

Indian Academy of Pediatrics (IAP)



STANDARD TREATMENT GUIDELINES 2022



Acute Watery Diarrhea

Lead Author

Nirmala Cherukuri

Co-Authors

Nishanth Wadhwa, Prasanth K Sobhan

Under the Auspices of the IAP Action Plan 2022

Remesh Kumar R

IAP President 2022

Upendra Kinjawadekar

IAP President-Elect 2022

Piyush Gupta

IAP President 2021

Vineet Saxena

IAP HSG 2022–2023



© Indian Academy of Pediatrics

IAP Standard Treatment Guidelines Committee

Chairperson

Remesh Kumar R

IAP Coordinator

Vineet Saxena

National Coordinators

SS Kamath, Vinod H Ratageri

Member Secretaries

Krishna Mohan R, Vishnu Mohan PT

Members

Santanu Deb, Surender Singh Bisht, Prashant Kariya,
Narmada Ashok, Pawan Kalyan

Acute Watery Diarrhea

Definition

- ☑ *Acute watery diarrhea* is defined as a change in the consistency of stool leading to loose or liquid stools and/or an increase in the frequency of evacuations to three or more in 24 hours, with or without fever or vomiting lasting 7 days or less.
- ☑ Frequent passing of formed stools is not diarrhea. Babies fed only on breast milk often pass loose, “pasty” stools; this also is not diarrhea.

- ☑ Viruses are the most common agents accounting for >60% of cases, followed by bacteria and parasites. Globally, Rotavirus infection remains the leading cause of diarrhea in children < 5 years.
- ☑ Water and electrolytes (sodium, chloride, potassium, and bicarbonate) are lost through liquid stools, vomit, sweat, urine, and breathing. Dehydration occurs when these losses are not replaced.

Etiopathogenesis

- ☑ The degree of dehydration is rated on a scale of three.

Severe dehydration (at least two of the following signs):

- ☑ Lethargy/unconsciousness
- ☑ Sunken eyes
- ☑ Unable to drink or drink poorly
- ☑ Skin pinch goes back very slowly (≥ 2 seconds)

Some dehydration (two or more of the following signs):

- ☑ Restlessness and irritability
- ☑ Sunken eyes
- ☑ Drinks eagerly and thirsty

No dehydration

- ☑ Not enough signs to classify as some or severe dehydration.

In most cases, children with acute watery diarrhea do not require any diagnostic workup.

- ☑ In severe conditions and/or in the hospital setting, investigations may be appropriate in individual cases.
- ☑ Microbiological investigations should be considered in the following:
 - Children with underlying chronic conditions (e.g., oncologic diseases, inflammatory bowel disease, and immunodeficiency)
 - Extremely severe clinical conditions (e.g., sepsis)
 - Prolonged symptoms (>7 days)
 - During outbreaks (childcare, school, and hospital)
 - Children with high fever
 - History of travel to at-risk areas
- ☑ In children with severe dehydration, renal function test, serum electrolytes, and blood glucose should be done.

- ☑ To prevent potentially fatal complications including dehydration, metabolic acidosis, electrolyte disturbances, and sepsis.

Rehydration

- ☑ Oral rehydration solution (ORS) (low osmolarity 75 mmol/L Na) is the first line of treatment for acute watery diarrhea (**Table 1**).

TABLE 1: Rehydration therapy in acute diarrhea.

Treatment plan	Plan-A	Plan-B	Plan-C
State of hydration	No dehydration	Some dehydration	Severe dehydration
Percentage of body weight loss	<5	5–10	>10
Estimated fluid deficit (mL/kg)	<50	50–100	>100
Goals of management	Replacement of ongoing losses of fluid and electrolytes	Correction of existing deficits of fluid and electrolytes	Urgent replacement of existing deficits of fluid and electrolytes
Fluid therapy	Maintenance (oral)	Rehydration (oral)	Rehydration [intravenous (IV)]
Treatment facility	Home	Health facility	Health facility
Rehydration fluid	Oral rehydration solution (ORS)/homemade solutions	ORS	RL*
Amount of rehydrating fluid	<p><i>For every loose stool:</i> 10 mL/kg Age up to 2 months—5 teaspoons/purge 2 months to < 2 years → 50–100 mL Age 2–10 years → 100–200 mL Older child: As much as desired <i>Plus</i> Free access to drinking water</p>	<p>75 mL/kg Over 4 hours <i>Plus</i> Non-breastfed infants <6 months—100–200 mL of clean drinking water Older children and adults: Free access to plain water in addition to ORS</p>	<p>IV fluid <i>Infants</i> 30 mL/kg Over 1 hour 70 mL/kg Over 5 hours <i>Age > 1 year</i> 30 mL/kg Over ½ hour 70 mL/kg Over 2½ hours <i>Plus</i> ORS (5 mL/kg/h) start orally as soon as child is able to drink</p>
Monitoring	Watch for vomiting, early signs of dehydration, blood in stools, etc.	<p>Monitor every hour and reassess after 4 hours ☑ If still in plan B, repeat as above ☑ If rehydrated, shift to plan A</p>	<p>Monitor ½ hourly and reassess after 6 hours (infants) 3 hours (older children) ☑ If still in plan C, repeat as above ☑ If rehydrated, shift to plan B/A</p>

