Strategies in prevention of diarrheal disease

Sunit C Singhi, M.D. and Vijay Kumar, M.D.

Overwhelming significance of diarrheal disease control in primary health care,1-4 in improving the nutritional status1,5 and in achieving the target of health for all by year 2000, has been accepted and emphasised.6-8 Prevention of acute diarrheal disease has always been realized as a more permanent solution of the problem. Various interventions have been suggested and examined to achieve reduction in diarrheal morbidity from time to time.6,7,9-13 Diarrheal disease programme of WHO (1978) advocates many of those interventions. Recently a more comprehensive examination of various interventions is being undertaken by Feachem and colleagues.14-19 The purpose of this review is to increase awareness and focus attention on some of the interventions which could be applicable in our context, and examine their effectiveness. It is hoped that references made to some of the more focussed analysis on each of the individual interventions will be of some value to readers interested in details.

Conceptual consideration

Basic considerations in formulating any effective diarrheal disease control programme are; (i) epidemiological characteristics viz., preference for infancy, early childhood and malnourished children; (ii) feco-oral transmission and therefore, the role of contaminated water and food and; (iii) seasonal variation.

The primary preventive strategies could therefore be conceptualised as the ones directed towards; (i) interruption of transmission of the disease at 'the source' (water and food) through provision of safe water and environmental sanitation; (ii) prevention of contamination of food and water at the household and individual level through improved food and water handling practices, personal hygiene, and fly control; (iii) prevention of ingestion of contaminated food through promotion of breast feeding, and appropriate weaning practices; (iv) improvement of nutritional status of infant and children through improved maternal nutrition during pregnancy and lactation, breast feeding, supplementary feeding and growth monitoring; (v) increasing the host resistance to specific diarrheal disease through immunization against measles, rotavirus, cholera, salmonella, shigella, and E. coli; and (vi) use of small daily doses of prophylactic antibiotics in 'high risk' target groups.
Out of these possible measures to prevent diarrheal disease, attention is drawn to some specific and feasible intervention.

**Safe water supply**

The provision of safe water was identified as the most urgent need by the group of experts who formulated a strategy and a plan of action to combat gastroenteritis and malnutrition in children under 2 years, in Caribbean in 1972, and has found a place in comprehensive primary health care package to achieve health for all. United Nations General Assembly has underscored its significance, by proclaiming 1980-1990 as the International Drinking Water Supply and Sanitation decade.

The role of contaminated water in causation of acute diarrheal disease has been discussed and accepted. Impact of safe water supply on the incidence of diarrheal disease has been reviewed. An assessment of 24 studies from around the world by Hughes (1983) suggested that an improvement in bacteriological quality of water alone, reduces diarrheal disease on an average by 30 per cent; increase in availability of water through standpipes alone by about 34 per cent, and both together reduce diarrhea incidence by about 40 per cent. Kawata has quoted studies from Southern USA which showed 50 per cent reduction in acute diarrheal illness through pipes water supply into home. In India, Trivedi et al have shown a significant reduction in incidence of diarrheal disease following an improvement in bacteriological quality of water. Hebert in a study carried out in Madras, has shown that water quality is relatively important determinant of health of children under 3 years of age; for children above 3 years water quantity is a stronger determinant. On the basis of overall evidence it can be said that by improving the quality and quantity of water, and by ensuring its availability within each household a significant reduction in diarrheal morbidity could be achieved.

Doubts had been expressed on the cost effectiveness of this intervention because of large capital expenses. Briscoe in a more recent review has questioned that procedure used in the cost effective calculation. He is of the opinion that methodology used is biased against water supply and sanitation. Most of the cost of a safe water supply scheme can be covered by redirecting the expenditures presently being incurred by the population for an inferior water supply facility, and from the direct or indirect economic benefits accruing from the time saved by the population which is otherwise spent in carrying water from source to home.

There is a need to examine and adopt simple, less expensive and locally suitable water supply systems which could be financed from local resources to provide safe drinking water in adequate amounts. Increasing the popularity and helping individual families with some subsidy in establishment of covered wells and hand-pumps is definitely a step forward. Maximum attention should be paid to the population who need the water most viz. the dry areas and the poor areas. This should be supplemented by a programme of health education in water handling and storage practices through mass media.

**Excreta disposal**

Many authors have concluded that best results in controlling acute diarrheal