



DEALING WITH DIARRHOEA IN CHILDREN IN REFUGEE, EMERGENCY AND DEVELOPMENT SITUATIONS IN THE CONTEXT OF MICRONUTRIENT POWDER USE



“Diarrhoea remains the second leading cause of death among children under five globally. Nearly one in five child deaths – about 1.5 million each year – is due to diarrhoea.”

UNICEF

INTRODUCTION

In many settings where micronutrient powders are used, episodes of diarrhoea pose a challenge and it is therefore important to have an understanding of diarrhoea – its causes, treatment and prevention – together with insight into the valuable role of micronutrient powders in such settings.

Although annual deaths from diarrhoea in children under five years have declined over the past two decades, from an estimated 5 million deaths to 1.5 million deaths in 2004, globally it remains the second most common cause of death, after pneumonia, among children under five. This highlights the exceptional vulnerability of children.

Diarrhoea is more prevalent in the developing world, especially in populations affected by humanitarian emergencies, which includes refugee settings. This is largely due to contaminated drinking water and lack of sanitation and hygiene, coupled with poor overall health and nutritional status.

Globally, some 2.5 billion people lack adequate sanitation facilities, and nearly one billion people live without access to safe drinking water. These unsanitary environments allow diarrhoea-causing pathogens to spread more easily. Improving access to safe drinking water and adequate sanitation, as well as promoting good hygiene (especially avoiding indiscriminate or open defecation and promoting hand washing), are key components in preventing diarrhoea. During the acute phase of emergencies, a minimum of 15 litres of water person per day is needed for drinking, cooking and personal hygiene*. However, this indicator is often not met and more water is needed in the post emergency phase.

In general, children are at greater risk than adults of developing life-threatening dehydration that can result from diarrhoea, a risk that is increased in emergency and refugee situations. This is because water constitutes a greater proportion of children's bodyweight.



Basic hygiene is essential in preventing the spread of diarrhoea-causing micro-organisms

What is diarrhoea?

Diarrhoea is the term given when an individual passes watery stools at least three times in a 24 hr period or more frequently than usual for the individual. Acute diarrhoea appears rapidly and may last for up to several days, while chronic diarrhoea may last 14 days or longer. When diarrhoea continues for several days, the body loses the water and salts that are essential for survival. Severe dehydration and fluid loss caused by diarrhoea can be fatal. Worldwide,

there are approximately 2 billion cases of diarrhoea every year. Diarrhoea is usually caused by eating food or drinking water contaminated with a wide range of pathogens, including bacteria,



Salmonella is just one of many organisms responsible for diarrhoea

viruses, or parasites. Some chemicals such as magnesium sulphate and sorbitol, if taken in an overdose, are also known to possibly cause diarrhoea. However, just a handful of organisms are responsible for most acute cases of childhood diarrhoea. Rotavirus is the leading cause of acute diarrhoea. Other major bacterial pathogens include *E. coli*, *Shigella*, *Campylobacter* and *Salmonella*, along with *V. cholerae* during epidemics.

How is diarrhoea transmitted?

Most pathogens that cause diarrhoea share a similar mode of transmission which is from the stool (faeces) of one person to the mouth of another person. This is known as faecal-oral transmission. The number of organisms needed to cause illness differs between the pathogens.

*Sphere guidelines, 2004 – http://www.sphereproject.org/component/option,com_docman/task,cat_view/gid,70/Itemid,203

MICRONUTRIENTS PROTECT AGAINST INFECTIONS

It is well known that malnourished children, especially those who suffer from micronutrient deficiencies, have a greater risk of being affected by diarrhoea and other infectious diseases and of developing and dying from diarrhoea, measles, malaria and pneumonia. This is because their overall health is compromised and their bodies are less able to fight disease. Repeated bouts of diarrhoea also place children at greater risk of a worsening nutritional status. The reason for this is that these children have a decreased food intake and reduced nutrient absorption. This combined with the child's increased nutritional requirements during repeated episodes of diarrhoea puts them at nutritional risk.

The risk of stunting in young children has been shown to increase significantly with each episode of diarrhoea. Thus, in children who are chronically undernourished, diarrhoea (both acute and prolonged diarrhoea) seriously exacerbates their poor health and accelerates malnutrition, creating a deadly cycle.

It is therefore important to ensure that the micronutrient needs of especially the most vulnerable, including infants and young children, are adequately met through food and food products that contain high quality nutrients. The regular diet, when low in diversity, is also low in the required amounts of the vital micronutrients and this commonly results in deficiencies. Since many refugee populations are entirely dependent upon food rations with little opportunity to diversify their diets, micronutrient deficiencies are not uncommon. Micronutrient powders are one option to improve the nutritional quality of this diet. Other options of providing micronutrients to infants and children are complementary food supplements, fortified blended foods, other fortified complementary foods and fortified ready-to-use foods.

