How Much Has ORT Reduced Child Mortality?

In 1979 oral rehydration therapy (ORT) using oral rehydration salts (ORS) solution became the cornerstone of the global effort, initiated by WHO, to reduce deaths of young children from diarrhoea, then estimated at 4.6 million annually (1). National programmes to control diarrhoeal diseases (CDD) were eventually developed in more than 110 countries. These gave priority to ensuring an adequate supply of ORS packets and to teaching health workers and mothers how to treat or prevent dehydration at home using ORS solution, sugar-salt solution, and various home fluids. The programmes also promoted other effective measures for preventing or treating diarrhoea.

The effects of this effort on indicators of programme implementation, and on diarrhoea morbidity and mortality, were monitored throughout the 1980s and 1990s by periodic surveys, including the WHO Household Survey, the Demographic and Health Survey (DHS) supported by USAID, and UNICEF’s Multiple Indicator Cluster Survey (MICS). The results have been remarkable. Access to treatment with ORS solution rose from essentially zero in 1979 to 80% in 1995, and ORT use rates (children with diarrhoea given either ORS solution or increased home fluids) reached 58 to 81% in different regions. Although diarrhoea-morbidity rates did not change appreciably, estimated mortality from diarrhoea in children aged 0-4 years declined by 1990 to 2.9-3.3 million/year (2,3) and by 1999 to 1.5 million/year (4). Thus, in two decades estimated diarrhoea deaths fell by 3.1 million/year or 67%. Although these figures are global extrapolations from a limited number of national surveys and the confidence limits of the estimates are wide, the consistent direction of change and its magnitude are persuasive. Moreover, these estimates are supported by a nearly universal observation that the number of young children presenting at health facilities with severe dehydration and the number requiring admission to hospital for treatment of diarrhoea have declined markedly (4).

It is unclear, however, to what extent the efforts of national CDD programmes to promote effective case management, including the use of ORT at home and in health facilities, caused this dramatic change. Declining rates of infant mortality from all causes, which have fallen by 73% in 50 years (5), and other concurrent interventions might be largely responsible. In their recent report (4), Victora and his colleagues have attempted to answer this question by reviewing WHO reports on the achievements of national CDD programmes and summaries by UNICEF of survey data, including WHO Household Survey, DHS and MICS results. They have also summarized the experiences of four countries: Brazil, Egypt, Mexico, and the Philippines, in which CDD programmes were vigorously supported and carefully evaluated. They pointed out two important factors that limit their effort. First, there are no useful population-based data on the impact of facility-based treatment on mortality rates. This is surely unfortunate, given the major emphasis of national CDD programmes on training of health workers to provide effective case management at facilities and firm evidence that such treatment is highly effective in preventing death from dehydrating diarrhoea. This forced the authors to focus mostly on survey data concerning home-based ORT. Here, however, their work was complicated by frequent changes in the operational definition of ORT. Although each new definition was considered an improvement, the changes made it difficult to compare survey data obtained during different years.

Despite these limitations, the authors were impressed that diarrhoea-mortality rates during the past 15 years have declined as CDD programmes have been implemented, and especially, as ORT use rates at home have increased. They also noted that in at least two of the four country case studies marked declines in diarrhoea mortality followed implementation of CDD programme, paralleled increased use of ORT, and seemed not to be fully explained by other simultaneously implemented interventions. The decline in diarrhoeal deaths also exceeded that in child deaths due to other causes. They concluded that “there are strong grounds for considering that CDD programmes, in particular the promotion of ORT in conjunction with other key
interventions, have had a large role in the marked reduction in deaths caused by diarrhoea among children.”

This conclusion will be welcomed by public health officials in developing countries and by the international agencies that have supported the CDD effort. However, are the available data sufficient to support this view, and is it possible to distinguish the benefit of ORT from the benefits of other concurrent interventions and from secular trends in mortality?

For several reasons, some caution would seem appropriate. It is, for example, certain that many, perhaps even a majority, of the deaths averted by ORT result from facility-based treatment by trained health workers using ORS solution and IV fluids when necessary. However, because population-based estimates of this benefit are not available, the authors were forced to focus only on home-based ORT, which is much more difficult to assess. For example, a mother who reports giving any increase in fluids during diarrhoea satisfies the definition of ‘ORT’; but the authors note that some mothers have difficulty in estimating whether fluid intake was increased, and others have found that, when measured, the amount of extra fluid actually given is often too small to appreciably benefit a seriously ill child (6). This does not contradict evidence that home-based ORT appears to be life-saving when it is vigorously promoted and mothers are repeatedly educated in its preparation and use, as was done in Egypt from 1984 to 1991 with support from USAID (7). Such efforts are, however, usually based on widespread distribution of ORS packets and are costly; the one in Egypt could not be sustained.

Although the authors focus largely on home-based ORT, other factors may also have contributed substantially to reduced diarrhoea mortality. Thus, CDD programmes also promote continued feeding during diarrhoea, which prevents worsening of nutritional status, antimicrobial treatment of dysentery, which substantially shortens the illness, and breast-feeding, personal hygiene, and clean drinking water each of which reduces the incidence of diarrhoeal disease. And the Expanded Programme on Immunization includes measles immunization which can reduce substantially the risk of death from diarrhoea, at least in children older than 9 months (8). In Brazil, for example, water supplies, the duration of breast-feeding, vaccine coverage, and nutritional status each increased substantially concurrent with the promotion of facility-based case management of diarrhoea and home-based ORT (4).

In an accompanying article, Rutstein uses DHS survey data to assess the contribution of various factors to the continuing decline in infant and child mortality during the past decade (9). His analysis shows that the greatest contribution was from reduced rates of malnutrition and improvements in water supply, sanitation, and quality of housing. Next was improved medical care during pregnancy, at birth and during illness, including home- and facility-based treatment of diarrhoea. These were followed by improved economic status and maternal education. Birth spacing, breast-feeding, and complementary feeding had not improved much during the decade, and thus, appeared to play little role if any. Most importantly, Rutstein noted that the greatest reductions in child mortality occurred in countries in which most of these factors had improved.

If the contribution of ORT to reduced diarrhoea mortality is to be sorted out, it will at least require that the population-based benefit of facility-based treatment is accurately estimated. The contribution of home-based ORT will remain difficult to measure, but would be facilitated by use of a single, unchanging definition of ORT, as urged by Victora and his colleagues. However, one may reasonably ask how important it is to dissect the contribution of a single intervention in what should arguably remain a multifaceted approach. Each of the elements of this approach, including infant immunization, breast-feeding and sound weaning practices, safe drinking water, safe faeces disposal, continued feeding and increased home fluids during illness, and early treatment for serious illness at a health facility has been shown to be effective in reducing diarrhoea incidence and mortality, and many have other substantial health benefits. Given the dramatic decrease in diarrhoea mortality observed during the past 20 years and the continuing decline in overall infant and child mortality that has accompanied the promotion of these practices and interventions, it would seem prudent to stick with a winning team rather than to search for a silver bullet.

REFERENCES


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