Diarrhea: Use of Probiotics

What We Know

- Diarrhea refers to the passing of loose or watery stool 3 or more times in a day. The World Health Organization and UNICEF report that there are about 2 billion cases of diarrheal disease globally each year, including the diarrhea-related deaths of 1.9 million children under the age of 5. More than 20 viruses, bacteria, and parasites can cause diarrhea. The most common cause of diarrhea is viral gastroenteritis (commonly called stomach flu), which can result from infection from any of a variety of viruses and usually resolves spontaneously within a few days. In some cases, diarrhea persists and is more severe, resulting in dehydration and malnutrition. Worldwide, the primary cause of severe diarrhea in infants and children is rotavirus. In adults and children several medical conditions can result in diarrhea, including celiac disease, inflammatory bowel disease (IBD; e.g., Crohn’s disease and ulcerative colitis), irritable bowel syndrome (IBS), and food intolerance (e.g., to lactose and/or gluten). Diarrhea can occur as an adverse effect of certain medications (e.g., antibiotics, chemotherapy agents, laxatives). Travelers frequently develop diarrhea (commonly called traveler’s or community-acquired diarrhea) from the bacteria Escherichia coli due to exposure to poor sanitation or unclean water.\(^{(1,5,7,8,9,12,16,17,18,21)}\)

- Radiation therapy, particularly to the abdominal region, can also lead to diarrhea since it disturbs the colonization of the intestinal flora (Demers, Hamad). This phenomenon is referred to as radiation therapy induced (RTI) diarrhea.\(^{(23)}\)

- The clinical manifestations of diarrhea are divided into three categories:\(^{(7)}\)
  - Acute diarrhea is identified as the presence of three or more loose or watery stools in a 24-hour period
  - Dysentery refers to the presence of visible blood in the stools
  - Persistent diarrhea is defined as diarrheal episodes that last longer than 14 days. This can lead to malabsorption and significant weight loss, further exacerbating the condition

- Antibiotic-associated diarrhea (AAD) versus Clostridium difficile-associated diarrhea (CDAD)
  - AAD is due to several occurrences in the body: suppression of anaerobic bacteria, disruption of the protective effect of commensal bacteria, and activation of antibiotics through prokinetic activity.\(^{(9)}\)
  - CDAD often occurs through the fecal-oral route as a result of the contamination of the hands of healthcare workers and patients.\(^{(3)}\) CDAD is more prevalent in older adults who are hospitalized and exposed to broad-spectrum antibiotics.\(^{(15)}\)

- Whatever the cause, the treatment goals are to prevent or reverse dehydration and/or malnutrition and shorten the duration of the illness. Treatment options include rehydration; avoidance of foods that trigger diarrhea, if that is a factor; medication (e.g., antibiotics; agents that suppress gut motility); treatment of the underlying medical condition causing diarrhea, when relevant; and probiotics

- Probiotics are live microorganisms that are thought to positively alter the normal flora (i.e., friendly bacteria) of the intestines and provide certain health benefits when ingested. Practitioners have used probiotics successfully in the treatment of Clostridium difficile infections, rotavirus-related diarrhea, and traveler’s diarrhea. Some researchers
have also concluded that the use of the probiotics *Lactobacillus acidophilus* or *L. plantarum* can also resolve bowel-related signs and symptoms in persons with IBS.

> **Signs and symptoms of diarrhea**

- Painful abdominal bloating or cramping
- Passing loose or watery stool
- Dehydration characterized by one or more of the following:
  - Reduced urine output
  - Crying without producing many tears
  - Dizziness or light-headedness
  - Dry mouth
  - Sunken eyes

> **Risk factors for diarrhea**

- Taking medications that are known to cause diarrhea, including the following:
  - Certain antibiotics, including cephalosporins, clindamycin, erythromycin, penicillins, quinolones, and tetracyclines
  - Chemotherapy drugs prescribed for cancer treatment
  - Laxatives that contain magnesium
- Receiving radiation therapy
- Medical conditions that can cause diarrhea include the following:
  - Celiac disease
  - IBD
  - IBS
  - Lactose intolerance
  - Malabsorption syndromes

> **Treatment of diarrhea**

- Treatment is focused on preventing or reversing dehydration and/or malnutrition and reducing the duration of the illness
- Provide hydration by administering prescribed oral and/or intravenous rehydration solutions
- Identify and remove foods suspected of causing diarrhea
  - Avoid heavily fried foods, foods that are high in fat, and spicy foods
  - As appropriate, evaluation for lactose intolerance may be initiated. Patients may need to avoid milk products, butter, ice cream, and cheeses
  - Avoid alcohol and caffeinated beverages
  - As appropriate, avoid sorbitol and other artificial sweeteners
  - As appropriate, avoid foods that may cause gas such as cabbage, beans, broccoli, and cauliflower
  - Avoid foods that may be tainted, not properly refrigerated, or improperly stored
- Probiotics have been shown to be effective for a variety of causes of diarrhea and are generally considered safe
- Antibiotics can be prescribed if diarrhea is the result of bacterial infection
- Agents that suppress gut motility (e.g., loperamide, codeine) can be prescribed