*Normal saline (0.9% NaCl) or half strength Darrow's solution may be used if Ringer Lactate (RL) is not available. Severely malnourished children rehydrated slowly over 6–12 hours.

In children who fail on oral rehydration, administration of rehydration fluids either by nasogastric (NG) tube or intravenously (IV) is effective and recommended.

Nutritional Management

- ☑ Infants younger than 6 months to continue breastfeeding and for non-breastfed, not to introduce diluted or modified formula.
- ☑ Regular oral feeding to be reintroduced no later than 4–6 hours after the onset of rehydration.
- ☑ In children with severe acute malnutrition (SAM), food offered during rehydration phase.
- ☑ Home available fluids can be given such as rice or pulses-based drink (rice water and *dal* water); vegetable soup; yogurt drink with salt (salted *Lassi*); lemon drink (*Shikanji* with added salt and less sugar), and coconut water. Plain water can be given in between.
- ☑ Elimination diet is usually not indicated
- ☑ An extra meal a day with energy rich foods for at least a week or two, after the diarrhea stops or until the child is back on its original weight.

- ☑ It helps in reducing the duration, severity of diarrhea, and in preventing further episodes of diarrhea for next 3 months.
- ☑ *Dose:* 6 months to 5 years of age: 20 mg/day × 14 days
2–6 months: 10 mg/day × 14 days

Zinc

Probiotics

- ☑ Effective in reducing the duration and intensity of symptoms
- ☑ Selected probiotic strains (including *Lactobacillus rhamnosus* GG, *Saccharomyces boulardii*, and also *L. reuteri* DSM 17938) can be considered as an *adjunct* to ORS.

- ☑ Ondansetron administered either *orally* or *intravenously* (0.15 mg/kg/dose, maximum: 8 mg) is effective in reducing vomiting.

Antiemetics

Indications for Antibiotics

Routine use of antibiotics is not recommended for the treatment of acute watery diarrhea.

The use of antibiotics may be considered in:

- ☑ Infants < 3 months
- ☑ Children with underlying chronic conditions or immunodeficiency
- ☑ Children with SAM
- ☑ Infections with *Shigella*, enterotoxigenic *Escherichia coli* (ETEC) (not Shiga-like toxin producing), *Vibrio cholerae*, and *Yersinia enterocolitica*
- ☑ Invasive bacterial infection.

The routinely used antibiotics are given in **Table 2**.

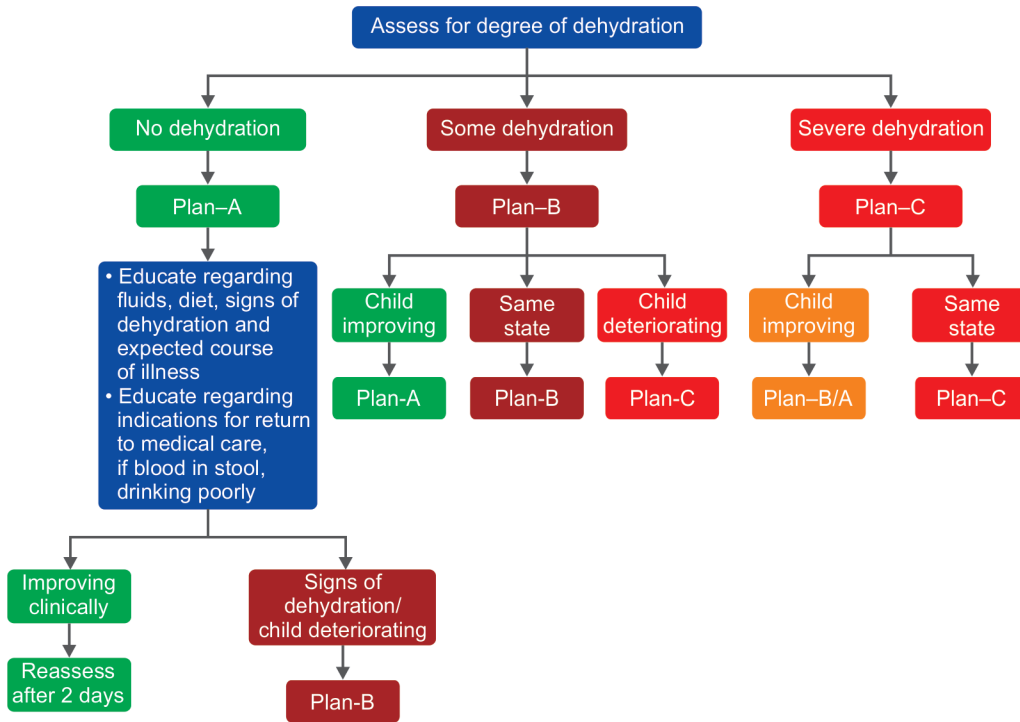
TABLE 2: Antibiotics recommended for the treatment of acute watery diarrhea.

