

Diarrhea

Diarrhea can be defined as an increase in frequency of the passage of soft or watery stools relative to the usual bowel habit for that individual. It is not a disease but a sign of an underlying problem such as an infection or gastrointestinal disorder. It can be classed as acute (less than 7 days), persistent (more than 14 days) or chronic (lasting longer than a month).

Causes of Diarrhea:

1. Acute gastroenteritis: The term gastroenteritis is used to describe gut infection with viruses, bacteria or parasites, which is characterized by the sudden onset of diarrhea, with or without vomiting. It is the most common cause of diarrhea in all age groups, is usually viral in origin (commonly rotavirus, Norovirus and small, round structured virus). Viruses tend to cause diarrhea by blunting the villi of the upper small intestine, decreasing the absorptive surface.

Rotavirus: In infants, the virus mainly gains entry via the fecal–oral route or sometimes through the air from sneezing and coughing. The infection starts abruptly, and fever and vomiting often precede diarrhea. The acute phase is usually over within 2–3 days, although diarrhea may persist for up to a week. While the majority of infections are usually not too severe and are self-limiting, it should be remembered that rotavirus infection can cause severe illness and even death; it is one of the main causes of death in children in developing countries.

Norovirus: This is another common cause of viral gastroenteritis in people of all ages. It can occur in clusters or ‘mini’ epidemics, such as on hospital wards or in schools, and is more common in winter. The virus is readily spread by contact with another person, through contaminated food or surfaces contaminated with vomit. After an incubation of up to 48 h, the illness begins suddenly with profuse vomiting, diarrhea and flu-like symptoms. It usually settles in 2–3 days and treatment include the usual advice on fluid replacement. As with all cases of gastroenteritis, prevention of spread is very important, and careful handwashing procedures and hygiene measures are essential. Norovirus rarely causes significant harm except in those who are very old or frail.

2. Bacterial causes of diarrhea are normally as a result of eating contaminated food or drink and cause diarrhea by a number of mechanisms. The typical symptoms include

severe diarrhea and/or vomiting, with or without abdominal pain. For example, enterotoxigenic *E. coli* produce enterotoxins that affect gut function with secretion and loss of fluids; enteropathogenic *E. coli* interferes with normal mucosal function. and enteroinvasive *E. coli*, *Shigella* and *Salmonella* species cause injury to the mucosa of the small intestine and deeper tissues. Antibiotics are generally unnecessary as most food-borne infections resolve spontaneously. The most important treatment is adequate fluid replacement. Antibiotics are used for *Shigella* infections and the more severe *Salmonella* or *Campylobacter* ones. *Ciprofloxacin* may be used in such circumstances.

Features of some bacterial illnesses causing diarrhea

Bacteria	Incubation	Duration	Symptoms
Staphylococcus	2-6 h	6-24 h	Severe, short lived; especially vomiting
Salmonella	12-24 h	1-7 days	Mainly diarrhoea
Campylobacter	2-7 days	2-7 days	Diarrhoea with abdominal colic
Bacillus cereus	1-5 h	6-24 h	Vomiting
Bacillus Cereus (second type of infection)	8-16 h	12-24 h	Diarrhoea
Listeria monocytogenes	3-70 days		Flu-like, diarrhoea

3. Protozoan: Examples include *Entamoeba histolytica* (amoebic dysentery) and *Giardia lamblia* (giardiasis). In Giardiasis, the patient will present with watery and foul-smelling diarrhea, accompanied with symptoms of bloating, flatulence and epigastric pain. Diagnosis is made by sending stool samples to the laboratory. Treatment is usually with metronidazole (**The bellow table shows the main causes of diarrhea with its incidence**).

Causes of diarrhoea and their relative incidence in community pharmacy	
Incidence	Cause
Most likely	Viral and bacterial infection
Likely	Medicine induced
Unlikely	Irritable bowel syndrome, giardiasis, faecal impaction
Very unlikely	Ulcerative colitis and Crohn's disease, colorectal cancer, malabsorption syndromes

4. Persistent or chronic diarrhea

Persistent, chronic or recurrent diarrhea may be due to an irritable bowel or, more seriously, a bowel tumor, an inflammation of the bowel (e.g. ulcerative colitis or Crohn's disease), an inability to digest or absorb food (i.e. malabsorption, e.g. coeliac disease) or diverticular disease of the colon.

