بسم الله الرحمن الرحيم

اسهال حاد در کودکان

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Diarrhea is the passage of loose or watery stools at least three times in a 24 hour period. Diarrheal illness is the second leading cause of child mortality In resource-limited countries, infants experience a median of six episodes annually; children experience a median of three episodes annually.

Diarrheal illness may consist of acute watery diarrhea, invasive (bloody) diarrhea, or chronic diarrhea (persistent ≥14 days)

ETIOLOGY — Most cases of acute diarrhea in resource-limited countries are caused by infectious gastroenteritis. Less commonly, acute diarrhea can be a symptom of a systemic infection or an intra-abdominal surgical emergency

Infectious gastroenteritis

The most common microbiological causes of infectious gastroenteritis differ by age group, geographical region, and type of diarrhea.

In a large study of children five years or younger at seven sites in Asia and Africa, stool samples from 9439 children with moderate to severe diarrhea and from 13129 controls were tested for a panel of microorganisms :

Rotavirus was the most common pathogen among children under two years old, whereas Shigella was the most frequently isolated pathogen in children aged two to five. Cryptosporidium was the second most common pathogen among infants under one year old, but was infrequently detected in children older than two years.

Rotavirus, Cryptosporidium, Shigella, and enterotoxigenic Escherichia coli (ETEC) were important pathogens at all study sites, and most attributable cases of diarrhea were due to these organisms.

Aeromonas was a frequent pathogen in Pakistan and Bangladesh, and Campylobacter jejuni in Pakistan, Bangladesh, and India.

Vibrio cholerae was an important cause of diarrhea at those three Asian sites as well as Mozambique.

adenovirus 40/41 norovirus

Major etiologies of childhood diarrhea in resource-limited countries

Syndrome	Etiologic agents	Features
Acute watery diarrhea Watery stools; may contain mucous. Fever may be present.	Rotavirus	Leading cause of gastroenteritis in children younger than two years.
	Enterotoxigenic *Escherichia coli* (ETEC)	Leading cause of gastroenteritis in older children and adults.
	Vibrio cholerae O1 and O139	Associated with endemic and epidemic disease. Vomiting and voluminous "rice-water diarrhea" in severe cases.
	Cryptosporidium	Common in infants (younger than one year) even in the absence of HIV; infrequently seen in older children.
	Norovirus	Abrupt onset of vomiting and diarrhea with low grade fever.
Invasive diarrhea Gross blood in stool. Often associated with fever, vomiting, abdominal pain.	Shigella spp.	Leading cause of invasive diarrhea. *S. dysenteriae* serotype I produces Shiga-toxin and is associated with epidemics of severe disease. Complications include toxic megacolon, rectal prolapse, intestinal perforation, seizures, encephalopathy and sepsis.
	Nontyphoidal *Salmonella enterica*	Several serotypes cause gastroenteritis. Infants, elderly, and immunocompromised at increased risk for disseminated infection.
	Campylobacter spp.	Predominantly *C. jejuni* and *C. coli*. May mimic appendicitis. Complications include Guillain-Barré syndrome.
	Enteroinvasive *Escherichia coli* (EIEC)	EIEC are closely related to Shigella and cause a syndrome essentially identical to shigellosis.
	Enterohemorrhagic *Escherichia coli* (EHEC)	EHEC produce Shiga toxin identical to that produced by *S. dysenteriae* serotype I, associated with increased risk of hemolytic uremic syndrome.
	Entamoeba histolytica	*E. histolytica* is a protozoal organism which causes intestinal infection which may be indistinguishable from Shigella and other bacteria. Rare complications include extraintestinal infections, most commonly hepatic abscess.
	Adenovirus types 40/41	Also cause watery diarrhea.

Associated conditions:

Systemic infections associated with diarrhea include influenza, measles, dengue fever, human immunodeficiency virus infection, and malaria. Serious bacterial infections associated with diarrhea include pneumonia, urinary tract infection, meningitis, and sepsis. Surgical emergencies such as intussusception or appendicitis also may present with diarrhea. These concomitant illnesses are major causes of mortality among children brought to medical attention for acute diarrhea

CLINICAL ASSESSMENT — The assessment of the child with diarrhea can be divided into four components to guide clinical management:

- Classification of the type of diarrheal illness
- Assessment of hydration status
- Assessment of nutritional status
- Assessment of co-morbid conditions

The assessment of a child with diarrhea should include a history of the duration, frequency, and character of the diarrhea, as well as an assessment of the stool

- **Acute watery diarrhea** – loose or watery stools at least three times in a 24 hour period.

