENT OF DIARRHOEA AND USE OF ORAL REHYDRATION THERAPY

Second Edition

A Joint WHO/UNICEF Statement



WHO/UNICEF



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WORLD HEALTH ORGANIZATION

Geneva

1985

First edition (unpublished), 1983
Second edition, 1985

ISBN 92 4 156086 X

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PRINTED IN SWITZERLAND

85/6503 — Gloor-Luder SA — 20000

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"The discovery that sodium transport and glucose transport are coupled in the small intestine so that glucose accelerates absorption of solute and water was potentially the most important medical advance this century" (Lancet, 1978, ii, 300).

DEFINITIONS

Dehydration. Loss of water and dissolved salts from the body, occurring, for instance, as a result of diarrhoea.

Rehydration. The correction of dehydration.

Oral rehydration therapy (ORT). The administration of fluid by mouth to prevent or correct the dehydration that is a consequence of diarrhoea.

Oral rehydration salts (ORS). Specifically, the standard WHO/UNICEF recommended formula, which consists of four constituents:

1. Sodium chloride 3.5 grams
2. Trisodium citrate, dihydrate 2.9 grams

or

Sodium hydrogen carbonate
(Sodium bicarbonate) 2.5 grams

3. Potassium chloride 1.5 grams
4. Glucose 20.0 grams

to be dissolved in one litre of clean
drinking water

ORS is generally provided pre-packaged in a dry form to be reconstituted when required.

INTRODUCTION

In 1980, an estimated five million children under 5 years of age - about 10 every minute - died as a consequence of diarrhoeal disease. These deaths were an outcome of the some 1 000 million episodes that occurred in the developing countries (excluding China) among the 338 million children in this age group and were undoubtedly more frequent in poorer families.

An estimated 60-70% of diarrhoeal deaths are caused by dehydration. Oral rehydration therapy (ORT) can prevent and correct this dehydration and thus prevent many of these diarrhoea-associated deaths. This technological breakthrough offers important new possibilities for reducing the number of deaths in children because it can be used throughout the health care system and can even be administered in the home by family members.

ORT can be provided in the form of prepackaged salts or as home-prepared solutions; both have important roles to play in the management of diarrhoea. The present annual supply of ORS packets (about 200 million) is only enough to treat some 10% of all childhood diarrhoeal episodes. There is an urgent need to accelerate the production of ORS and to disseminate more information about the early treatment of diarrhoea in the home.

Diarrhoea is also a major factor in the causation or aggravation of malnutrition. This is because the diarrhoea patient loses his appetite and is unable to absorb food properly, and because it is a common practice to withhold fluids and food (including breast-milk) from him. Such malnutrition is itself a contributing cause to the high number of deaths associated with diarrhoea in childhood. Thus, continued feeding, both during and after a diarrhoea episode, is an important part of the proper management of diarrhoea, complementing ORT.

ORT is a simple, inexpensive, and effective therapy; ensuring that it is widely available and widely used is a major public health challenge. WHO and UNICEF, as well as numerous international, bilateral, and voluntary agencies, are now collaborating with many countries in establishing national primary health care services which include diarrhoeal disease control programmes with ORT as their cornerstone. As more and more experience is gained with ORT, the best types of solution to use in different situations are becoming clearer.

This statement presents WHO's and UNICEF's joint views on ORT in the light of experience to date. It should be borne in mind that it has been written at a time when new scientific knowledge and practical experience are being acquired at a rapid rate. The paper deals in particular with scientific, programmatic, and operational issues in relation to ORT which are important in the development and strengthening of national diarrhoeal disease control programmes. It is not intended as operational guidelines for the implementation of these programmes; such guidelines would need to address many other issues, such as the provision of information to a wide range of audiences, the training of health and other workers at various levels, the nutritional aspects of diarrhoea management and prevention, and the use of water supply and sanitation facilities and good hygiene practices.

This statement views ORT in the context of wider national diarrhoeal disease control programmes, which are themselves an integral component of primary health care and need to be linked with other essential elements such as immunization and other maternal and child care activities, including nutrition and birth spacing, and the provision of essential drugs. These activities have in common the need to reach the family and strengthen community responsibility, and

require supporting referral and other services. Making ORT, along with these other essential primary health care interventions, accessible to all families requires managerial, organizational, and financial support. Because diarrhoea is so frequent, the implementation of ORT delivery services offers an excellent entry point for the strengthening of primary health care.

THE SCIENTIFIC BASIS OF ORAL REHYDRATION THERAPY

Principles of therapy

A person with acute diarrhoea¹ begins to lose essential water and salts from the onset of illness. Unless these are adequately replaced, dehydration will develop. Prevention of dehydration is therefore the first appropriate response to diarrhoea. Once a person is dehydrated² he needs to be treated in two phases:

- (1) the rehydration phase - replacement of the accumulated deficit due to fluid and salt losses in stools and vomitus.
- (2) the maintenance phase - replacement of ongoing abnormal losses due to continuing diarrhoea and vomiting, and replacement of normal losses due to respiration, sweating, and urination, which are particularly high in infants.

Fluid replacement by injection into the veins (intravenous therapy) was first used for the treatment of dehydration from diarrhoea in the mid-nineteenth century. This technique, however, requires sophisticated equipment, is costly, and

¹"Acute" diarrhoea is an attack of sudden onset, which usually lasts 3 to 7 days but may last for up to 10 to 14 days.