5. Antibiotics and *Clostridium difficile*

Diarrhea is commonly seen with antibiotics, occurring in around 10% of people. Of more importance is that about a quarter of cases of antibiotic-associated diarrhea are due to *Clostridium difficile*. Many people carry small amounts of this bacteria in their gut, and as it is resistant to many antibiotics, the antibiotic kills off other flora in the gut and allows the *C. difficile* to flourish. Some strains of *C. difficile* produce a toxin that damages the large bowel lining, which results in profuse watery diarrhea.

People who are most susceptible to *C. difficile* are those who are already weakened by age or illness. Factors that increase the risk of infection include advanced age and underlying morbidity, such as abdominal surgery, cancer and chronic renal disease. In well mobile people, the infection causes protracted unpleasant diarrhea lasting a few weeks; however, in debilitated people, the complications of *C. difficile* infection can be more severe and include dehydration, perforation of the colon, sepsis and even death.

Usually, it can be treated by careful attention to rehydration. Antidiarrheal medication, such as *loperamide*, should not be used as this can aggravate the condition. If the diagnosis is confirmed using a stool, an antibiotic, such as *metronidazole* or *vancomycin*, may be used.

A case of persistence diarrhea after a course of antibiotics required referral

Differential Diagnoses:

The community pharmacist can appropriately manage the vast majority of cases. The main priority is identifying those patients who need referral and how quickly they need to be referred. Dehydration is the main complicating factor, especially in the very young and very old. A number of diarrhea-specific questions should always be asked to the patient to aid in differential diagnosis.

Age

Particular care is needed in the very young and the very old. Infants (younger than 1 year) and older people are especially at risk of becoming dehydrated.

Frequency and nature of the stools:

Patients with acute self-limiting diarrhea will be passing watery stools more frequently than normal. Diarrhea associated with blood and mucous (dysentery) requires referral to eliminate invasive infection such as *Shigella*, *Campylobacter*, *Salmonella* or *E. coli*. Bloody stools is also associated with conditions such as inflammatory bowel disease

Symptoms

Acute diarrhea arising from infection is rapid in onset and produces watery stools that are passed frequently. Abdominal cramps, flatulence and weakness or malaise may also occur. Nausea and vomiting may be associated with diarrhea, as may fever. The pharmacist should always ask about vomiting and fever in infants; both will increase the likelihood that severe dehydration will develop. Another important question to ask about diarrhea in infants is whether the baby has been taking milk feeds and other drinks as normal. Reduced fluid intake predisposes to dehydration. Diarrhea with severe vomiting or with a high fever would also require medical advice.

Previous history

A previous history of diarrhea or a prolonged change in bowel habit would warrant referral for further investigation; therefore, it is important that the pharmacist distinguish among acute, persistent and chronic conditions. Persistent diarrhea (with a duration of more than 2 weeks) may be caused by bowel conditions, such as Crohn's disease, IBS or ulcerative colitis, and requires medical advice. Chronic diarrhea is where the condition goes on for 5 weeks or longer.

Onset of symptoms:

Ingestion of bacterial pathogens can give rise to symptoms in a matter of a few hours (toxin-producing bacteria) after eating contaminated food or up to 3 days later. It is therefore important to ask about food consumption over the last few days

Timing of diarrhea

Patients who experience diarrhea first thing in the morning might well have underlying pathology such as IBS. Nocturnal diarrhea is often associated with inflammatory bowel disease.

Recent travel abroad

Diarrhea in patient who has *recently traveled* abroad requires referral since it may be infective in origin (**Traveler's diarrhea**)

Signs of dehydration

Mild (<5%) dehydration can be vague but include tiredness, anorexia, nausea and light-headedness Moderate (5% to10%) dehydration is characterized by dry mouth, sunken eyes, decreased urine output, moderate thirst and decreased skin turgor (pinch test)

Medication

Medicines already tried: The pharmacist should establish the identity of any medication that has already been taken to treat the symptoms in order to assess its appropriateness.

Details of any other medication being taken (both OTC and prescribed) are also needed, as the diarrhea may be *drug induced* (Table 2)

Table-2: Some drugs that may cause diarrhea.