- **Invasive diarrhea** – (synonymous with dysentery) gross blood (by history or inspection) in the stool of <14 days duration (picture 2), typically accompanied by fever. It is usually the result of exudative inflammation of the distal small bowel and colonic mucosa in response to bacterial invasion.

- **Persistent diarrhea** – loose, watery, or bloody stools of ≥14 days

Other characteristics of the diarrhea and associated symptoms may be clues as to the etiology. As an example, the diagnosis of cholera is suggested by a short history (usually less than 24 hours) of vomiting and passage of voluminous watery diarrhea, which may have a characteristic rice-water appearance, associated with severe dehydration

Hydration status — Death due to dehydration is an important cause of mortality in resource-limited settings. It can occur because the initial dehydration status is underestimated and/or because the extent of ongoing fluid loss is underappreciated

Following the initial assessment, ongoing fluid losses should be estimated based on the volume of emesis and stool. These assessments are essential for determining the volume, route, and pace of rehydration therapy needed.

Individual clinical signs and symptoms have important limitations if used as independent predictors of the degree of dehydration. The absence of any particular dehydration sign is not sufficient proof that the patient has been adequately hydrated. For example, a sunken anterior fontanelle is a poor predictor of dehydration in infants, a patient who sheds tears may still be dehydrated, and hypotension is a late finding in dehydrated children (and may be absent even in severe dehydration). Serum and urine indices of dehydration provide no additional predictive benefit beyond the clinical examination

Nutritional status

Recurrent diarrhea in childhood is associated with malnutrition, which contributes to delays or irreversible deficits in physical and cognitive development. Malnutrition is associated with more than 5 million childhood deaths annually . Children presenting with diarrhea in resource-limited countries should be assessed for malnutrition according to WHO standards,
Children with acute diarrhea and malnutrition are at increased risk for developing fluid overload and heart failure during rehydration. The risk of serious bacterial infection is also increased. As a result, such children require an individualized approach to rehydration, nutritional care, and antibiotics

Physical examination

Assessment of a child with acute diarrhea should include evaluation of the following:

- Temperature
- Respiratory tract
- Abdomen – Abdominal pain out of proportion to typical gastroenteritis raises the possibility of a surgical emergency
- Central nervous system – Moderate dehydration can lead to irritability; severe dehydration can lead to lethargy and coma. Encephalopathy and/or seizures can

Fever is common in the setting of diarrheal illness. The presence of fever or hypothermia in a patient with watery diarrhea should also raise clinical suspicion of a comorbid illness. Fever in areas where malaria is endemic should prompt appropriate diagnostic evaluation

Tachypnea can be a sign of pneumonia in the setting of cough or difficulty breathing; the WHO uses the following parameters: infants <2 months: >60 breaths/min; infants 2 to 12 months: >50 breaths/min; children 1 to 5 years: >40 breaths/min; children ≥5 years: >20 breaths/min [24].

Children with dehydration should be reassessed for pneumonia following initial rehydration. In some cases, a chest radiograph may be required for diagnosis of pneumonia, particularly in severely malnourished and dehydrated patients

Among patients with severe dysentery due to Shigella, intestinal obstruction was reported in 2.5 percent of hospitalized cases in one series.

Intussusception may present with acute bloody diarrhea and severe intermittent abdominal pain; in some cases a cylindrical abdominal mass is palpable. In young children, appendicitis may also present with diarrhea and abdominal pain

Encephalopathy and/or seizures can occur in the setting of severe disease due to Shigella, and less commonly in systemic Salmonella infection. The differential diagnosis of seizures in a child with diarrhea includes hypoglycemia, hyponatremia, hypernatremia, encephalopathy, meningitis, and febrile seizures. Meningeal signs may be absent in infants with meningitis; therefore any abnormal neurologic findings should raise suspicion for meningitis.

Diagnostic studies

Most children with acute diarrhea do not require laboratory testing, although in complex cases some laboratory studies may be useful.

Patients with seizures or altered consciousness should have glucose and electrolyte assessment if possible. Children with suspected pneumonia, sepsis, meningitis, urinary tract infection, or HIV infection should have the relevant investigations. Imaging studies are warranted for patients with acute abdominal findings on physical examination.

