

# **MANAGEMENT OF GASTROENTERITIS IN CHILDREN**

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# **GUIDELINES FOR MANAGEMENT OF GASTROENTERITIS IN CHILDREN**

## **Introduction**

Acute gastroenteritis is a common problem in paediatric practice with significant morbidity and mortality in Sri Lanka. (epidemiological bulletin 3550 cases of dysentery by mid year) The aim of formulating these guidelines is to develop conformity and to improve the quality of management of acute gastroenteritis throughout the country. These guidelines are intended for doctors who are treating children.

*Management guidelines are considered under the following headings.*

- 1. The essential components concerning diarrhoea included in this document.**
- 2. Diagnosis of gastroenteritis**
- 3. Criteria for hospital admission.**
- 4. Assessment of the children with diarrhoea.**
- 5. Basic principles of management of acute diarrhoea.**
  - 5.1 Prevention of dehydration.**
  - 5.2 Management of dehydration.**
  - 5.3 Feeding practices and maintenance of nutrition.**
  - 5.4 Zinc supplementation**
- 6. Drugs and anti microbial agents**
- 7. When to discharge from the hospital**
- 8. Parent education**
- 9. Public health measures.**
- 10. Post gastroenteritis syndrome.**

## 1. THE ESSENTIAL COMPONENTS CONCERNING DIARRHOEA INCLUDED IN THIS DOCUMENT

### 1.1 *Definition of diarrhoea*

Diarrhoea is the passage of unusually loose or watery stools, usually at least three times in a 24 hour period. However, it is the consistency of the stools rather than the number that is most important.

### 1.2 *Clinical types of diarrhoeal diseases*

It is most practical to base treatment of diarrhoea on the *clinical type* of the illness, which can easily be determined when a child is first examined. Laboratory studies are not needed. Four clinical types of diarrhoea can be recognized, each reflecting the basic underlying pathology and altered physiology:

- *Acute watery diarrhoea* (including cholera), which lasts several hours or days: the main danger is dehydration; weight loss also occurs if feeding is not continued;
- *Acute bloody diarrhoea*, which is also called *dysentery*: the main dangers are damage of the intestinal mucosa, sepsis and malnutrition; other complications, including dehydration, may also occur;
- *Persistent diarrhoea*, which lasts 14 days or longer: the main danger is malnutrition and serious non-intestinal infections; dehydration may also occur;
- *Diarrhoea with severe malnutrition* (marasmus or kwashiorkor); the main dangers are severe systemic infection, dehydration, heart failure and vitamin and mineral deficiency.

### 1.3 *Dehydration*

During diarrhoea there is an increased loss of water and electrolytes (sodium, chloride, potassium, and bicarbonate) in the liquid stool. Water and electrolytes are also lost through vomit, sweat, urine and breathing. Dehydration occurs when these losses are not replaced adequately and a deficit of water and electrolytes develops.

#### **1.4 Malnutrition**

Diarrhoea is, in reality, as much a nutritional disease as one of fluid and electrolyte loss. Children who die from diarrhoea, despite good management of dehydration, are usually malnourished. During diarrhoea, decreased food intake, decreased nutrient absorption, and increased nutrient requirements often combine to cause weight loss and failure to grow: the child's nutritional status declines and any pre-existing malnutrition is made worse. In turn, malnutrition contributes to diarrhoea which is more severe, prolonged, and possibly more frequent in malnourished children.

#### **1.5 Zinc**

Numerous studies have now shown that zinc supplementation (10-20 mg per day until cessation of diarrhoea) significantly reduces the severity and duration of diarrhoea in children less than 5 years of age. Additional studies have shown that short course supplementation with zinc (10-20 mg per day for 10 to 14 days) reduces the incidence of diarrhoea for 2 to 3 months. Based on these studies, it is now recommended that zinc (10-20 mg/day) be given for 10 to 14 days to all children with diarrhoea.

#### **1.6 Improved ORS formulation**

Studies showed that the efficacy of ORS solution for treating children with acute noncholera diarrhoea is improved by reducing its sodium concentration to 75 mEq/l, its glucose concentration to 75 mmol/l and its total osmolarity to 245 mOsm/l. instead of 311 mOsm/l in the previous WHO formula. The new formula is found to be effective as there is evidence to show that, when using the new formula

- the need for unscheduled supplemental intravenous therapy in children was reduced by 33%.
- stool output was reduced by about 20%
- incidence of vomiting was reduced by about 30%.