> **Recent research findings on diarrhea and the use of probiotics**

- Probiotics have been used successfully in the treatment of *C. difficile* infections, rotavirus diarrhea, and traveler’s diarrhea. Results of many studies show that the probiotics *Saccharomyces boulardii*, *L. reuteri*, and *L. rhamnosus* GG can reduce the frequency of diarrhea and shorten the duration of diarrhea caused by infection by an average of 25 hours. *S. boulardii* and *L. rhamnosus* GG have been shown to lower the risk of antibiotic-associated diarrhea. The probiotics *L. acidophilus* and *L. plantarum* have been used to successfully reduce IBS-related signs and symptoms in affected persons.

- Few clinical trials have been conducted on the effect of probiotics on IBD. There are some promising but inconclusive findings for the use of probiotics in the treatment of ulcerative colitis, but no significant benefit has been documented for their use in the treatment of Crohn’s disease. Researchers estimate that about 40% of adults and children with IBD use alternative and complementary therapies, which frequently include the use of probiotics. Because of this, further research on the efficacy of probiotics for the treatment of IBD is imperative and practitioners should become educated about the use of probiotics.
• Probiotics have been shown to be beneficial in the prevention and treatment of radiation-induced diarrhea. While more research is needed, strains that have been shown to be effective in reducing the incidence and severity of diarrhea from radiation therapy include VSL #3 and Lactobacillus casei DN-114001. Bifilact has been shown to reduce diarrhea at the end of radiation treatment in patients with pelvic cancer. VSL #3 and Bilifact are commercial probiotic preparations.

– Patients undergoing pelvic radiation may benefit from diet modifications which include modifying the type of fat, reducing lactose, restricting fat intake, and increasing fiber through food and/or supplements.

• The use of probiotics in older adults receiving antibiotics has not been shown to be effective in preventing AAD or CDAD. In a multi-center, randomized, double-blind, placebo-controlled parallel arm study, researchers found no evidence to support the notion that probiotics were effective in preventing AAD and only a modest trend toward reduced CDD in older patients taking antibiotics.

• Because of the lack of sufficient compelling evidence, the American College of Gastroenterology does not recommend the use of any particular probiotic product for treatment of acute adult diarrheal infection. However, there is sufficient evidence for use of probiotics in the prevention of acute diarrhea associated with antibiotic use.

What We Can Do

› Educate yourself about the use of probiotics in patients with diarrhea so you can accurately assess your patients’ personal characteristics and health education needs; share this information with your colleagues

› Education patient/family on sources of probiotics, including yogurt, sauerkraut (unpasteurized), kefir, sourdough bread, milk with probiotics, sour pickles, tempeh, and probiotic supplements as appropriate. It is unclear whether some probiotic foods and products are more effective than others; there may be differences in outcomes for patients between yogurt and probiotics in capsule or powder form, or between lactic acid bacteria and other microorganisms

› Educate patients on how to store probiotics. Probiotics should be refrigerated with the lid tightly closed. Capsules should not be handled with bare hands; instead they should be shaken into the cap and then the extra poured back into the bottle. A clean dry spoon should be used to measure powdered probiotics

› Emphasize the importance of reporting all health-related changes to the treating clinician as soon as possible to prevent complications

› Assess patient/family members for knowledge deficits about the prescribed treatment regimen and emphasize the importance of strict adherence to the prescribed treatment regimen and continued medical surveillance to monitor health status

Related Guidelines

› American Academy of Pediatrics Report on Use of Probiotics and Prebiotics in Children

› ACG Clinical Guideline: Diagnosis, Treatment, and Prevention of Acute Diarrheal Infections in Adults

Coding Matrix

References are rated using the following codes, listed in order of strength:

| M | Published meta-analysis |
| SR | Published systematic or integrative literature review |
| RCT | Published research (randomized controlled trial) |
| R | Published research (not randomized controlled trial) |
| C | Case histories, case studies |
| G | Published guidelines |
| RV | Published review of the literature |
| RU | Published research utilization report |
| QI | Published quality improvement report |
| LG | Legislation |
| PGR | Published government report |
| PFR | Published funded report |
| PP | Policies, procedures, protocols |
| X | Practice exemplars, stories, opinions |
| GI | General or background information/texts/reports |
| U | Unpublished research, reviews, poster presentations or other such materials |
| CP | Conference proceedings, abstracts, presentation |

References