Microscopy can be used for presumptive diagnosis of two important causes of gastroenteritis. Cholera may be diagnosed using dark field microscopy to detect motile Vibrios, which appear as "shooting stars". In the setting of acute bloody diarrhea, direct microscopic evidence of Entamoeba trophozoites containing red blood cells is a sufficient diagnostic finding warranting treatment for amoebic dysentery (rather than shigellosis)

Microbiology laboratory evaluation, when available, is warranted for patients with invasive diarrhea who do not respond to empiric antibiotic therapy. Other judicious uses of microbiology data include surveillance to detect epidemics and evaluation of antimicrobial susceptibility patterns of selected pathogens.

In other cases, microbiological identification of specific pathogens in the setting of diarrhea is of uncertain significance, as several pathogens can often be found in the stool of children in resource-limited settings during both diarrheal illnesses and asymptomatic periods; diarrhea appears to be associated with a state of overall pathogen excess.

In a large study of children at sites across Asia and Africa, two or more potential pathogens were identified in 45 percent of those with moderate to severe diarrhea and in 31 percent of asymptomatic condition.

TREATMENT

Treatment consists of correcting fluid and electrolyte losses, administering appropriate nutrition, and managing associated comorbid conditions. In the setting of invasive diarrhea, treatment of the underlying cause of illness is also necessary

Fluid and electrolytes

Fluid management consists of two phases: replacement and maintenance.
The goal of replacement therapy is to replenish deficits in water and electrolytes lost. The replacement phase is continued until all signs and symptoms of volume depletion are absent and the patient has urinated; ideally this is achieved during the first four hours of therapy.
Maintenance therapy counters ongoing losses of water and electrolytes; this phase is continued until all symptoms resolve. Most children with acute diarrhea should be treated with Oral Rehydration Solution (ORS)
For children with severe dehydration, the replacement phase should begin with intravenous fluids (IVF).

Composition (mEq/L) of common solutions used for rehydration

Route	Solution	Na +	K +	Cl-	HCO3-	Citrate	Ca + +	Glucose/carbohydrate
Intravenous	Normal saline	154	-	154	-	-	-	-
	Ringer's Lactate	130	4	111	28	-	3	-
	Ringer's Lactate + 5 percent dextrose	130	4	109	28	-	3	278
	Cholera saline ("Dhaka solution")	133	13	98	48	-	-	140
Oral	Standard ORS	90	20	80	-	10	-	111
	Hypo-osmolar ORS	75	20	65	-	10	-	75
	ReSoMal* (Reduced Osmolarity ORS for Malnourished Children)	45	40	76	-	7	-	125

ORS is reviewed in detail separately. [See "Oral rehydration therapy"].

ORS: oral rehydration solution(s).

* Also contains Mg 6 mmol/L, Zn 300 umol/L, Cu 45 umol/L.

Fluid loss in acute watery diarrhea can be isonatremic, hyponatremic, or hypernatremic.

The advantage of correcting sodium imbalances with ORS is that the correction occurs relatively gradually, reducing the risk of the neurologic complications due to rapid shifts in osmolarity that may occur with intravenous fluids.
Stool potassium losses commonly result in hypokalemia. This most often manifests with muscle weakness, though in more severe cases may be complicated by paralytic ileus and/or arrhythmia. Among 140 patients who died following rehydration therapy in Bangladesh, hypokalemia was a proximate cause of death in 9 percent of cases .
Potassium losses are generally replaced using ORS, though some isotonic intravenous fluids contain higher amounts of potassium to replace these losses.

The approach to fluid and electrolyte management depends on the degree of dehydration:

●No signs of dehydration – According to the WHO classification, patients with no overt signs of dehydration are <5 percent dehydrated; they do not require a replacement phase and can begin maintenance therapy (table 3). Such patients usually do not require hospital admission and may be sent home after a brief period of observation to verify that they are tolerating oral maintenance fluids. Ideally ORS is administered for maintenance fluids to counter ongoing fluid and electrolyte losses.

If the stool output is modest, ORS may not be necessary and ongoing feeding along with supplemental fluids may be sufficient.