- Antacids: *Magnesium salts*
- Antibiotics**
- Antihypertensives: *methyldopa*; beta-blockers (rare)
- Digoxin* (toxic levels)
- Diuretics (*furosemide*)
- Iron preparations*
- Laxatives
- Misoprostol*
- Non-steroidal anti-inflammatory drugs
- Selective serotonin reuptake inhibitors

Lactose intolerance

Lactose is a sugar found in milk and other dairy products. People who have difficulty digesting lactose have diarrhea after eating dairy products. Lactose intolerance can increase with age because levels of the enzyme that helps digest lactose drop after childhood.

When to refer

Dehydration suspected

Diarrhoea of greater than

1 day's duration in children younger than 1 year

2 days' duration in children under 3 years of age and elderly patients

3 days' duration in older children and adults

Severe vomiting, or vomiting lasting for more than 1–2 days

Persistent diarrhoea after a course of antibiotics

Feverish, high temperature

Suspected outbreak of 'food poisoning'

Recent travel abroad

Suspected drug-induced reaction to prescribed medicine

History of change in bowel habit

Presence of blood or mucus in the stools

Elderly, frail or with underlying significant health problem

Weak immune system, such as due to HIV, chemotherapy or long-term corticosteroids

Pregnancy

Management:

Goals of OTC treatment are therefore concentrated on relief of symptoms. Given most causes of diarrhea only last 24 to 48 hours, the main aim of treatment should be to reduce any potential dehydration caused by fluid loss.

A-Advices for patients suffering from diarrhea.

Most people with gastroenteritis do not usually need to seek medical advice. Symptoms are often mild and commonly get better within a few days without treatment. Abdominal cramping or stomach ache may be a feature and *paracetamol* may help.

If vomiting occurs, it often lasts only a day or so, but sometimes longer. Diarrhea may continue after the vomiting stops for a few days and loose stools may continue for a week or so further before a normal pattern returns. It used to be advised not to eat with gastroenteritis. However, it is now thought that eating small, light meals or soup, according to appetite, is not harmful. It is better to avoid fatty, spicy or heavy food. Adults and older children should be advised to drink plenty of water to avoid

dehydration. If diarrhea is frequent, they should drink 200 ml of water, or more if diarrhea is profuse, with each loose motion in addition to the amount they normally drink (which may be more than 2 l if the weather is hot). Drinks that are fizzy or sugary may make diarrhea worse.

NICE guidelines advises that factors associated with high risk of dehydration in children are:

- Children younger than 1 year of age, particularly younger than 6 months
- Infants who were of low birth weight
- Children who have passed more than five diarrhea stools in the previous 24 h.
- Children who have vomited more than twice in the previous 24 h
- Children who have not been offered, or have not been able to tolerate, supplementary fluids before presentation
- Infants who have stopped breastfeeding during their illness
- Children with signs of malnutrition

Children who meet these criteria should also be considered for referral. Rehydration should still be initiated even if referral to the doctor is thought to be necessary.

Symptoms and signs of dehydration

Dehydration in adults (urgent referral)	Dehydration in children (urgent referral)
<ul style="list-style-type: none"> • Tiredness • Dizziness or light-headedness • Headache • Muscular cramps • Sunken eyes • Passing little urine • A dry mouth and tongue • Weakness • Becoming irritable 	<ul style="list-style-type: none"> • Appears unwell • Passing little urine • A dry mouth • A dry tongue and lips • Fewer tears when crying • Sunken eyes • Weakness • Being irritable or lacking in energy (lethargic)
Severe dehydration in adults (immediate medical attention)	Severe dehydration in children (immediate medical attention)
<ul style="list-style-type: none"> • Weakness • Confusion • Rapid heart rate • Coma • Producing very little urine 	<ul style="list-style-type: none"> • Drowsiness • Pale or mottled skin • Cold hands or feet • Very few wet nappies • Fast (but often shallow) breathing

B-Oral rehydration therapy

Oral rehydration solution (ORS) is considered to be the standard in the management for acute diarrhoea in babies and young children. It is also recommended for people who are over the age of 60, or who have frailty or underlying health problems. It may be advised in other people if dehydration is developing, or symptoms persist. ORS may be used with antidiarrhoeal drugs in older children and adults.

