FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

Integrating Gender and Nutrition within Agricultural Extension Services

Activity Sheet
May 2018

Name This Foodborne Disease

Time: *80 Minutes*

Materials Needed:

- Foodborne Illnesses Handout (Appendix A)

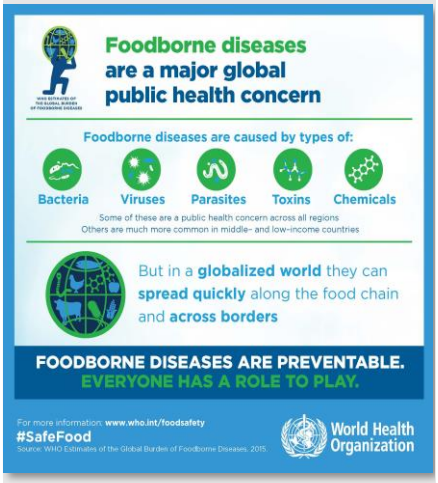

Figure 1: Global burden of foodborne diseases (WHO 2015b)

Introduction

Foodborne disease is any illness caused by contaminated and spoiled food, pathogenic bacteria, viruses, or parasites that contaminate food, as well as toxins, such as poisonous mushrooms. Foodborne diseases remain a preventable public health problem worldwide that disproportionally affect those in developing countries. There, many people often have higher levels of exposure to environmental factors (for example, pollution from water, soil or air) as well as being less equipped to handle foodborne diseases medically (WHO 2015a). Children under five years old are especially at risk with children accounting for almost one-third of deaths from foodborne diseases (WHO 2015a). Through proper food handling and safety practices, such as washing hands before cooking or eating, washing food with clean water, proper handling of raw food including meat during food preparation, and proper storing of uncooked and cooked food (ideally in a cool place, covered), foodborne diseases can be prevented.

Objectives

- ✓ To give a definition of foodborne disease.
- ✓ To be able to identify the occurrence, signs and symptoms, and control of foodborne diseases.
- ✓ To describe outbreak situations that could be the result of poor food safety.

Steps

1) Review title of activity, objectives, and brief introduction. **(5 min)**
2) Distribute a copy of the common foodborne diseases handout to help with this activity. **(5 min)**

   First we'll review two different case studies to determine what foodborne disease the person may have had and then we'll discuss ways in which the foodborne disease could have been avoided.

3) Begin case study 1: **(15 min)**

   A patient arrives at a clinic with diarrhea and vomiting. After meeting with the physician, the physician notices the patient is having trouble breathing and keeps stumbling around the room. The physician asks if the patient wears prescription glasses, the patient answers no, his vision is usually good but lately he has experienced some blurriness.

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Figure 2: Traditional Tajik meal eaten on the floor

What could the patient potentially have?

Answer: *Clostridium botulinum (commonly known as botulism)*

Why, what symptoms give it away?

Answer: *Effects to neurological system include paralysis, blurred vision, and difficulty breathing and swallowing*

Which foods do you suspect and why?

Before soliciting answer use the chart below to show which foods and food handling practices could have made the patient ill.

Food/ Container	Packaging	Storage	Container opened?
Ground meat	Vacuum packaged in tray	Refrigerated	Yes (trash)
Strawberries	Plastic clamshell	Refrigerated	Yes (trash)
Pineapple chunks	Canned	Shelf stable	No (cupboard)
Chili beans, meat, seasoning	Canned	Shelf stable	Yes (recycle bin)
Ketchup	Plastic bottle	Refrigerated	Yes (refrigerator)
Milk	Plastic jug	Refrigerated	Yes (refrigerator)
Orange juice	Paperboard carton	Refrigerated	Yes (refrigerator)
Grape jelly	Plastic jar	Refrigerated	Yes (refrigerator)
Vegetable soup	Canned	Shelf stable	No (cupboard)
Dried spaghetti	Box	Shelf stable	Yes (cupboard)
Tomato sauce	Glass jar	Shelf stable	No (cupboard)
Soda	Plastic bottle	Shelf stable	Yes (refrigerator)

Answer:

Ground meat - Anaerobic, low-acid, if stored at improper temperature
Chili beans, meat, seasoning - Anaerobic, low-acid
Vegetable soup - Anaerobic, low-acid

4) The culprit in Case study 1 was the canned chili sauce. It had been processed incorrectly, leaving the product undercooked. Canned low-acid foods are considered at risk for supporting *C. botulinum* spores growth; however, strict adherence to low-acid, canned food regulations which require processing conditions in excess of those necessary to inactivate *C. botulinum* spores has provided an excellent safety record for these foods. Review methods that this foodborne disease can be prevented. **(20 min)**
5) Begin case study 2: **(15 min)**

Figure 2: Traditional way of cooking food in rural areas of Tajikistan

A family becomes ill showing signs of diarrhea, fever, and stomach pain. They haven't eaten anything outside of their normal diet for a few weeks. However, about 3-4 weeks earlier they had all attended a wedding ceremony where food was served. The physician at the clinic noticed other patients had similar symptoms and that many if not all had attended this wedding. Most of the patients were presenting with a yellowish skin color.

What could this family and the other patients have? Why?