In general, patient thirst should be sufficient to guide the volume of ORS administered; children under two years should receive approximately 50 to 100 mL of ORS for each episode of diarrhea or vomiting and children over two years should receive 100 to 200 mL of ORS for each episode. All children over the age of six months should also receive zinc therapy

WHO guidelines for assessment of dehydration

Clinical feature	Predicted degree of dehydration		
	None (<5 percent)	Some dehydration (5-10 percent)	Severe dehydration (>10 percent)
General appearance	Well, alert	Restless, irritable	Lethargic or unconscious
Eyes	Normal	Sunken	Sunken
Thirst	Drinks normally, not thirsty	Thirsty, drinks eagerly	Drinks poorly or unable to drink
Skin pinch	Goes back quickly	Goes back slowly	Goes back very slowly
Estimated fluid deficit	<50 mL/kg	50-100 mL/kg	>100 mL/kg

Data from: World Health Organization. The treatment of diarrhea: A manual for physicians and other senior health workers, 4th revision. WHO/FCH/CAH/05.1. World Health Organization, Geneva 2005. (Available at http://whqlibdoc.who.int/publications/2005/9241593180.pdf).

Graphic 68271 Version 4.0

Fluids for patients without signs of dehydration

Acceptable
Oral rehydration solution (optimal for both repletion and maintenance)
Salted drinks (salted rice water or salted yogurt drink)
Broth/soup (salted vegetable or meat soup)
Water
Rice water
Coconut water (unsweetened)
Weak tea (unsweetened)
Fresh fruit juice (unsweetened)
Unacceptable
Carbonated beverages
Sweetened juices
Coffee
Medicinal teas or infusions

Fluids containing salt should be encouraged. Unacceptable fluids include carbonated beverages and sweetened juices; the sugar in these fluids may worsen diarrhea. Coffee and medicinal teas or infusions are also unacceptable since they can have diuretic and purgative effects.

Data from: World Health Organization. The treatment of diarrhea: A manual for physicians and other senior health workers, 4th revision. WHO/FCH/CAH/05.1. World Health Organization, Geneva 2005. (Available at http://whqlibdoc.who.int/publications/2005/9241593180.pdf).

Graphic 82172 Version 4.0

Replacement fluid volume for patients with moderate volume depletion by age and weight

Age	Weight	Replacement fluid volume
<4 months	<5 kg	200 to 400 mL
4 to 12 months	5 to 8 kg	400 to 600 mL
1 to 2 years	8 to 11 kg	600 to 800 mL
2 to 4 years	11 to 16 kg	800 to 1200 mL
5 to 14 years	16 to 30 kg	1200 to 2200 mL
>14 years	>30 kg	2200 to 4400 mL

Patients with moderate volume depletion are estimated to have lost 5 to 10 percent of their body weight (ie, 50 to 100 mL of fluid per kg). The total fluid deficit should be repleted within the first three to four hours of presentation.

If weight is known, 100 mL/kg of fluid can be administered. Ongoing losses, if severe, should be incorporated into replacement phase. Fluids should never be restricted. For infants <6 months receiving standard oral rehydration solutions (ORS), provide an additional 100 to 200 mL of water; this is not needed for patients receiving hypo-osmolar ORS.

Some dehydration

According to the WHO classification this category includes children with 5 to 10 percent dehydration (table 3). These children require replacement therapy with ORS in a supervised setting (table 6)

If ongoing stool losses are profound, these losses can be added to the initial amount of fluids given over the first four hour period. Ideally stool output is measured
Alternatively, stool output can estimated as 10 to 20 mL/kg of body weight for each diarrheal stool. Observed fluid replacement and frequent reassessment of hydration status are essential for patients in this category
Children with profound ongoing stool losses (such as seen in cholera) or vomiting may fail repeated attempts at oral rehydration or progress to severe dehydration; this occurs in approximately 3 to 5 percent of patients

Severe dehydration

According to the WHO classification, this category includes children with >10 percent dehydration (table 3). Severe dehydration is a medical crisis and should be managed urgently with intravenous fluids in a hospital setting. However, patients with severe malnutrition should not receive intravenous fluids

The goal of rehydration with intravenous fluids is to stabilize the circulation immediately. This requires that isotonic fluids be administered as quickly as possible, often through multiple sites of intravenous access.