What is micronutrient powder?

Micronutrient powders are one of the options for increasing the micronutrient (vitamin and mineral) intake of individuals at risk of inadequate dietary intakes due to their increased needs. Micronutrient powders are a complementary food supplement, comprised of a mixture of vitamins and minerals in powder form. They are specially designed to



contain the vitamins and minerals needed to meet the needs of the most vulnerable. Micronutrient powder is usually provided in a single-serving sachet, the contents of which can simply be added to the bowl/plate of food just before eating. This is commonly known as home-fortification.

All of these address micronutrient deficiencies in different ways. Specifically developed micronutrient powder that is designed to meet the greater needs of children and can simply be added to food just before eating is globally recognised as an important, effective and safe intervention. The WFP, UNHCR, UNICEF and WHO all widely recommend the use of micronutrient powders especially for the most vulnerable children and women.*

Ensuring the safe use of micronutrient powders

Micronutrient powders should be stored in the sealed sachet until use. Improper handling and storage of micronutrient powders may damage the sachets and this could lead to contamination of the powder. It is therefore critical to ensure that the sachet and its seal are in good order before the product is used. The normal appearance of the powder is a light cream colour and it should pour easily from the sachet. Open sachets should not be stored or used and any uneaten food to which micronutrient powder has been added should be thrown away. Quality control (that is stability testing of the micronutrients) of the micronutrient powder should be conducted on a regular basis by the supplier.



Vitamin A supplementation has been shown to reduce the duration, severity and complications associated with diarrhoea. Studies have shown mortality (death) reductions ranging from 19 per cent to 54 per cent in children receiving vitamin A supplements.

* Preventing and controlling micronutrient deficiencies in populations affected by an emergency. http://www.who.int/nutrition/publications/micronutrients/WHO_WFP_UNICEFstatement.pdf



MICRONUTRIENT POWDERS AND DIARRHOEA

To date more than 16 scientific studies have evaluated the efficacy and effectiveness of micronutrient powders in thousands of children in Africa, Asia and the Americas. Overall less than 1% of caregivers have reported an increase in vomiting, stomach upset, hard stools or diarrhoea.

- A survey undertaken in Nepal in 2009 found that less than 3% of mothers reported that they stopped giving micronutrient powder because they associated it with diarrhoea.
- Studies conducted in Bangladesh and Haiti have shown no differences in diarrhoea symptoms between children who consumed micronutrient powder and those who did not consume the powder.
- A study conducted in Pakistan found that children who consumed micronutrient powder had less frequent episodes of diarrhoea compared to those who did not consume the micronutrient powder.

Therefore, based on the current evidence, there is no clear link between micronutrient powder consumed at a recommended level and the risk of diarrhoea. However, in a few cases micronutrient powder, especially if high in iron, may lead to dark stools, gastrointestinal discomfort associated with constipation and in rare cases diarrhoea. This is believed to be as a result of the high iron dose consumed. Most micronutrient powders, even taken in amounts of up to 4 sachets a day, are safe according to international recommendations and the risk of overdosing is generally low due to the single-dose packaging and bland taste of the micronutrient powder.

This information should be clearly communicated to beneficiaries through social marketing prior to receiving micronutrient powder. Children with severe acute malnutrition (with or without complications) should be treated according to the recommended protocols before being provided with micronutrient powder, due to its iron content.

TREATING DIARRHOEA

It is essential that when children develop diarrhoea, the caregiver seeks immediate medical attention so that the necessary treatment regime can begin. The latest recommendations for treating childhood diarrhoea in the developing world are set out in a UNICEF and WHO joint statement issued in 2004. These interventions are proven, affordable and relatively straightforward to implement. The use of low-osmolarity oral rehydration solution (ORS) is the cornerstone of treatment programmes to prevent life-threatening dehydration associated with diarrhoea. A recent and important development in diarrhoea treatment is the addition of zinc to the regimen.

Clinical studies have shown that a 10 to 14 day treatment course with zinc (20 mg/day for children 12 months and older and 10 mg/day for children younger than 12 months) effectively reduces the duration and severity of both persistent and acute diarrhoea. Zinc has been associated with a 25 per cent reduction in the duration of acute diarrhoea, as well as a 40 per cent reduction in treatment failure and death in persistent diarrhoea.

How important is breast feeding for the prevention of diarrhoea?