The new formula could safely be used in the prevention of dehydration as well as in the treatment of dehydration.

Reduced osmolarity ORS	grams/litre
Sodium chloride	2.6
Glucose, anhydrous	13.5
Potassium chloride	1.5
Trisodium citrate, dehydrate	2.9
<b>Total weight</b>	<b>20.5</b>

Reduced osmolarity ORS	mmol/litre
Sodium	75
Chloride	65
Glucose, anhydrous	75
Potassium	20
Citrate	10
<b>Total osmolarity</b>	<b>245</b>

### 1.7 Use of antimicrobials and “antidiarrhoeal” drugs

*Antimicrobials should not be used routinely.* It is difficult to distinguish clinically episodes that *might* respond, such as diarrhoea caused by enterotoxigenic *E. coli*, from those caused by agents unresponsive to antimicrobials, such as rotavirus or *Cryptosporidium*. Moreover, even for potentially responsive infections, selecting an effective antimicrobial requires knowledge of the likely sensitivity of the causative agent, information that is usually unavailable. In addition, use of antimicrobials adds to the cost of treatment, risks adverse reactions and enhances the development of resistant bacteria.

## 2. DIAGNOSIS OF GASTROENTERITIS

- Diarrhoea is defined as frequent watery stools with or without blood and/ or mucus.
- In an exclusively breast fed baby, frequent passage of watery stools should not be considered as diarrhoea.
- Common pathogens, which are known to cause diarrhoea in children are *rotavirus* and other viruses, bacteria like *shigella*, *escherichia coli* and *salmonella*. *Vibrio cholerae* is no more a common pathogen but might cause epidemics.
- Viral gastroenteritis commonly presents with profuse watery stools and vomiting. However presence of blood and or mucus in the stools does not exclude a viral aetiology.
- Frequent small mucoid stools with or without blood, abdominal pain and tenesmus suggest bacillary dysentery. However shigella dysentery and enteroinvasive *E. coli* could initially present as watery diarrhoea.
- Stool naked eye examination is very valuable.
- Stool microscopy and culture, full blood count, blood urea and serum electrolytes are useful investigations in management of the patient.
- However, these investigations have their own limitations.
  - Presence of few pus cells and red blood cells does not necessarily mean that the child is having bacterial infection.
  - Children with shigellosis and *E. coli* diarrhoea who are already treated with antibiotics could have negative stool cultures.
  - Full blood count, blood urea and serum electrolytes are helpful in the management of a systemically ill child who is likely to develop complications.
  - Serum electrolytes are essential in children with moderate to severe dehydration.

### 3. CRITERIA FOR HOSPITAL ADMISSION.

Most of them could be safely managed at home and some may need observation in diarrhoea treatment units.

Following are indications for hospital admission.

- Systemically ill child.
- Moderate to severe dehydration
- Intractable vomiting
- Profuse diarrhoea.
- Presence of complications.
- Adverse social implications.
- Malnutrition.
- Persistent diarrhoea.
- Immunosuppressive status including HIV

### 4. ASSESSMENT OF CHILDREN WITH DIARRHOEA.

A child with diarrhoea should be assessed for dehydration, presence of bloody diarrhoea, persistent diarrhoea, malnutrition and serious non-intestinal infections, so that an appropriate treatment plan can be developed and implemented without delay. The information obtained when assessing the child should be recorded.

#### 4.1. Assessment of dehydration

It is important to assess the degree of dehydration in children. Infants and small children are at a higher risk of dehydration. Weight loss is useful in estimating the degree of dehydration if weight prior to admission is known.

**Table 1**  
**Degree of dehydration**

	<b>No dehydration</b>	<b>Some dehydration</b>	<b>Severe dehydration</b>
General Condition	Well, alert	Restless, Irritable	Lethargic, unconscious or floppy
Eyes	Normal	Sunken	Very sunken and dry
Tears	Present	Absent	Absent
Mouth & tongue	Moist	Dry	Very dry
Thirst	thirsty	Thirsty, drinks eagerly	Drinks poorly or not able to drink
Skin pinch	Goes back quickly	Goes back slowly	Goes back very slowly

The presence of two or more signs in each category will determine the degree of dehydration.