> ***Answer:*** *Hepatitis A. The yellowish discoloration of the skin is a sign of jaundice. The 3-4 week onset of symptoms is also a characteristic of Hepatitis A.*

What food could have attributed to the spread of Hepatitis A?

Review the table below to discuss potential contaminated foods

Food	# Ate and Sick	# Ate and Not Sick	# Not Eat and Sick	# Not Eat and Not Sick
Potato with green onions	*17*	*3*	*3*	*4*
Cabbage	*3*	*1*	*17*	*6*
Rice	*7*	*2*	*13*	*5*
Soup with meat	*4*	*2*	*16*	*5*
Bread	*5*	*4*	*15*	*3*
Pasta	*6*	*1*	*14*	*6*
Lamb	*2*	*1*	*18*	*6*

Why do you suspect the potato with green onions got so many people sick?

> ***Answer:*** *The green onions could have been infected through fecal contamination while it was being grown in the farm or by the cook not washing his or her hands before preparing the meal*

6) The case studies in this activity were based off real events but were altered to meet the appropriateness of the audience (e.g., changing the foods to local, recognizable food). Use these case studies to discuss country-appropriate ways in which foodborne diseases can be avoided and what common practices are currently taking place at homes or communities that should be changed. **(20 min)**

References:

1. WHO (World Health Organization) 2015a. "WHO estimates of the global burden of foodborne diseases: foodborne disease burden epidemiology reference group 2007-2015." March. 2015, www.who.int/foodsafety/publications/foodborne_disease/fergreport/en/
2. WHO (World Health Organization) 2015b. "Foodborne diseases are a major global public health concern." Infographic. *Global burden of foodborne diseases*, Dec. 2015, www.who.int/foodsafety/areas_work/foodborne-diseases/ferg/en/

Appendix A: Foodborne Illnesses Handout

Organism	Common Name of Illness	Onset Time After Ingesting	Signs & Symptoms	Duration	Food Sources
Bacillus cereus	B. cereus food poisoning	10-16 hrs	Abdominal cramps, watery diarrhea, nausea	24-48 hours	Meats, stews, gravies, vanilla sauce
Campylobacter jejuni	Campylobacteriosis	2-5 days	Diarrhea, cramps, fever, and vomiting; diarrhea may be bloody	2-10 days	Raw and undercooked poultry, unpasteurized milk, contaminated water
Clostridium botulinum	Botulism	12-72 hours	Vomiting, diarrhea, blurred vision, double vision, difficulty in swallowing, muscle weakness. Can result in respiratory failure and death	Variable	Improperly canned foods, especially home-canned vegetables, fermented fish, baked potatoes in aluminum foil
Clostridium perfringens	Perfringens food poisoning	8–16 hours	Intense abdominal cramps, watery diarrhea	Usually 24 hours	Meats, poultry, gravy, dried or precooked foods, time and/or temperature-abused foods
E. coli O157:H7	Hemorrhagic colitis or E. coli O157:H7 infection	1-8 days	Severe (often bloody) diarrhea, abdominal pain and vomiting. Usually, little or no fever is present. More common in children 4 years or younger. Can lead to kidney failure.	5-10 days	Undercooked beef (especially hamburger), unpasteurized milk and juice, raw fruits and vegetables (e.g. sprouts), and contaminated water
Hepatitis A	Hepatitis	28 days average (15-50 days)	Diarrhea, dark urine, jaundice, and flu-like symptoms, i.e., fever, headache, nausea, and abdominal pain	Variable, 2 weeks-3 months	Raw produce, contaminated drinking water, uncooked foods and cooked foods that are not reheated after contact with an infected food handler

Organism	Common Name of Illness	Onset Time After Ingesting	Signs & Symptoms	Duration	Food Sources
Listeria monocytogenes	Listeriosis	9-48 hrs for gastro-intestinal symptoms, 2-6 weeks for invasive disease	Fever, muscle aches, and nausea or diarrhea. Pregnant women may have mild flu-like illness, and infection can lead to premature delivery or stillbirth.	Variable	Unpasteurized milk, soft cheeses made with unpasteurized milk, ready-to-eat deli meats
Noroviruses	Variously called viral gastroenteritis, winter diarrhea, acute non-bacterial gastroenteritis, food poisoning, and food infection	12-48 hrs	Nausea, vomiting, abdominal cramping, diarrhea, fever, headache. Diarrhea is more prevalent in adults, vomiting more common in children.	12-60 hrs	Raw produce, contaminated drinking water, uncooked foods and cooked foods that are not reheated after contact with an infected food handler; shellfish from contaminated waters
Salmonella	Salmonellosis	6-48 hours	Diarrhea, fever, abdominal cramps, vomiting	4-7 days	Eggs, poultry, meat, unpateurized milk or juice, cheese, contaminated raw fruits and vegetables
Shigella	Shigellosis or Bacillary dysentery	4-7 days	Abdominal cramps, fever, and diarrhea. Stools may contain blood and mucus.	24-48 hrs	Raw produce, contaminated drinking water, uncooked foods and cooked foods that are not reheated after contact with an infected food handler
Staphylococcus aureus	Staphylococcal food poisoning	1-6 hours	Sudden onset of severe nausea and vomiting. Abdominal cramps. Diarrhea and fever may be present.	24-48 hours	Unrefrigerated or improperly refrigerated meats, potato and egg salads, cream pastries

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