The current global recommendation is that infants should be exclusively breastfed for the first 6 months of life, followed by the introduction of appropriate complementary foods together with continued breastfeeding for the first 2 years of life. Breast milk contains everything needed by an infant to survive and develop during the first six months of life and still contributes towards meeting nutritional requirements until at least 2 years of age. Healthy infants who are exclusively breastfed for the first six months of life and continue to be breastfed until two years of age and beyond, develop fewer infections and have less severe illnesses than those who are not. This is because breast milk is the only milk which contains some of the protective components known to fight infectious diseases such as diarrhoea. In addition, breast feeding is usually more hygienic than providing milk from a bottle or other container, which can easily become contaminated. Breast feeding protection has been shown to be higher where maternal literacy is lower and where sanitation is limited. Infants who are not breastfed have a significantly greater risk of dying from infectious diseases in the first two months of life, including from diarrhoea, than those who are breastfed. All children should be exclusively breastfed for the first six months of life.

Did you know?

- It is estimated that 88 per cent of deaths from diarrhoea worldwide is attributable to unsafe water, inadequate sanitation and poor hygiene.
- A number of studies have shown that hand washing with soap (after using the toilet, after cleaning a child's bottom and before handling and consuming food) can reduce the incidence of diarrhoeal disease by over 40 per cent.
- Diarrhoea control is a major concern when responding to humanitarian emergencies and priority interventions include providing safe water in adequate quantities, setting up appropriate sanitation facilities, establishing health services to rapidly detect and treat cases, and promoting good hygiene.

The amount of zinc in a single sachet of micronutrient powder is 4.1 mg, based on the WFP, UNICEF and the WHO recommendations. The zinc in the micronutrient powder helps protect children from infections but the amount is not sufficient to provide what is required for the treatment of diarrhoea and, where available, additional zinc will need to be provided to the child.

Continuing to provide breast milk, other liquids and food to children aged 6 months and older during the diarrhoea episode, while also providing oral rehydration therapy and zinc supplementation, further supports the absorption of fluids from the gut into the bloodstream to prevent dehydration. These children are also more likely to maintain their nutritional status and their ability to fight infection. The caregiver should use the micronutrient powder as instructed by the healthcare provider in line with the specific diarrhoea treatment programme.

Vitamin A supplementation has also been shown to reduce the duration, severity and complications associated with diarrhoea, and vitamin A supplementation in infants and young children is included in the WHO diarrhoea prevention strategies. Studies have shown mortality (death) reductions ranging from 19 per cent to 54 per cent in children receiving vitamin A supplements.

This reduction is associated in large part with declines in deaths due to diarrhoeal diseases and measles. Micronutrient powder does contain vitamin A, but the vitamin A dose recommended as a supplement or biannual administration is significantly higher than that included in micronutrient powder. Therefore, micronutrient powder cannot be used to replace vitamin A supplementation.

The combination of high dose vitamin A supplementation and regular use of micronutrient powders is safe.



PREVENTION IS ALWAYS BETTER THAN CURE

The prevention of childhood diarrhoea requires interventions to make children healthier and less likely to develop infections that lead to diarrhoea. Many well-known child survival interventions are critical to reducing child deaths from diarrhoea. They work in two ways: either by directly reducing a child's exposure to the pathogens that cause diarrhoea or by reducing a child's susceptibility to severe diarrhoea and dehydration through improved nutrition and overall health.

Ensuring clean environments that are less likely to transmit disease and the support of communities and caregivers in consistently reinforcing healthy practices are vitally important. Improving access to safe drinking water and adequate sanitation, as well as promoting good hygiene practices, especially avoiding indiscriminate or open defecation and hand washing with soap,

are key components in preventing diarrhoea. Ensuring good health and nutritional status of children is equally important. It is vital to ensure that micronutrient needs of the most vulnerable are adequately met.

Diarrhoea remains a scourge that needs to be addressed, managed and prevented. There are well known and documented actions that make a lasting contribution to the prevention of diarrhoeal diseases. Education and health-promotion activities are critical. Continued breastfeeding – together with the introduction of appropriate complementary foods after 6 months of age – and micronutrient powders are part of the solution and their use needs to be encouraged and promoted at all times, especially in refugee camps and emergency situations.

UNICEF / WHO RECOMMENDATIONS FOR THE PREVENTION AND TREATMENT OF DIARRHOEA*

TREATMENT RECOMMENDATIONS	PREVENTION RECOMMENDATIONS
<ul style="list-style-type: none"> • Fluid replacement to prevent dehydration. • Zinc treatment. 	<ul style="list-style-type: none"> • Measles vaccination and where available Rotavirus vaccination. • Promotion of early and exclusive breastfeeding and vitamin A supplementation. • Promotion of hand washing with soap. • Improved water supply quantity and quality, including treatment and safe storage of household water. • Community-wide sanitation promotion.
<p>In addition to the above UNICEF/WHO recommendations, ensuring the inclusion of a micronutrient powder or the introduction of quality complementary foods with micronutrients, after the age of 6 months, is a well accepted infant and young child feeding practice.</p>	

*Diarrhoea: Why children are still dying and what can be done. http://www.who.int/child_adolescent_health/documents/9789241598415/en/index.html

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