

Dialogue on Diarrhoea



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Climate, customs and diarrhoea

Weather patterns have long been linked in people's minds with patterns of disease. 'Winter vomiting' and 'summer diarrhoea' were recognised as recurrent child health dangers many years before scientists were in a position to explain why and how these infections came about.

Problems of seasonality

In many parts of the world, people depend for their survival on rainfall which only occurs at certain times. During the 'hungry season', when stores are running out, women need to work extra hard in the fields to make sure the new crops benefit from precious rains. Food supplies for the future are all important. In consequence, children and babies suffer an increased risk of malnutrition and disease. Extremes of drought and of flooding may make matters worse. Seasonal problems in The Gambia and in Bangladesh are described on page three.

Value of behaviour change

People may not be able to change their weather but they can change their ways. Even small alterations in the behaviour of mothers when handling their children will bring about noticeable improvements (see pages four and five). The vital ORT message about how to prevent and treat dangerous dehydration due to diarrhoea needs to be accompanied by appropriate family hygiene education, based on local customs and circumstances (see page 8).

KME and WAMC



Food supplies for the future — weeding maize in Eritrea.

Photo courtesy of the Hutchison Library

In this issue . . .

- Nasogastric feeding and rehydration
- The influence of climate, environment and behaviour on diarrhoea

AHRTAG

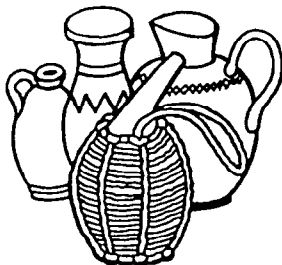
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Water handling and cholera

The majority of those infected with the cholera vibrio are not seriously ill, and many are symptomless carriers. The germ spreads rapidly in overcrowded or slum conditions. Person-to-person transmission through contamination of domestic food and water seems to be important. A study carried out in Calcutta, India, found that carriers of *V. cholerae* were contaminating domestic water with their dirty fingers, where water was stored in wide-mouthed vessels such as buckets.

Two methods were used to see if transmission of infection could be reduced: chlorination of stored water, and the use of a narrow-necked earthenware vessel (called a sorai) for water storage. These were tried out in similar population groups in east Calcutta. The results showed that transmission rates of cholera were significantly reduced in both the group chlorinating their water (by 57.8 per cent), and in the group using a sorai to store their water (by 74.6 per cent). A

third control group, who used neither method, showed no reduction in transmission. These results also suggested that exposure to infection outside the home was relatively less important than transmission within the home. The sorai has the additional advantage of



being cheap and also acceptable to the local community. Its narrow neck prevents the introduction of infected hands and germs into the stored water.

Bulletin of the World Health Organization, 64(1): 127-131, 1986. Studies on interventions to prevent El Tor cholera transmission in urban slums. B C Deb et al. Reprints of this article are available from Dr Deb at the National Institute of Cholera and Enteric Diseases, P-33, C.I.T. Road, Scheme XM, Beliaghata, Calcutta, 700 010, India.

Money for research

Funds will be available from WHO in 1987 to support biomedical and epidemiological research in diarrhoeal disease control in the following areas: epidemiology and disease prevention; immunology, microbiology, and vaccine development; case management. Applicants wishing to apply for support should send 1-2 pages outlining the proposed project to the *Research Co-ordinator, CDD Programme, 1211 Geneva 27, Switzerland*. Preference will be given to projects of the most direct relevance to the problem of childhood diarrhoea in developing countries.

In addition, support is available for health services research, both operational and applied research linked to national CDD activities. Those interested in this type of study should write to their WHO regional office.

Coconut water for rehydration?

Is water from unripe coconuts suitable for rehydration of children with acute diarrhoea? In Tanzania, it is a popular

drink and the Tanzanian National Diarrhoeal Diseases Control Campaign has recently analysed it to see if it could be safely recommended for rehydration. Compared to the WHO-recommended ORS formula, it is low in sodium, chloride and bicarbonate but also contains a higher concentration of glucose, potassium, magnesium and calcium. The amounts vary depending on whether the coconuts have been harvested from coastal or inland areas.