**Table 2**  
**Estimation of child's fluid deficit**

Assessment fluid deficit as % of body weight	Fluid deficit in ml/kg body weight
No signs of dehydration (<5%)	<50 ml/kg
Some dehydration (5-10%)	50-100 ml/kg
Severe dehydration (>10%)	>100 ml/kg

For example, a child weighing 5 kg and showing signs of “some dehydration” has a fluid deficit of 250-500 ml.

- In some infants and children the eyes normally appear somewhat sunken. It is helpful to ask the mother if the child's eyes are normal or more sunken than usual.
- The mouth may always be dry in a child who habitually breathes through the mouth. The mouth may be wet in a dehydrated patient owing to recent vomiting or drinking.
- The skin pinch is less useful in infants or in children with marasmus or kwashiorkor or in obese children.

## **5. BASIC PRINCIPLES OF MANAGEMENT OF ACUTE DIARRHOEA**

### **5.1 Prevention of dehydration**

- Give the child more fluids than usual to prevent dehydration
- Home based fluids and ORS solutions such as kanjee should be used.
- Give as much fluid as the child wants.  
As a guide approximately 50 ml of fluid should be given after each stool.
- Watch for signs of dehydration.

### **5.2 Management of dehydration**

It is useful to consider the following three essential needs.

- 5.2.1. *Correction of the existing water and electrolyte deficit*
- 5.2.2. *Replacement of ongoing losses.*
- 5.2.3. *Provision of normal daily fluid requirement.*

### 5.2.1 Correction of the existing water and electrolyte deficit

This can usually be achieved by giving ORS solution by mouth. However, in cases with severe dehydration, frequent and severe vomiting, or in the presence of complications that prevents successful oral therapy, intravenous therapy is needed.

Patients receiving rehydration therapy should be monitored hourly to assess the degree of hydration.

- *Some dehydration*

*Approximate amount of ORS solution to be given in the first 04 hours*

Mild to moderate (5-10%) dehydration → 75 ml/kg in 4 hours

- The volumes and time shown are guidelines based on usual needs. If necessary, the rate and the volume can be increased, or the ORS solution can be given at the same rate for a longer period to correct dehydration. Similarly, the amount of fluid given should be decreased if hydration is achieved earlier than expected. Fluid management plan should be reviewed regularly.
- Vomiting does not prevent successful use of ORS solution.
- Slow administration of ORS solution is useful in children with vomiting.

- *Severe dehydration*

Children with severe dehydration need intravenous fluids, as there is a risk of impending shock.

- Start IV Ringer Lactate fluid immediately. If the patient can drink, ORS should be given while the drip is set up.
- Normal saline could be used if Ringer Lactate solution is not available,
- If intravenous access is impossible attempt intra osseous administration or give ORS through naso-gastric tube

**Table 3**  
**Intravenous fluid therapy for severe dehydration**



- Reassess the patient every 1-2 hours. If hydration is not improving, give the IV drip more rapidly.

- *Hypernatraemic dehydration.*

Some children with diarrhoea develop *hypernatraemic dehydration*, especially when given drinks that are hypertonic owing to their excessive content of sugar (e.g. soft drinks, commercial fruit drinks, too concentrated infant formula) or salt. These draw water from the child's tissues and blood into the bowel, causing the concentration of sodium in extra-cellular fluid to rise. If the solute in the drink is not fully absorbed, the water remains in the bowel, causing osmotic diarrhoea.

Children with hypernatraemic dehydration (serum Na >150 mmol/l) have thirst that is out of proportion to other signs of dehydration. Their most serious problem is convulsions, which usually occur when the serum sodium concentration exceeds 165 mmol/l.

**Hypernatraemic dehydration should be corrected slowly over a period of 12 hours.**

- *Management of children who present with severe dehydration and in impending shock*

**Airway, Breathing and Circulation should be assessed and established quickly. Give rapid iv infusion of 10 to 20 ml/Kg body of normal saline or Hartmann solution.**

- Reassess the patient every 1-2 hourly and adjust the fluid therapy accordingly. If hydration is not improving, give the IV drip more rapidly.
- When the child can tolerate oral fluids about 5 ml/kg/hour of ORS should be recommenced.

