

Food safety: the fourth pillar in the strategy to prevent infant diarrhoea

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Public health historians will hopefully clarify one day why the public health community has taken so long to recognize the link between contaminated food and diarrhoea — particularly infant diarrhoea — and why it has taken so long to integrate food safety into prevention strategies.

Over two decades ago, WHO recognized that infant diarrhoea was a critical public health problem (Snyder JD, Merson HMM. *Bulletin of the World Health Organization* 1982;60:605-13) and that the epidemiological link between contaminated food and the resulting diarrhoea had been established and confirmed (*The role of food safety in health development. Report of a FAO/WHO Expert Committee on Food Safety*. Geneva: World Health Organization; 1984 (WHO Technical Report Series, No. 705); Motarjemi Y et al. Contaminated weaning food — a major risk factor in the cause of diarrhoea and associated malnutrition. *Bulletin of the World Health Organization* 1993;71:79-82). The microbiological evidence was even more striking: diarrhoea is caused by pathogens that enter the body through the mouth, mainly via food or drinking-water. Food, however, contains substances that are not only nutritious for people but that also support the growth of bacterial pathogens. Herein lies the crucial difference between food and water in terms of what happens to bacteria. In water, bacterial pathogens may survive for some time but they will not increase in number. However, in many foods, and most importantly in complementary (weaning) foods, the growth of pathogens is well documented. Thus, even if food contained an originally insignificant bacterial contamination, the pathogens may multiply within a few hours to reach the minimum infective dose that is required to cause disease, particularly if food is stored at ambient temperature (between 20 °C and 40 °C) — a situation frequently observed in developing countries. A substantial number of cases of acute diarrhoea is caused by microbiologically contaminated food, and the resulting malabsorption, leading to a reduced nutritional status of the patients, is especially serious for malnourished people.

On the basis of the available epidemiological and microbiological evidence, WHO concluded that food plays a much more significant role in the epidemiology of enteric diseases than previously thought, and it advocated the need to develop appropriate food safety measures to complement the three traditional strategies for preventing infant diarrhoea — namely, promotion of breastfeeding, vaccination against certain childhood diseases and improvements in the communities' drinking-water supply and sanitation. This advocacy was supported by data on infant diarrhoea morbidity. Although mortality had been successfully reduced annually from around 5 million deaths in

the early 1980s to under 2 million deaths in 2000 by the widespread use of oral rehydration salts, morbidity figures have remained virtually unchanged during this period.

Although one could point to various reasons for the failure to reduce morbidity rate, it is clear that the advocacy to add food safety as the fourth pillar in the strategy to prevent infant diarrhoea is, at best, minimal. In my view, there is a lack of collaboration among different people working in the health sector, which originates from competing interests (e.g. case management vs preventive measures) as well as from competition for the limited resources available. Ministries of health have not, on the whole, established a mechanism that provides coordination of programmes like nutrition or control of diarrhoeal diseases, particularly if there are different professional disciplines involved, such as physicians, nutritionists, food safety specialists, sanitary engineers and others. I have also noticed that paediatricians and clinical microbiologists are still largely unaware of the role of food safety in preventing infant diarrhoea, and the need to assure safe complementary (weaning) food is often not considered, much less advocated. This also leads me to question the quality of the training they receive. For example, I have not yet seen an undergraduate medical curriculum that includes food safety and its role in health and disease. This is, unfortunately, even true for curricula taught in Schools of Public Health. Likewise, nursing schools and the education of nutritionists do not cover food safety. The attempt, in 2000 and 2001, to add food safety to the Master of Public Health curriculum of the School of Public Health at Yale University (New Haven, USA) failed because of lack of money. Recently, the apparent general lack of concern about food safety was exemplified during a discussion I had with the director of the microbiological laboratory of a paediatric clinic in a developing country, where I was told that he and his colleagues have never asked themselves how the pathogens that cause diarrhoea get into the child's body.

On the basis of the sad reality regarding food safety, WHO published a fact sheet in 1993 on this topic (*Facts about Infant Feeding*, issue No. 3, April 1993), in 1996 it published *Basic principles for the preparation of safe food for infants and children* (WHO/FNU/FOS/96.6) and in 1999 it published the book *Basic food safety for health workers* (WHO/SDE/PEH/FOS/99.1). However, the results of implementing the guidance contained in these texts are not yet visible.

The sources of food contamination are diverse. They include nightsoil, polluted water, flies, animals and pets, unclean utensils and pots, dust and dirt. Raw foods are frequently a source of contaminants because some might naturally harbour pathogens or come from infected animals. Food handlers may be the source

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of contamination either as carriers of pathogens or through poor hygienic practices. However, a careful analysis of foodborne diseases has shown that two main errors in food preparation increase risk, because they permit the survival and/or growth of pathogens to disease-causing levels. These errors are the preparation of food several hours before consumption, combined with its storage at temperatures that favour growth of pathogenic bacteria, and, in some cases, the formation of toxins; and insufficient cooking or reheating of food to reduce or eliminate pathogens. If these two practices are avoided most contaminants in food can be controlled, despite the numerous sources of food contamination, and a considerable number of foodborne disease episodes can be prevented.

It is difficult to understand why such a simple and inexpensive intervention that has substantial health outcomes is

not strongly advocated by the public health community. It is also difficult to understand why health care providers don't see the treatment of institutionalized cases and outpatients with diarrhoea as creating opportunities for educating patients and their families/caretakers on why diarrhoea occurs and how it can be prevented.

Does history repeat itself? Ignaz Semmelweis, 150 years ago, proved that puerperal fever was a form of septicaemia and that this could be prevented by the simple measure of thorough handwashing by obstetricians. But it took many years and perhaps thousands of deaths until this simple intervention was accepted by Semmelweis' colleagues. With regard to food safety and the prevention of infant diarrhoea, at least 20 years have already been lost. ■

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