

Editorial Commentary

FOOD SAFETY

Take life easy; eat, drink and be merry. Luke 12: 19b

Food and water are essential requirements for living. If the quality of food or water is not satisfactory it may result in ill health. A large number of diarrhoeal illnesses are caused by consumption of contaminated water and food. Diarrhoea illnesses constitute one of the leading infectious causes of death and disability worldwide especially in areas with poor sanitation. Food-related illness may present as a sporadic disease or as an epidemic/food poisoning outbreak. Foods most commonly associated with diarrhoea are raw or undercooked sea foods like shrimps, clams and fish. Other types of cooked food like grains, beans, rice with sauces especially when stored without refrigeration could transmit infection. Ready to eat foods like salads, sandwiches, pastry and ice cream are also implicated. When cooked food is stored in a warm environment, even if the initial amount of bacteria is small it can multiply quickly in 8-12 hour period of storage. Unpasteurized milk or improper storage of milk also transmits infection.

Several bacteria, fungi, viruses and parasites had been associated with diarrhoea. Bacterial causes include salmonella, shigella, clostridium, staphylococcus, campylobacter, and Vibrio. Bacterial infection may be due to either the presence of microorganisms in the food or preformed toxins in the food as in diarrhoea caused by *Bacillus cereus*, *Staphylococcus aureus*, and *Clostridium perfringens*. Examples of parasites causing diarrhoea include giardia, cryptosporidia, trichinella and taenia. Viruses which can be transmitted through food include Hepatitis A, calicivirus and Norwalk virus. Symptoms of food-borne infections are nausea, vomiting and diarrhoea; - the severity may depend on the causative agent. Symptoms may range from very mild to severe - leading to dehydration and death. In the developing world, illness due to contaminated food is a major problem and since most infection is treated at home, estimates may be just the tip of the iceberg.

Food safety is dependent a chain of events starting from production on the farm to consumption. Every step along the chain is important.

Farming methods have a marked effect on the quality of vegetables in the market. Studies have shown that fields that have been grazed by livestock and wild animals often have enteric patho-

gens. Bacteria like *Salmonella enteritidis* and *Listeria monocytogenes* could survive in sewage slough commonly applied to agricultural soil for prolonged periods. Local farmers in Accra metropolis use water from drains for irrigation of vegetables and animal manure as fertilizer- these are sources of pathogens. Due to poor sanitation, during the raining season, flood waters are polluted with animal and human excreta which will subsequently contaminate farm lands and crops. In a study of microbiological quality of lettuce and tomatoes grown in Accra, unacceptably high levels of faecal coliforms were found on the vegetables. Organisms such as *Shigella dysenteriae*, *Shigella flexneri*, *Shigella boydii*, *E coli* and *Salmonella Group B* were isolated from tomatoes purchased from farm gates and open markets in Accra¹. In another study, vegetables (carrots, cabbages, and lettuce) from three markets in Accra were found to have infective stages of parasites. These included *Cryptosporidium parvum*, *Strongyloides stercoralis*, *Clonorchis sinensis*, *Enterobius vermicularis* and *Hookworms*. Lettuce carried the highest number of parasites followed by cabbage and then carrots². Sometimes waste water is applied to vegetables just before harvest; this can cause significant microbial contamination.

Production and processing of meat is also a matter of concern. Although state-of-the-art abattoirs are available in the city, a lot of butchers kill and process animals under unsanitary conditions. Car boots and other unauthorized vans are used for carting meat from the abattoir to the market where it is then exposed to flies and dust. Open display of meat in the market for several hours exposes it to more flies - which are known vectors of bacteria including coliforms. The high ambient temperature in the markets and stalls will also allow the bacteria to multiply. Analysis of beef and goat meat in Accra showed that they were contaminated with unacceptably high levels of bacteria¹. Even a supermarket sample of meat (displayed under refrigeration) was found to have *Shigella flexneri*.

Although cooking of meat kills microorganisms, they may survive gentle frying and roasting especially if the meat was not properly defrosted before preparation. Fresh poultry used to be a fairly safe source of meat. Currently deep-freezing of carcasses, inefficient thawing and cooking have

turned poultry into dangerous food if it is not processed properly. The intestines of poultry are usually contaminated with various species of bacteria including salmonella. During evisceration organisms are transferred from the intestines to the flesh of a clean bird. Cooking may not kill all the bacteria if the temperature inside the bird does not rise high enough for example during roasting of chicken. When this partially cooked chicken is then kept in a warm kitchen/buffet table for a long period, salmonella and other bacteria multiply to dangerous levels. I strongly recommend our traditional way of cooking meat; boiling it for several hours, which can kill bacteria.

Eggs can also be a source of infective organisms. Salmonella can easily pass through the shells of newly-laid eggs, especially in wet contaminated environments. Unpasteurized milk is another source of organisms like brucella and salmonella, which cause food-borne infections. Rats and cockroaches in food preparation areas are potential vectors of salmonella, vibrio and parasites like Entamoeba species. Flies which settle on either raw or cooked food, also have access to waste material and excreta and therefore transmit infective agents to the food. Other substances that affect food safety are aflatoxins and antimicrobial agents.

Aspects of food safety are discussed in this edition of the Ghana Medical Journal. Agbodaze et al³ had described the microbiological quality of 'khebab' consumed in Accra metropolis. This is an example of cooked snack sold at public drinking bars and street corners. Thirty samples of 'khebab' bought in three sampling sites in different locations in Accra were assessed for enteric and other pathogens. These 'khebabs' were found to be contaminated with *E. coli*, *Staphylococcus species* and other Gram-negative bacteria some of which are potential pathogens. Another study to evaluate the microbial quality of cooked street food in Accra⁴, showed that, although breakfast and snack foods tested negative for mesophilic bacteria, main meals comprising salads, macaroni, fish, rice and 'shito'- fried pepper, had high levels of pathogenic bacteria including; *Bacillus cereus*, *E. coli* and *Staphylococcus aureus*. Some of the food sellers (whose food was analyzed) had very little knowledge of causes of diarrhoea.

These few examples of studies in Accra show the sorry state of food samples in Accra – it may not be any better in other parts of the country. The incidence of food related infections is grossly under-reported in the country, because only the very

serious episodes are taken to hospital. Invariably only severe outbreaks may be properly investigated to identify the causative agent.

Compared to previous decades, food habits have changed remarkable in Ghana and a lot of people eat food prepared and sold at all types of places- some of which unfortunately have dirty surroundings. Even relatively expensive restaurants may have poor environment. In Ghana, one needs no special qualification or training to sell food on the street. With the increase in food selling points along the streets of major roads in Accra and other big towns in the country, vendors have to be educated on food hygiene practices.

The production of food in farms, transfer, processing and sale of both raw and cooked food in Accra metropolis require urgent attention. Abattoirs must clean; meat must be inspected and certified before it is sold. It may be necessary to build modern markets for farm produce so that food especially meat and vegetables will no more be sold on the bare floor/table. Inspection of the chain of production to consumption must be seen as an important public health issue. Appropriate sanctions must be applied to those who do not do things properly. Finally, everyone must know how to handle food safely.

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