



UNISDR Scientific and Technical Advisory Group Case Studies - 2014

Prevention of diarrhoea in disasters, refugee camps and developing countries

The problem

In complex emergencies and natural disasters, diarrhoeal diseases are a major cause of morbidity and mortality. These diseases cause more than 40% of the deaths in refugee camp settings with mortality and morbidity rates much higher in children aged under 2 years than in any other age group^{1,2}. Loss of fluid (dehydration) is the major threat from diarrhoea, although it also reduces the absorption of nutrients from the gut, which can lead to poor growth in children and reduced resistance to infection, and can potentially result in long-term gut disorders³.

Different factors influence the spread of diarrhoeal disease including inadequate quality and quantity of water, substandard and insufficient sanitation facilities, overcrowding, poor hygiene, and scarcity of soap for hand-washing^{1,2}. Outbreak investigations are reported to indicate that the common sources of infections include polluted water sources (by faecal contamination of surface water entering incompletely sealed wells), water contaminated during transport and storage (through contact with hands soiled by faeces), shared water containers and cooking pots, scarcity of soap, and contaminated foods⁴.

The level of contamination of water with bacteria is known as its 'microbiological quality'; in the early 2000's, although the evidence for how to reduce diarrhoea, in settings where it is very common, by improving the microbiological quality of drinking water was equivocal³.

The science

The Cochrane Collaboration tried to find a clear answer on how best to reduce diarrhoea in these settings through structured reviews of the available scientific evidence (www.cochrane.org). These 'systematic reviews' involve searching for all available scientific studies on a topic, identifying the best quality studies and then assessing what results they show – and what actions they support – when looking at them collectively. The Cochrane Collaboration performed reviews looking at the scientific evidence for interventions aiming to improve the



Source: International Federation of Red Cross and Red Crescent Societies.

microbiological quality of drinking water and for interventions aiming to increase hand-washing to prevent diarrhoea^{3,4}. The systematic review assessing these interventions found 30 trials of sufficient quality on this topic, which included more than 53,000 participants. Interventions to improve the microbiological quality of drinking water included conventional improvements at the water source (e.g. protected wells, bore holes, and stand posts) and point-of-use interventions at the household level (e.g. chlorination, filtration, solar disinfection, and combined flocculation and disinfection).



Source: International Federation of Red Cross and Red Crescent Societies.

Although the trials were all very different, making it difficult to combine their results, the evidence generally suggested that interventions to improve the microbiological quality of drinking water are effective in preventing diarrhoea both for people of all ages and, specifically, for children under five. Further analysis suggested that household interventions are more effective in preventing diarrhoea than interventions at the water source. The interventions were still effective in communities without access to improved water supply or sanitation.

The World Health Organization also commissioned a review that assessed a wide variety of household-based water treatment interventions for their

effectiveness, health impact, acceptability, affordability, sustainability, and scalability⁵. The review concluded that household-based water treatment is among the most cost-beneficial and cost-effective approaches in preventing diarrhoeal disease where adequate quantities of water are available^{6,7}.

The systematic review on hand-washing to prevent diarrhoea identified 14 trials that were considered of good enough quality. When the results of these trials were considered together it was found that interventions promoting hand-washing resulted in a 31% reduction in diarrhoea episodes in communities in low- or middle-income countries. This is comparable to the effects of providing clean water in low-income areas. Many hygiene promotion interventions such as educational programmes, leaflets and discussions were shown to be effective⁴.

The application to policy and practice

The results of these systematic reviews have led to changes in policy so that measures to safeguard the quality of water at the household level are now implemented along with the provision of safe water in emergencies. For instance, the Red Cross now includes a hygiene education component on the treatment and storage of water at the household level when training local volunteers in affected populations. The International Federation of Red Cross and Red Crescent Societies and many UN agencies now systematically employ the Participatory Hygiene and Sanitation Transformation (PHAST) methodology with the communities they assist. The objective is for communities to understand how transmission of disease takes place and therefore how they can be prevented at household level. Hand-washing is now an integral part of PHAST⁵. To make the results of Cochrane, and other systematic reviews accessible to as many disaster responders as possible, the Evidence Aid project (www.evidenceaid.org) includes the reviews and other information in the freely-available resources on its website.

Did it make a difference?

The change in policy brought about by this evidence is far-reaching; for instance, the Red Cross' inclusion in its emergency programme of education on the safe storage and treatment of water in the household will protect the health of a substantial number of people affected by disasters around the world³. However, these are still early days and further research, including longer-term assessments, is necessary to understand the full impact of interventions related to water quality⁸.

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A case study series published by the UNISDR Scientific and Technical Advisory Group

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