Coconut water is therefore not recommended as an alternative to ORS for rehydration. Mothers in Tanzania have proved that they can, with proper teaching, prepare a safe and effective salt and sugar solution at home for early treatment of diarrhoea in children.* Porridge made from maize or millet flour is the main weaning diet for most children, and, like rice-ORS in Bangladesh, may form the basis for a future cereal-based ORS in Tanzania. **Dr Abel Msengi, Department of Paediatrics and Child Health, Faculty of Medicine, P.O. Box 65001, Dar-es-Salaam, Tanzania.**

***Editors' note:** Where sugar-salt solution cannot be easily made,

coconut water may be a useful, clean drink in the very early stages of diarrhoea, before any dehydration occurs.

Further reading

I. Msengi A E et al, 1985. The biochemistry of water from unripe coconuts obtained from two localities in Tanzania. E Afr. Med J. 62 (10); 725.

ORS production

The revised WHO manual *ORAL REHYDRATION SALTS — Planning, establishment and operation of production facilities*, mentioned in DD 23, is now available in French. A Spanish edition will be available soon. Readers should write to *Mr Hans Faust, CDD Programme, WHO, 1211 Geneva 27, Switzerland*.

Many countries have now set up facilities for local production of ORS. For example, in Nigeria, WHO and UNICEF have provided technical expertise to a private company, ASTRA-AREWA, to set up production of oral rehydration salts packets. The *ORHESAL* packets have been designed to make up 600 ml of oral rehydration solution, using the standard sized containers widely available in Nigeria: a 600 ml beer bottle or two 300 ml mineral bottles. Stickers, posters and prescription pads for doctors promote the use of ORS for dehydration. The current annual production of 2 million packets of *ORHESAL* is expected to increase to 6 million in 1987.

Breastfeeding — a new book

Breastfeeding for Modern Mothers is a practical, helpful paperback by Dr Clair Isbister. It is well illustrated and costs \$5.95 Australian from *Hodder and Stoughton (Australia) Pty Limited, 2, Apollo Place, Lane Cove, NSW 2066, Australia*.

Erratum

Maureen Minchin tells us that *Breastfeeding Matters* is available from: *5 Meredith Court, Alfredton, Victoria 3350, Australia*, not the address given in DD 24. US \$, sterling and other currencies are acceptable as well as Australian \$. The price of \$12 Australian can be reduced for readers unable to pay the full cost. The author is willing to exchange the book for other publications.

The Gambia and Bangladesh

Seasonal variations in rainfall and temperature often bring changes in disease patterns, especially diarrhoea. Very little is known about why this happens and patterns may change from one year to the next. Mike Rowland discusses seasonality and diarrhoea in The Gambia and Bangladesh.

The Gambia and Bangladesh share some common characteristics in climate including a cool dry winter of three months followed by a hot dry spring, and hot wet summers of five to seven months in length. The main difference is in the amount of rainfall. While The Gambia may have 20-30 inches of rain per year, Bangladesh usually has up to four or five times this amount. Drought is a recurring problem in The Gambia, floods in Bangladesh. These climatic factors have an important impact on the incidence of diarrhoeal disease. A study in The Gambia found there was a close link between the time of the annual peak in diarrhoea in young children and the summer rains. A second peak of diarrhoea in the winter was also significant and was shown to coincide with a short period of intense transmission of rotavirus.

The agents

Of the enteric infections of childhood, the enterotoxigenic *Escherichia coli* (ETEC), that is, those producing heat-stable toxin (ST), were found to be the most important aetiological agents of diarrhoea in both countries, with a peak during the rains. ETEC are thought to be transmitted mainly by food and water. In rural Gambia, water is obtained almost exclusively from surface wells, 15 to 20 metres deep. It was found that, although this water was faecally contaminated throughout the year, levels of contamination increased by up to one hundred times within one or two days of the start of the rains because excreta is washed into the wells. It was also clear that contaminated water and domestic environment contribute to contamination of children's food. The high level of contamination of food during the summer coincided with the time of high diarrhoea prevalence. In Bangladesh it was shown that the incidence of ETEC diarrhoea in infants was positively correlated with the



Bangladesh: severe seasonal flooding (see page 4)

UNICEF photo by Hassan

frequency of consumption of weaning foods contaminated with faecal coliforms. The seasonal peak of ETEC diarrhoea coincided with the time when food was most contaminated due to higher bacterial growth caused by high temperatures.