²The signs and symptoms that allow one to assess the degree of dehydration and fluid deficit are described in Treatment and prevention of acute diarrhoea. Guidelines for the trainers of health workers. Geneva, World Health Organization, 1985.

calls for specially trained workers. The concept of replacing fluid losses by mouth began to receive attention in the 1960s, when a major breakthrough was made with the successful use of an oral solution containing glucose and essential salts to treat cholera cases with very severe diarrhoea. The scientific evidence to explain the success of ORT included the demonstration that the presence of the sugar in ORT solution (glucose) made it easier for the intestine to absorb water and sodium, a process that remained unimpaired during acute diarrhoea.

Some 25 pathogenic bacteria, viruses, and parasites have so far been identified as causes of diarrhoea. The mechanisms by which they produce diarrhoea are varied: some cause little or no change in the lining of the walls of the intestine, while others cause considerable damage to some areas of the wall. However, it is now firmly established that, regardless of the causative agent or the age of the patient, an ORT solution containing glucose and essential salts is adequately absorbed and replaces both previous and continuing fluid and salt losses. ORT does not stop the diarrhoea, but the diarrhoea usually continues for only a limited time.

Composition and use of ORT

A rational response to diarrhoea is as follows:

- (a) To prevent dehydration using solutions prepared from ingredients commonly found in the home ("home remedies"); this should be the first response.
- (b) To correct dehydration using a balanced, more complete, glucose-salt solution; ORS is the universal solution of this type recommended by WHO and UNICEF;

(c) To correct severe dehydration (usually defined as loss of 10% or more of body weight) by intravenous therapy; this method should also be used in patients who are unconscious or unable to drink.

Prevention of dehydration. Intensive promotion by health and other workers of the use of home remedies for the early treatment of diarrhoea can be expected to result in fewer cases developing dehydration during diarrhoea. The use of such remedies should thus decrease the number of visits to health facilities and community health workers and the need for ORS packets. Further studies are needed to clarify the extent of these benefits.

There are two groups of home remedies:

(a) "Household food" solutions - fluids or liquids that are normally available in the home and are appropriate for the early home treatment of acute diarrhoea. Such solutions are often prepared from boiled water, thus ensuring safety for drinking, and contain sodium, sometimes potassium, and a source of glucose - such as starches - that can facilitate the absorption of salts in the intestine; they also may contain other sources of energy. Two examples are rice water, often found in homes in Asia, and various soups - e.g., carrot soup, often found in homes in North Africa; other less robust examples include juices, coconut water, and weak tea. There is a need to identify other appropriate "household food" fluids in different regions of the world.

(b) "Salt and sugar" solutions - consisting of white sugar (sucrose) and cooking salt (sodium chloride). In a few countries molasses or unrefined sugar is used in place of white sugar; it has the advantage of containing also potassium chloride and sodium bicarbonate. More than 20 different recipes

have so far been suggested for these solutions, and methods for their preparation include hand measures (e.g., "pinch and scoop"), household spoons (metallic or home-made), and specially manufactured double-ended plastic measuring spoons. Each of these methods has advantages and disadvantages, but the proper use of all of them requires considerable training of health workers and mothers and the availability of sugar and salt, which may not be affordable in the poorest homes. Costs, seasonal shortages, and varying quality of sugar or salt have made it difficult to promote and implement the use of "salt and sugar" solutions in the home in some areas; in such cases the use of "household food" solutions should be considered.

The comparative safety and efficacy of "household food" and "salt and sugar" solutions in the prevention of dehydration are important subjects that require further intensive study.

As these home remedies may have a varied composition and usually lack or have insufficient amounts of the ingredients in ORS (particularly potassium and citrate or bicarbonate - see below), they are not ideal for the treatment of dehydration at any age. However, they certainly should be used at the onset of diarrhoea to prevent dehydration and in situations where the complete formula is needed but is not available.

The proper management of diarrhoea in the home also includes, along with the administration of ORT, the promotion of appropriate child feeding, both during and after a diarrhoea episode, to prevent excessive and uncompensated loss of nutrients. In many societies the parent's remedial response to diarrhoea is to withhold food and fluid, including breast-milk, in the mistaken belief that this will stop the diarrhoea and ease the strain on the intestine. This "treatment" only adds to the dehydration and malnutrition caused by the illness.

Treatment of dehydration. The treatment of dehydration requires the use of a balanced glucose-salt solution. Much experience has been gained in the use of ORS for the treatment of dehydration in hospitals, clinics, and homes. This solution (see definitions for composition), which WHO and UNICEF began to recommend and make available in 1971, was selected because it is universal - i.e., it can be used to treat dehydration from diarrhoea of any cause, including cholera, in all age groups. The adoption of a universal solution simplifies the production and distribution of the solution (or its ingredients) as well as the training of health care personnel at all levels. This increases the availability and assures safer use of ORT. From the outset, ORS was envisaged for use both to correct dehydration (the rehydration phase) and to maintain hydration during continuing diarrhoea (the maintenance phase). Extensive experience has repeatedly demonstrated the safety and efficacy of ORS as a universal ORT solution when used correctly.

Some doctors have expressed concern about the sodium concentration of the ORS solution because it is substantially higher than that of some commercial solutions marketed primarily in the industrialized countries. Many of these commercial solutions are, however, recommended for maintenance phase therapy only, and not for rehydration. Experience has shown that the use of ORS very rarely causes a blood level of sodium above normal and that even when it does, it is usually very brief and of no clinical importance. Even in the newborn, ORS has been proved safe provided that additional fluid is given during the maintenance phase of treatment. Thus, young infants receiving ORS solution should be fed breast-milk, juices, weak tea, or plain water. While ORS with a substantially lower sodium concentration can be used for treating most cases of diarrhoea in infants, it is not suitable for use as