Pathogen	Drug of choice	Alternative
<i>Shigella</i>	Parenteral, IV, IM: Ceftriaxone (50 mg/kg for 2–5 days)	Cefixime PO (8 mg/kg/day); ciprofloxacin PO (20–30 mg/kg/day)
<i>Salmonella (non-typhi)</i> Only in high-risk children	Parenteral ceftriaxone (50–100 mg/kg/day)	Azithromycin PO (10 mg/kg/day); ciprofloxacin PO (20–30 mg/kg/day)
Enterotoxigenic <i>Escherichia coli</i>	Azithromycin PO (10 mg/kg/day) for 3 days	Cefixime (8 mg/kg/day) for 5 days
<i>Vibrio cholerae</i>	Single dose of doxycycline (>2 years) 2–4 mg/kg	Single dose of azithromycin/ ciprofloxacin 20 mg/kg

Up-to-date immunization, especially for *Rotavirus* and measles, helps in preventing diarrhea.

Vaccination

Flowchart 1: Approach to management of acute watery diarrhea.



Assessment and management of dehydration in an SAM child differs from children without malnutrition. Diagnosis is by history:

- ☑ Definite history of diarrhea of sudden onset within few hours or days
- ☑ Recent change in the child’s appearance
- ☑ Mother says the eyes have changed to become sunken since the diarrhea started
- ☑ Eagerness to drink

SAM child in shock:

- ☑ Cold hands with
- ☑ Slow capillary refill >3 seconds and
- ☑ Weak and fast pulse.

Management

- ☑ Managed in a health facility.
- ☑ Oral rehydration. NG tube used for children who drink poorly.
- ☑ IV fluids used only for the treatment of shock, due to risk of overhydration and heart failure.
- ☑ Oral rehydration 70–100 mL/kg over 12 hours. Start 10 mL/kg/hour in the first 2 hours. Then alternate hours give starter diet.
- ☑ Continue at this rate or a lower rate based on the child's thirst and ongoing stool losses.
- ☑ Increasing edema is evidence of overhydration.
- ☑ Full-strength ORS solution should not be used for oral or NG rehydration. It provides too much sodium and too little potassium.
- ☑ When using the new ORS solution containing 75 mmol/L of sodium:
 - Dissolve one ORS packet into 2 L of clean water (to make 2 L instead of 1 L);
 - Add 45 mL of potassium chloride solution (from stock solution containing 100 g KCl/L)
 - Add and dissolve 50 g sucrose
- ☑ Rehydration solution for malnourished (ReSoMal) can be used, dilute one sachet in 2 L water. It has high potassium and low sodium.

Further Reading

- ☑ Bhatnagar S, Lodha R, Choudhury P, Sachdev HP, Shah N, Narayan S, et al. IAP Guidelines 2006 on management of acute diarrhea. *Indian Pediatr.* 2007;44(5):380-9.
- ☑ Dekate P, Jayashree M, Singhi SC. Management of acute diarrhea in emergency room. *Indian J Pediatr.* 2013;80(3):235-46.
- ☑ Guarino A, Lo Vecchio A, Dias JA, Berkley JA, Boey C, Bruzzese D, et al. Universal recommendations for the management of acute diarrhea in nonmalnourished children. *J Pediatr Gastroenterol Nutr.* 2018;67(5):586-93.
- ☑ Mohanty N, Thapa BR, Mathai J, Pai U, Mohanty N, Biradar V, et al. Low osmolarity oral rehydration salt solution (LORS) in management of dehydration in children. *Indian Pediatr.* 2021;58(3):266-72.
- ☑ Szajewska H, Guarino A, Hojsak I, Indrio F, Kolacek S, Orel R, et al. Use of probiotics for the management of acute gastroenteritis in children: an update. *J Pediatr Gastroenterol Nutr.* 2020;71(2):261-9.