Cholera is endemic in many areas of Bangladesh but not in The Gambia. Though similar to some other diarrhoeal diseases in showing a rainy season peak, the timing of peaks of cholera incidence can and has changed from year to year in Bangladesh. The reason for this and the variable occurrence of a less marked pre-rains peak of cholera is not known. A similar pattern, with twice yearly peaks in incidence occurs with shigellosis, an important disease in both countries, particularly Bangladesh where the more virulent species predominate and are becoming rapidly resistant to routinely used antimicrobials. It has been suggested that diarrhoea epidemics occurring in the post-rains period might be due to increasing concentrations of faecal organisms in dwindling water supplies, but a study of village wells in The Gambia produced no evidence to support this.

Social and economic factors

In both Bangladesh and The Gambia womens' work is important in the rural farming economy. During the main farming season, therefore, busy

mothers have less time for breastfeeding. In Bangladesh, for example, suckling time has been shown to be less, and in The Gambia intervals between feeds are longer; children might even be prematurely weaned. Smaller amounts of breastmilk were consumed by breastfeeding infants at this time of year coinciding with poorer maternal nutritional status. This was also the season of poorest nutritional status in children, leading to increased duration,

and perhaps severity, of diarrhoea.

Personal hygiene, attitudes to breastfeeding, and weaning practices are important factors in diarrhoeal diseases all year round, whatever the season. To be more effective, health education messages could be varied according to the season, as different problems occur at various times of the year. In a recent Mass Media for Infant Health Campaign in The Gambia, the emphasis changed from nutritional to rehydration strategies at different times. Changing the emphasis could help to offset the impact of the seasonal factors which cause very high death rates from diarrhoea at certain times of the year.

Dr M.G.M. Rowland, Associate Director, ICDDR,B, GPO Box 128, Dhaka 2, Bangladesh.

Further reading:

Seasonal Dimensions to Rural Poverty, 1981. Chambers R, Longhurst R, Pacey A, eds. London: Frances Pinter (Publishers) Ltd.

Diarrhoea and Malnutrition: Interactions, Mechanisms and Interventions, 1982. Chen LC, Scrimshaw NS, eds. New York: Plenum Publishing Corporation.

Mass Media and Health Practices. Field Notes, 1984. Offices of Education and Health, Academy for Educational Development, Washington DC.

A vulnerable age

A study in Bangladesh discovered high rates of diarrhoea in crawling infants. The results and a range of interventions to help protect this age group are described in this article.

Diarrhoea occurs most often in Bangladesh in children between the ages of six and eleven months — the time when they start to crawl. In rural areas, crawling infants come into contact with chicken faeces and other animal dung on the ground inside and outside the home. The ground is also contaminated with the baby's own faeces and those of its brothers and sisters. Many infants put earth and faeces in their mouths and most suck their fingers which have touched and will pass on germs and faecal matter.

Infants in two villages near Dhaka were found to have high rates of illness and malnutrition. Those whose families were poor and did not own land were more severely affected — they had worse malnutrition and a higher incidence of diarrhoea. One village suffered from severe seasonal flooding, contaminating the environment and probably contributing to a very high diarrhoea rate.

Crawling behaviour and environment

In both villages most infants were put down to play for most of the day. In one village nearly half the infants were down all day, and a further 23 per cent every morning and afternoon. In the other, nearly 90 per cent were put down to play either all day or every morning and afternoon. Fewer than 2 per cent of infants in both villages were put down to play on the ground less than once a day. Most mothers said they rarely or never put a mat or jute sack down for their baby to lie on or crawl around on, and only a third of mothers were able to watch their babies continuously.

The ground on which these infants were crawling was found to be highly contaminated. Some sort of animal dung or faeces (usually chicken faeces) were found in 91 per cent of play areas in one village, and in 70 per cent of play areas in the other. Half the mothers had also seen their babies eating or touching faeces during the previous two weeks.

Traditional beliefs

It was discovered that while most mothers knew that faeces were dirty, they were not aware that faeces can cause disease. Hence they do not see the need to keep their homes and yards clear of faeces and do not know that they are exposing their children to germs. In fact most mothers bathed their babies every day to keep them clean. Poor traditional weaning practices and poor food hygiene also contributed to high attack rates of diarrhoea.