Start IV fluids immediately. If the Ringer Lactate Solution, divided as
Age
Infants (under 12 months)
Older

### ***5.2.2. Replacement of ongoing losses***

- Offer as much fluid as the child wants.
- Add approximately 10 to 20 ml of ORS or any other fluid for each stool.
- Depending on the stool volume fluid intake should be increased.

### ***5.2.3. Provision of normal daily fluid requirement.***

- Breast feeding should be continued.
- If on formula milk, continue in the same dilution.
- Offer as much fluid as possible to drink in addition to ORS solution.

## ***5.3 Feeding practices and maintenance of nutrition***

- Encourage the mother to continue breast-feeding
- Formula feeds need not be diluted
- Food intake should never be restricted during or following diarrhoea
- Maintain the intake of energy and other nutrients at as high a level as possible
- Continued feeding speeds the recovery of normal intestinal function
- Dietary modifications may be necessary in lactose intolerance and in conditions like post gastroenteritis syndrome

## ***5.4 Zinc supplementation***

Zn supplementation is recommended as it is known to reduce the duration of diarrhoea. When Zn is given for 14 days in a dose of 10-20 mg per day it reduces the risk of recurrences of diarrhoea for the next few months

## 6. DRUGS AND MICROBIAL AGENTS

### 6.1 Microbial Agents

- Majority of childhood diarrhoea is of viral origin and does not require treatment with antibiotics.
- Diarrhoea due to Shigella and E.coli will need treatment with antibiotics on suspicion.
- Rational use of antibiotics is necessary to prevent emergence of multi resistant pathogens.
- Antibiotic sensitivity patterns change in various epidemics and the choice of antibiotics should be guided by available studies.
- Majority of the children who require antibiotics could be managed with oral antibiotics.
- Intra venous antibiotics should be reserved for children who cannot tolerate oral drugs and for those who are suspected to have sepsis.

**Table 4**  
**Antibiotics used in the treatment of specific causes of diarrhoea**

First line Antibiotics	Second line antibiotics	Alternative drugs
Furozolidone 2mg/kg/dose - 6 hrly	Mecillinam 10-20mg/Kg/ dose 8 hrly	Ciprofloxacin 5-10mg/kg/dose b.d oral
Nalidixic acid 15mg/kg/dose - 6 hrly oral	Cefuroxime 10-15 mg/kg/dose bd oral 25mg /kg/dose 8hrly (IV)	Cotrimoxazole
Gentamicin 2.5mg/kg/dose (IV) – 8 hrly	Cephalexin 12.5mg/kg/dose 8hrly	

### 6.2 Other Drugs

- Anti diarrhoeal and anti spasmodic drugs are **never indicated** for the treatment of acute diarrhoea in children.
- If the child continues to vomit non-sedative anti emetics could be used.

## **7. WHEN TO DISCHARGE FROM THE HOSPITAL**

These children could be safely discharged

- When they are not systemically ill and tolerating feeds.
- It is not necessary to keep them in the hospital until the diarrhoea settles.
- Social factors

## **8. PARENT EDUCATION**

- Family knowledge about diarrhoea must be reinforced in areas such as prevention, oral rehydration treatment, zinc supplementation and when to seek help.

## **9. PUBLIC HEALTH MEASURES**

- Notification is essential for blood and mucus diarrhoea.

## **10. DIAGNOSIS OF LACTOSE INTOLERANCE/ POST GASTROENTERITIS SYNDROME**

- Milk intolerance is only important when milk feeding causes a prompt increase in stool volume
- Tests for reducing substance in stools are over sensitive and often indicate impaired absorption of lactose when it is not clinically important.
- Lactose intolerance is suspected when there is protracted diarrhoea with profuse explosive watery stools associated with abdominal distension. Reducing substances in the stools is significant only in the presence of these clinical features.
- Lactose free formula is indicated in such infants for a period of time until the brush border is recovered.
- Very often breast milk is well tolerated even in the presence of lactose intolerance and breast milk should be continued.
- If the infant is on formula feeds replace the formula with lactose free formula for a temporary period of time.
- Continue solids, which are free of lactose.

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