Sachets of ORS powder for reconstitution are available; these contain sodium and potassium salts along with glucose. Some contain rice starch instead of glucose. Intestinal absorption of sodium and water is enhanced by glucose and starch (carbohydrate).

Patients should be reminded that drinking water should be used to make the solution (never use fruit juices or carbonated drinks) and that boiled and cooled water should be used for children younger than 1 year. Boiling water should not be used. One sachet is mixed with 200 ml of water. The solution can be kept for 24 h if stored in a refrigerator.

Quantities of ORS

Once dehydration, or suspected dehydration, has been corrected rapidly over several hours by drinking plenty of ORS, further dehydration should be prevented by encouraging the patient to drink their normal volumes of fluid and by replacing continuing losses with an ORS. In infants, breastfeeding or formula feeds should be offered between ORS drinks.

Give ORS by mouth to correct continuing losses in the following volumes:

- For Children of 1–11 months

1–1½ times usual feed volume

- For Children of 1–11 years

200 ml, after every loose motion

- For Children of 12–17 years

200–400 ml, after every loose motion, dose according to fluid loss

- For Adults

200–400 mL, after every loose motion, dose according to fluid loss

Giving too much of the ORS will not harm the child (or adult), so it is better to give more rather than less. Discourage giving fruit juices and carbonated drinks until the diarrhea has stopped.

Often, sickness and diarrhea are seen together with gastroenteritis. If a child is vomiting as well as having diarrhea, the advice is to give small amounts of ORS often (i.e. 10–20 ml every 5–10 min), as larger amounts may make the child sick. It is important that the full amount is still given

C-Antimotility Drugs:

Loperamide

It is a synthetic opioid analogue and is thought to exert its action via opiate receptors slowing intestinal tract time and increasing the capacity of the gut. It is very effective in acute infectious diarrhea. *Loperamide* may not be recommended for use in children under 12 years. It should not be used for longer than 2 days. It should be avoided in bloody or suspected inflammatory diarrhea (patients who have fever) and in cases of significant abdominal pain. An obvious side effect is constipation. Sometimes, dizziness, headaches, flatulence and nausea are seen. Abdominal pain, drowsiness, dry mouth, dyspepsia, rash and vomiting are rarely reported.

An important caution is to advise the person not to exceed the recommended daily dose as cardiac arrhythmia has been reported in association with overuse.

Adult dose: Initially 2 tablets (4 mg) followed by 1 tablet (2 mg) after each loose stool (max. 8 tablets / day).

Diphenoxylate/atropine (Co-phenotrope)

Co-phenotrope can be used as an adjunct to rehydration to treat diarrhea in those aged 16 years and over

Adult doses: 4 tablets initially followed by 2 tablets every 6 hours.

Kaolin

Kaolin has been used as a traditional remedy for diarrhea for many years. Its use was justified on the theoretical grounds that it would absorb water in the GI tract and would absorb toxins and bacteria onto its surface, thus removing them from the gut. The use of *kaolin*-based preparations has largely been superseded by oral rehydration therapy, although patients continue to ask for various products containing *kaolin*.

Extra-Notes:

A-Probiotics (dietary supplement): Probiotics are **dietary** supplements containing bacteria (including several *Lactobacillus* species) that may promote health by enhancing the normal microflora of the GI tract while resisting colonization by potential pathogens. Probiotics have been shown to decrease **the duration** of infectious and antibiotic-induced diarrhea in adults and children.

B-Use of zinc in children with diarrhea: Several large studies performed in **developing countries** have shown that daily zinc supplementation in young children with acute diarrhea reduces both the **duration** and **severity** of diarrhea. The **WHO/UNICEF** recommends that children with acute diarrhea also receive zinc (10 mg of elemental zinc/day for infants younger than 6 months; 20 mg of elemental zinc/day for older infants and children) for 10 to 14 days.

Summary

Since diarrhea results in fluid and electrolyte loss, it is important to re-establish normal fluid balance and so ORS is first-line treatment for all age groups, especially children and the frail elderly. Loperamide is a useful adjunct in reducing the number of bowel movements but should be reserved for those patients who will find it inconvenient to use a restroom.