Interventions and health education

Basic messages and a range of interventions to improve traditional hygiene and child care practices were developed. Firstly, mothers needed to understand about germs, and the fact that these cause diseases such as diarrhoea, even though they cannot be seen. Local materials and ideas were used to demonstrate this to a mainly illiterate audience. Mothers already knew that fishermen use alum crystals to purify river water for drinking. Alum crystals were mixed with a glass of pond or river water that looked clean, but was not free from germs. The dark coloured sediment that collected at the bottom of the glass was explained to mothers as the bodies of tiny dead germs 'smaller than chicken lice' killed by the alum. To show that germs stay on the hands and are passed on after washing with just water, the mothers' hands were rubbed with red magenta make-up powder. Even after washing, mothers could see that they still left a red handprint on their babies or any household objects they touched.

Interventions to keep the baby from touching and eating faeces:

- Sweeping the baby's play area four times a day. All households possessed a broom made of stiff straw. Messages emphasised that brooms keep away germs and keep homes beautiful.
- Using a dirt disposer, like a trowel, or a farming hoe to remove faeces from

the ground. The dirt disposer was adapted from the hoe, made in the local bazaar and was popular with villagers because they could remove faeces without soiling their hands.

- Using a covered pit or latrine to dispose of faeces.
- Using a special place for disposing of garbage.
- Keeping crawling infants in a playpen instead of letting them play freely on the ground. Inexpensive locally made playpens of bamboo, jute and nylon kept the infants off the ground, and could be easily cleaned. Mothers liked the playpens because they could get on with their work and know their babies were safe.

Interventions to reduce transmission of germs:

- Washing hands with ashes or soap after defaecating (most households could not afford soap but ashes were available and acceptable).
- Handling the water carrier (used for washing after defaecation) with the right hand so that germs from the left hand do not contaminate the carrier for other users.
- Cutting the fingernails of all family members with a blade every week. (This helps to prevent transmission of germs to the mouth as it is customary in Bangladesh to eat with the hands.)
- Washing babies in a particular place after defaecation so that germ-contaminated water does not spread everywhere.

Interventions to reduce transmission of germs during weaning:

- Keeping food covered to protect from flies, dirt, chickens and dogs.
- Storing clean plates and pots and pans upside down or covering them.
- Washing hands and plates with tubewell water before eating.
- Using only tubewell water for drinking and for mixing food for the baby.

Taken from Sanitary Conditions of Crawling Infants in Rural Bangladesh by Marian F. Zeitlin, Georgia Guldan, Robert E. Klein and Nasar Ahmad, with the collaboration of Kamal Ahmad, and; Messages and Interventions for Social Marketing from A Village Trial Laboratory for Developing Diarrhoeal Disease Control Behaviours by Marian F. Zeitlin, Azmat Ara Ahmad, Nasar Ahmad, Georgia Guldan and Suaib Ahmed.

Soiled saris

Clothes can act as carriers of disease. Bonita Stanton and John Clemens look at how the sari may spread diarrhoeal infections.

Saris are worn by most women in India, Pakistan and Bangladesh and fairly widely throughout the rest of Asia. The authors noticed that Bangladeshi women in slum areas of Dhaka often used their saris for many household tasks as well as for clothing purposes. A study was carried out to see whether this behaviour was common and if it affected the rates of childhood diarrhoea.

Collecting data

Information was obtained from 247 families in Dhaka slum areas about the sex and age of children under six; family income; maternal education;

and attitudes of mothers towards 'misuse' of saris. Mothers were observed at home to learn about their usual hygienic practices, including what they did with their saris. Information was also collected on the incidence of diarrhoea among their children.

Contamination of saris

There was no practice that all mothers believed to be a wrong use of the sari, including wiping a child's bottom after it had defaecated. Very few suggested that a particular use 'can spread disease'. Misuse of saris was seen as wrong for other reasons, such as 'it will make the sari wet'.



Photo by William Cutting

Dirty clothes can pass on disease.

Observation of mothers showed that, in a third of homes, saris were used to wipe both clean and dirty children, to wipe eyes (even where these were infected), and to blow noses, including their own. In over half the homes, mothers wiped dirty hands on their saris. Children whose mothers 'misused' their saris in these ways more frequently than the average tended to have diarrhoea more often. The level of maternal education and family income did not appear to influence hygienic or unhygienic use of saris.