For resource-limited settings the WHO recommends that a bolus of isotonic crystalloid fluid of 30 mL/kg given over 30 minutes (or one hour in infants <12 months), followed by additional isotonic fluids to correct the bulk of the remaining fluid deficit, by giving 70 mL/kg of isotonic crystalloid over 2.5 hours (or 5 hours for infants). It is critical that isotonic crystalloid fluids such as Ringers' Lactate solution or normal saline be used [30]. Colloids, blood products, or hypotonic fluids can be harmful and should NOT be administered since these may cause fluid shifts which exacerbate fluid loss in the cellular compartment

ORS should be initiated in addition to intravenous fluids as soon as the patient can drink, since commercial isotonic intravenous fluid solutions primarily replace water and sodium but do not replace glucose, potassium, or other electrolyte losses. If seizures are present (and hypoglycemia is suspected), a rapid bolus of intravenous glucose should be given followed by addition of 5 percent glucose to the intravenous fluid. Some locally prepared isotonic intravenous fluids (termed "cholera saline") contain higher amounts of potassium to replace potassium losses, but these fluids are not available in many clinical settings.

In settings where intravenous fluids are not available or intravenous access cannot be established, patients can be resuscitated by administration of fluids via nasogastric tube; such patients should be monitored for abdominal distension

Intraosseous administration of fluids is also a possible alternative. If neither of these approaches is possible, fluids may be administered by mouth directly at a rate of 20 mL/kg/hour for up to six hours. These are suboptimal therapies due to the risk of aspiration, but are preferable to the alternative of no fluid therapy. Comatose patients receiving oral fluids should be monitored for vomiting and aspiration, in which case the rate of administration should be slowed until fluids are tolerated.

Nutrition

The goal of nutritional management for patients without malnutrition is to encourage sufficient feeding both during and after the diarrheal illness episode to prevent development of malnutrition and chronic enteropathy.

Infants with diarrhea should be encouraged to breastfeed as much as possible [30]. Infants that are not breastfed should be encouraged to continue to take undiluted formula at least every three hours, in addition to ORS. For infants with dehydration, this should start once rehydration is completed. Milk intolerance is a rare cause of diarrhea in resource-limited countries; this diagnosis should not be applied unless milk refeeding causes a prompt increase in stool volume, weight loss, and worsening of dehydration.

Children with diarrhea should be encouraged to take solid foods immediately after initial dehydration is corrected; delaying the initiation of a nutrient rich diet may increase the risk of malnutrition.

After diarrhea resolves, at least one extra meal per day should be continued for a minimum of two weeks, or until the patient regains normal weight-for-height

Zinc — Several studies have demonstrated that zinc supplementation reduces the severity and duration of diarrhea and reduces the incidence of subsequent episodes of diarrhea for several months [34-36]. Based on these studies, the WHO recommends zinc for children under 5 years of age with diarrhea (10 mg/day for children under 6 months and 20 mg/day for children 6 months to 5 years, each for 10 days

Vitamin A — Children with diarrhea in resource-limited countries are at high risk of vitamin A deficiency and should receive high dose supplementation with vitamin A. Patients with signs of xerophthalmia, severe malnutrition, or a history of measles should receive a three dose series of repeated treatments for vitamin A deficiency

Role of antibiotics — Antibiotics are not indicated for most children with acute watery diarrhea; suspected cholera is an important exception in which antibiotic therapy is useful

In the absence of culture for diagnosis of cholera, a presumptive diagnosis can be made by darkfield microscopy, rapid dipstick, or clinical suspicion (eg, based on history of acute vomiting and voluminous watery diarrhea in the setting of a cholera outbreak).

Oral antibiotics for suspected cholera

Class	Antibiotic	Typical pediatric dose*	Adult dose	Comment(s)
Tetracyclines	Doxycycline	4 to 6 mg/kg (single dose)	300 mg (single dose)	▪ Antibiotic resistance to all tetracyclines is common [1]. ▪ Empiric use is appropriate in epidemics caused by documented susceptible isolates. ▪ Not recommended for pregnant women and children less than 8 years of age.
	Tetracycline	50 mg/kg/day in 4 equally divided doses, for 3 days	500 mg 4 times per day for 3 days	
Macrolides	Azithromycin	20 mg/kg (single dose)	1 g (single dose)	▪ Single dose azithromycin is preferred therapy [2]. ▪ Rare reports of macrolide resistance.
	Erythromycin	40 mg/kg/day in 4 equally divided doses, for 3 days	500 mg 4 times per day for 3 days	
Fluoroquinolones	Ciprofloxacin	20 mg/kg (single dose)	1 g (single dose) In areas with isolates that have reduced susceptibility to fluoroquinolones: 500 mg twice daily for 3 days [3]	▪ Reduced susceptibility to fluoroquinolones has been reported in Asia and Africa [2,4]. ▪ Not recommended for pregnant women and children less than 8 years of age.