Altering behaviour

Discussion with mothers clearly showed that the women were not aware they were contaminating their saris, or that the soiled saris could pass on diseases like diarrhoea to their children. It is important to convince them of this danger, because they can easily change their own behaviour and see results for themselves, unlike many other hygiene interventions. Success in preventing misuse of saris could serve as a good indicator to health workers of the effectiveness of an educational message in altering behaviour in a sanitation programme. Also, as general hygiene conditions improve, personal hygiene practices such as misuse of saris will become even more important.

Bonita Stanton, Director, Urban Volunteer Program, and John Clemens, Scientist, ICDDR,B, GPO 128, Dhaka 2, Bangladesh.



Photo by William Cutting

Mothers have many household tasks to do, as well as looking after small children.

Using a nasogastric tube

Christine Candy describes the practical issues involved.

Where possible, oral rehydration solution and food should be given by mouth. A nasogastric tube is useful when children are unable to drink safely and in sufficient amounts for any of the following reasons: severe dehydration; if IV therapy is unavailable; low birth weight infants; or the child is drowsy or vomiting. Severely malnourished children may be fed initially in this way if they are too weak or anorexic to eat or drink normally. It is therefore important that health workers know how to use nasogastric tubes.

Equipment

The health worker will need the following:

- Nasogastric tube. A 6 french gauge tube with an internal diameter of 1.4mm, or an 8 french gauge tube with an internal diameter of 1.8mm, is usually suitable. Check that fluid will flow easily down the tube, before passing it down. (If proper nasogastric tubes are not available, polythene/nylon tubes of the right size can be used, provided they are clean, rinsed and have no rough edges.)
- Lubricating fluid such as: 'KY Jelly' or vaseline if available; water; or mothers' saliva, if working in field conditions.
- Syringe (20 ml or 50 ml). This can be used afterwards as a funnel for giving feeds.
- Blue litmus paper, if available.
- Adhesive tape.
- Stethoscope if available.
- Fluid to be given.

Method

- Explain to the child's parents and the child, if old enough to understand, what you are going to do.
- Lie infants flat. Lie unconscious patients on their sides to avoid aspiration (the regurgitation and inhalation of fluid into the lungs). Older children may prefer to sit up.
- Measure the approximate length from the child's nostril to the ear lobe and then to the top of the abdomen (just below the ribs) with the tube, and mark the position. This will be a guide to how far to insert the tube.
- Clean the nostrils to remove mucus. Lubricate the tip of the tube and gently insert into the nostril. Pass the tube down through the nose slowly and smoothly. Stop if the child gags

(retches or chokes) and see if the tube is coiled in the mouth. If it is, gently pull out the tube and try again.

- If the child is conscious, give a drink of water. This helps to pass the tube down towards the stomach and reduces discomfort.
- If the child coughs, the tube may be going into the trachea (windpipe) — pull it out gently and try again. NB. A child who is partly or completely unconscious, may not have a cough reflex and the tube could go down the trachea without causing coughing. Always watch for cyanosis (blue lips and tongue) and distressed breathing. These may be the only signs in an unconscious patient that the tube is entering the lungs.
- Continue to pass the tube down until the position marked reaches the nostril. The end of the tube should then be in the stomach. Check once again for choking, restlessness or cyanosis. Fix the rest of the tube with adhesive tape below the nose and to the cheek or side of the forehead.
- To check that the tube is in the stomach, use the syringe to suck up some fluid and test with blue litmus paper. If the colour changes from blue to red the tube is in the stomach. If blue litmus paper is not available, but the fluid sucked up is clear, containing mucus or partially digested food, this also shows that the tube is in the stomach.
- Another test is to inject 20 to 50 ml of air down the tube while listening to the upper abdomen, either with a stethoscope or directly with the ear. A distinct gurgle will be heard as air enters the stomach. (This will not be heard if the tube is in the lung).
- If satisfied the tube is in the correct position, inject 5 to 10 ml of fluid (saline or OR solution, not milk formula) by syringe, and again look for choking or cyanosis.

Rehydration and feeding

Where possible, give a continuous drip of fluid. If this is not possible, give frequent small amounts using the syringe as a funnel. Hold the syringe upright, about 30 cms above the child's head, for a slow and gentle flow. After each feed, close the tube with a stopper or clamp

and note amount given. Before each feed (or every four hours in continuous feeding), look into the mouth to make sure the tube has not come out of the stomach into the throat. Suck up a little fluid and check as before.

Children who are able to drink will normally refuse ORS once rehydration is complete and they are no longer thirsty. However, in nasogastric feeding, the normal thirst mechanism is bypassed and it is possible to give too much fluid. It is therefore important to stop giving ORS by nasogastric tube as soon as the child is able to drink normally or is fully rehydrated. Overhydration can be dangerous.

Prolonged nasogastric feeding

If feeding continues for more than 24 hours, do the following:

- Clean the nostrils with warm water every day, especially around the tube. Change the tube to the other nostril every few days. Keep the mouth very clean with a dilute solution of 8 per cent sodium bicarbonate, if available, or citrus fruit juice. This helps to keep the saliva flowing and prevents infections.
- Wet adhesive tape quickly makes skin sore. Take off damp tape with plaster remover or ether. Clean skin with water and dry thoroughly. Change the position of the tape from time to time.

Stopping nasogastric feeding

If feeding has been continuous, start by changing to hourly then two hourly feeds. Then give every other feed by mouth during the day, continuing tube feeds at night. Tube feeds can then be gradually stopped as the amount taken by mouth increases. To remove the tube:

- Remove the adhesive tape.
- Take the tube out gently and smoothly. (Older children may prefer to remove it themselves).
- Offer the child a drink and gently cleanse the nostrils.

After prolonged nasogastric feeding a child may have feeding problems or loss of appetite. Patience and encouragement are needed to establish feeding by mouth again.

Christine Candy, Paediatric Nurse Tutor, Queen Elizabeth School of Nursing, Edgbaston, Birmingham, U.K.

An ORT centre in Malawi

Dr Mbvundula describes the impact of an ORT training centre at the Kamuzu Central Hospital in Lilongwe.

The CDD programme in Malawi became fully operational during 1985, when oral rehydration therapy (ORT) units were set up in all hospital out-patient departments, and ORT was integrated into the activities of all health facilities. Before this, an ORT training centre had been established in July 1984 at the Kamuzu Central Hospital out-patient department in Lilongwe. During the next five years, the national CDD programme plan hopes to be able to meet the following targets:

- offer effective out-patient and in-patient diarrhoeal disease treatment;
- educate mothers about ORT;
- decrease hospital admissions from diarrhoeal diseases;
- decrease hospital case fatality rates from diarrhoeal diseases.

The ORT Centre

The Kamuzu Central Hospital (KCH) is the main referral centre for the Central and Northern regions of Malawi, and has a paediatric ward with 97 beds. The occupancy rate of the ward is around 200 per cent all year round, with many children sharing beds. The greatest number of admissions to the ward occurs between December and May, coinciding with the peak season of diarrhoeal diseases.

Between 1981 and 1983, approximately seven per cent of admissions to the paediatric ward were for diarrhoeal diseases. Of children hospitalised with diarrhoeal disease during this period five per cent died.

Impact of activities

An evaluation of the ORT Centre after one year showed that:

- A total of 1,711 children had been treated, of whom 35 (two per cent) were admitted as in-patients.
- Seventy-five per cent of these children had diarrhoea alone, the rest had diarrhoea in combination with other illnesses such as malaria and acute otitis media. (Children with measles are admitted directly to the paediatric ward to avoid spreading the disease

in the ORT Centre. Therefore measles associated with diarrhoea was rarely seen at the ORT Centre.)

- Of the children treated at the ORT Centre: 62 per cent were aged 0-12 months; 26 per cent were aged between 13 and 24 months; and 12 per cent were over 24 months of age.
- Admissions to the paediatric ward decreased by 40 per cent compared to figures for 1981-1983.
- The case fatality rates for the paediatric ward did not change, perhaps due to the fact that only severely ill children were admitted — milder cases being treated in the ORT Centre.

Dr Mbvundula, Chief Paediatrician and Chairman, CDD Committee, Ministry of Health, Kamuzu Central Hospital, P.O. Box 149, Lilongwe, Malawi.

Editors' note: WHO has recently published a manual entitled: *Diarrhoea Training Unit-Director's Guide*. It contains useful information on setting up and running a diarrhoea training unit. Copies are available free of charge from the *Director, Diarrhoeal Diseases Control Programme, WHO, 1211 Geneva 27, Switzerland.*



A meal for a small child in Malawi

United Nations photograph

letters...letters...letters...

ORS composition

I am receiving *DD* regularly. Thanks for the valuable information. I use it for the teaching of health workers who only know 'Farsi' language. We are using ORS with satisfactory results in terms of tolerance, and response. I wish to know your opinion regarding the composition of the ORS packet enclosed.