* Not to exceed maximum dose.

We recommend not routinely using antiemetics or antimotility agents in children with acute diarrhea. Antimotility agents (loperamide, diphenoxylate-atropine, and tincture of opium) prolong some bacterial infections and have been associated with rare cases of fatal paralytic ileus in children . Antiemetics (chlorpromazine, prochlorperazine, promethazine, ondansetron, and metoclopramide) have sedating effects that can interfere with rehydration and may cause extrapyramidal reactions and respiratory depression. Thus, despite evidence of potential benefit with ondansetron and other antiemetics , we do not typically use them in this setting.

Invasive diarrhea

Treatment consists of invasive diarrhea requires correction of fluid and electrolyte losses, appropriate nutritional care, and treatment of the underlying cause of illness. The management of fluids and nutrition is as described in the preceding sections.
Empiric antibiotic therapy for acute bloody diarrhea should be targeted against Shigella species (table 2). Antimicrobial treatment of Shigella gastroenteritis reduces the duration of fever and diarrhea, decreases the duration of bacterial shedding, and may reduce the risk of life threatening complications of infection such as bacteremia

Antibiotics for suspected shigellosis in children in resource-limited settings

Antibiotic	Route	Typical pediatric dose	Comment(s)
Preferred agents			
Ciprofloxacin	Oral	30 mg/kg/day (divided twice daily) for 3 days	Multi-dose therapy is preferred.
Azithromycin	Oral	15 mg/kg initial dose on day 1 10 mg/kg daily on days 2-5	
Alternative agents			
Ceftriaxone	IM/IV	50-100 mg/kg once daily for 2-5 days	Ceftriaxone is the preferred empiric therapy for severe infections and infections refractory to other therapies.
Pivmecillinam	Oral	80 mg/kg/day (divided 4 times daily) for 5 days	

Resistance to amoxicillin, trimethoprim-sulfamethoxazole, and chloramphenicol (original first-line therapies) is too widespread to justify their empiric use for invasive diarrhea in developing countries.

IM: intramuscular; IV: intravenous.

For children with bloody diarrhea that does not remit within two days of starting empiric antibiotics for shigellosis, antibiotic-resistant infection or an alternative infectious etiology should be considered.

Amebic dysentery due to the intestinal parasite E. histolytica may be clinically indistinguishable from shigellosis and does not respond to anti-Shigella therapy. Direct stool microscopy can be used for presumptive diagnosis as discussed above.

Metronidazole (35 to 50 mg/kg per day in three divided doses for 7 to 10 days in children to a maximum of 750 mg PO three times daily) is a standard treatment regimen with a cure rate of approximately 90 percent

Hemolytic uremic syndrome — Shigella dysenteriae serotype 1 produce Shiga toxin, which is associated with hemolytic uremic syndrome. In patients with Shigellosis treated with appropriate antibiotics, there is no increase in toxin production or risk of HUS . This is in contrast to Shiga-toxin producing E. coli, for which retrospective and prospective observational studies have reported an increased risk of HUS with the administration of antibiotics during the bloody diarrhea phase.

PREVENTION WHO recommendations to prevent diarrhea include:

- Exclusive breastfeeding until age six months, and continued breastfeeding with complementary foods until two years of age. Complementary feeding may be considered in younger infants if growth is inadequate.
- The consumption of safe food and water. If available, water brought to a rolling boil for at least five minutes is optimal for preparing food and drinks for young children.
- Handwashing after defecating, disposing of a child's stool, and before preparing meals.

- The use of latrines; these should be located more than 10 meters and downhill from drinking water sources.

Immunizations The WHO Strategic Advisory Group of Experts has recommended that rotavirus vaccine for infants be included in all national immunization programs, and strongly recommended the introduction of this vaccine in countries where diarrheal deaths account for ≥10 percent of mortality among children aged <5 years

The WHO recommends the inclusion of oral cholera vaccines in endemic areas, and oral cholera vaccines are increasingly being utilized, through the global cholera vaccine stockpile, as part of an integrated control program in areas experiencing or at risk for cholera outbreaks

Prevention – Preventive measures for acute diarrhea among children in resource-limited settings include breastfeeding, consumption of safe food and water, adherence to hygienic practices, and vaccination against rotavirus infection

با تشکر از حسن توجهتان