Dr Gopal P. Gupta, PO Box 458, Sanandaj, Iran.

Editors' note: Thank you for your letter to *DD* enclosing the oral electrolyte packet (*Pursina*) which you are currently using in Iran. As you can see from the comparison table below, the *Pursina* solution is deficient in sodium and chloride for severe secretory diarrhoea. It also contains rather too much glucose which could hold fluid in the gut lumen by osmotic tension. The trace elements are not necessary if children are receiving milk or other food, which is the WHO recommendation as soon as initial rehydration is completed within 2-4 hours. The solution will, however, probably be of some value in milder cases.

Rehydration solutions (comparison in mmol/l)			
	ORS solution WHO/ UNICEF		Oral Electrolyte (<i>Pursina</i>)
	Bicarbonate	Citrate	
Sodium	90	90	30
Potassium	20	20	25
Chloride	80	80	25
Citrate	—	10	25
Bicarbonate	30	—	—
Glucose	111	111	194
Sulfate	—	—	4
Magnesium	—	—	4
Phosphate	—	—	5
Calcium	—	—	4
Saccharin	—	—	(10 mg)

Taste and temperature

Since UNICEF introduced ORS packets in Pakistan a few years ago, we have been using and promoting ORT. I have observed that sometimes children refuse to take it. Probably because commercial packets of ORS are widely available in Pakistan, home-

made ORS is not popular. (However, I do not think ORS packets would be available in remote areas of Pakistan, and I do not think people there know how to prepare ORS at home either). One pharmaceutical company has made orange-flavoured ORS. That too is often refused by children. I feel it is because of the TASTE of the solution and also the TEMPERATURE of the water added. Here in towns and cities, children, unlike those in the villages, are used to cold water. My mother tried to give my child ORS with a little ice in it. It was very well accepted. I agree it is costly for people in the villages to use ice, but wherever we can find ice prepared from boiled water, we tell the parents to add it to ORS. Do you agree? Do you think orange-flavoured ORS is technically sound?

Dr (Capt.) Mohammed Asif, Director General, Gulshan Hospital, A-2/3 Gulshan e-Iqbal, Karachi, Pakistan.

Editors' note: One important symptom of dehydration is thirst. Because they are thirsty, most dehydrated children will accept ORS readily, even if it is unflavoured and given at room temperature. Refusal to accept ORT usually means dehydration has been corrected or is quite mild. Some children, especially those over two years and with only mild dehydration, may accept flavoured or cooled solutions more readily, but it is not certain that this has much practical importance; moreover, the possibility of excessive intake should also be considered. See **DD 22** for practical hints on giving ORT.

Hygiene outside the home

We are currently implementing an educational program for rural mothers with children of five years or less in the areas of oral rehydration therapy and child growth monitoring. In developing educational materials, investigation and subsequent testing of materials, we have encountered a real difficulty.

Mothers and children spend a large portion of their time in the fields —

often long distances from their homes. This means that they are working and eating almost every day with little or no access to water, outhouse or any type of sanitation facilities. Promoting good hygiene is a primary concern of ORT/CGM. This, however, becomes a major obstacle when the 'target' group spends such a large portion of time working in the countryside where they have to prepare food and feed young children. As you well know, the classic educational materials for ORT etc. demonstrate hygienic practices in the home, with sufficient water, bowls, soap, heating facilities and so on. This is not the Bolivian reality, nor do we think it is the reality in most developing countries. We are concerned about how this problem can be dealt with effectively and would like any suggestions or ideas you may have. Certainly there are no easy answers but, based on the world-wide *DD* readership, we would be very interested in your response to this problem.

Curt Schaeffer, PRITECH Representative, and Dra. Ana Maria Aguilar, Consultant to PRITECH, La Paz, Bolivia.

Editors' note: Several actions could help overcome these problems. For example, special areas for defaecating well away from any water source, play areas or places where people rest or eat. Even cleaning and rubbing hands with grass, soil, sand or leaves after defaecating and before handling food, and keeping fingernails short, can help. Cover food to protect against flies and, where possible, reheat thoroughly before eating. The Editors would welcome suggestions from *DD* readers with experience of similar problems, for publication in a future issue.

In the next issue . . .

DD 27 will look again at the role of parasites in diarrhoea

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