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Lessons Learnt from Diarrheal Diseases Control Program and Implications for the Future

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Abstract : The national Diarrheal Disease Control Program was launched with the aim of improving the knowledge and practice of appropriate case management among caretakers of young children as well as health care providers. The National Family Health Survey (1992-3) revealed that 42.7% of mothers knew about ORS packets and 25.9% had ever used them. ORS use rates in children who suffered from diarrhea during the previous two weeks varied from 8.3% in Rajasthan to 50.1% in West Bengal. These findings represent substantial accomplishment, and also are a reminder that we still have to reach more than half of the households. Further analysis of the NFHS data showed that exposure to electronic mass media had a significant impact on mothers' awareness about ORS packets (56% in exposed, 32% in unexposed) and ORT use rates (38% in exposed, 25% in unexposed). In this review, future strategies for increasing the impact of the program are discussed. These include involvement of licensed and unlicensed medical practitioners, greater use of the electronic mass media, ORS standardization, greater focus on poorly performing states and resolving residual issues in the case management of diarrhea in malnourished children and infants under 6 months of age. **(Indian J Pediatr 1999; 66 : 55-61)**

Key words : *Diarrheal disease control program; Oral rehydration solution packets.*

The Diarrheal Disease Control Program was launched as a continuation and upgradation of the cholera control program. The primary thrust of the program has been to improve the knowledge and practice of appropriate case management among caretakers of young children as well as health care providers. Relatively less emphasis was given in this program to diarrhea prevention although other programs of the government related to sanitation and water supply address these issues. The mainstay of the case management approach during acute diarrhea include oral rehydration therapy (ORT), continued breast feeding, continued semi-solid feeding in children older than 6 months of age and use of appropriate antimicrobials in cholera and bloody diarrhea. Half way through the program, an algorithm for treatment of persistent diarrhea was introduced.

Training was provided through Child Survival and Safe Motherhood (CSSM) Program to various primary health workers. Multiple agencies like Indian Medical

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Association (IMA), Indian Academy of Pediatrics (IAP) were involved in the training of physicians working in various medical colleges, district hospitals and primary health care facilities in standard case management of diarrhea. Brief, one day sessions without "hands on" training for physicians were conducted by IMA through out India. Diarrhea Training and Treatment Units (DTTU) were established in medical colleges and district hospitals all over the country.

Twin approach of promoting home available fluids and oral rehydration salt (ORS) for maintenance of hydration and treatment of dehydration was adopted for IEC messages. Mass media was utilized on a vast scale to promote these messages. The

TABLE 1. Findings of the National Family Health Survey[1] (1992-93) : Implications for the Diarrheal Disease Control Program

- **42.7% of mothers knew about ORS packets and 25.9% had ever used them**
  Implication : We have to reach the remaining 57% of the mothers through accelerated use of interpersonal communication, mass media, social marketing and community organization.
- **ORS use rates varied from 8.3% in Rajasthan to 50.1% in West Bengal**
  Implication : New efforts must target at the poorly performing states (Rajasthan, Madhya Pradesh, Andhra Pradesh, Uttar Pradesh, Gujarat and Bihar). Mechanisms must be devised by which the obstacles in the current system can be removed. Monitoring by semi-autonomous institutions may help.
- **61.2% of children with diarrhea in the previous 2 weeks were taken to a health facility or provider; half of them received either ORS or a recommended home solution**
  Implication : When a mother visits a health facility or provider for diarrhea, she rightly perceives it to be severe and the provider should respond by advising use of ORS. We need to intensify efforts to ensure a 100% ORS prescription rate for all children visiting a health provider, including semi-qualified rural and urban medical practitioners
- **Exposure to electronic mass media had a significant impact on mothers' awareness about ORS packets (56% in exposed, 32% in unexposed) and ORT use rates (38% in exposed, 25% in unexposed)**
  Implication : Mass media was effectively used in the program but was phased out early. Use of electronic mass media should be continued to reach the population still unaware about ORS and ORT particularly in the poorly performing states.
- **Intake of fluids was maintained as usual in 65% and actually decreased in about 20% of children with diarrhea**
  Implication : In the messages to mothers of children having diarrhea, greater focus should be on amounts of fluids to be given
- **35% of infants at 4 months and 20% at 6 months were being exclusively breast fed**
  Implication : Our current advice to mothers is not being well received and efforts to refine the messages explaining the need for exclusive breast-feeding are required. Health providers need to be trained in a way that they have the capacity to hold counselling sessions with the mothers rather than just giving messages.

strategy used was universal promotion of ORT for every episode of diarrhea.

Program Evaluation : Use of ORT for Prevention and Treatment of Dehydration

The National Family Health Survey (NFHS) provides some estimates of the impact of the program on improved case management (Table 1). In North India, the knowledge of mothers about ORS packets ranged from a low 20% in Rajasthan to a high 74% in Delhi with a median of 59%. The proportion of mothers who had ever used ORS packets ranged from 8.3% in Rajasthan to 46% in Himachal Pradesh with a median of 35% for North India[1]. These findings represent substantial accomplishment, but also are a reminder that we still have to reach 40% of the households.

The NFHS shows ORS use rate of 17.5% based on reported treatment for diarrheal illnesses during past two weeks. An additional 18.6% used a recommended home solution and 13.8% increased fluid intake. It is also noteworthy that about 20% of the children had been given less fluid than usual during diarrhea. A disturbingly large 61.2% did not use ORT at all. It is obvious that in a significant proportion of the episodes where ORT was not used, the message had not reached the caretaker and the family. It may well be that a proportion of these 61% episodes was considered too mild.

There have been efforts by various professional bodies and Non Government Organizations (NGOs) to train private practitioners in diarrhea case management. In 1989, IMA carried out a massive national level training effort ultimately training some 30,000 members. When evaluated regarding ORT knowledge and use, ORS packet usage had increased according to 72% of respondents while 65% of them responded that intravenous fluid usage had decreased. At the same time, use of inappropriate anti-diarrheals continued to be a problem as prescribed by one-third of respondents although antibiotic use was described as decreasing in all types of diarrhea. The overall knowledge of the respondents pertaining to ORT was assessed

Table 2. Knowledge and Practices Regarding Diarrhea Case Management of Trained Rural Practitioners in West Bengal

Dehydration :	
Aware	122 (91%)
Knows cause	118 (88%)
Knows some signs	83 (62%)
ORT use :	
Uses ORT	129 (97%)
(a) ORS packet use	126 (96%)
(b) Salt-sugar solution	68 (52%)
Dangerous solution	21 (35%)
Acceptable solution	39 (65%)
(c) Preparing solution from ORS packets :	
Poor	90 (73%)
Acceptable	30 (24%)
Good	3 (2%)
(b) ORS solution volume administered :	
Poor	28 (22%)
Acceptable	81 (62%)
Good	21 (16%)
(e) Method of giving ORT to an infant or a child :	
Good	131 (100%)

Evaluation of training programme of Indian Rural Medical Association - 1998

Source : Consultant's report by Dr. Dilip Mahalanabis submitted to UNICEF

with the help of eight components. The average knowledge score was 4.8 out of a maximum score of 8, which is consistent with hypothesis that training programs do enhance knowledge (Personal Communication, Dr Jagdish C. Sobti).

An evaluation of the knowledge and practices of rural practitioners in West Bengal trained by the Indian Rural Medical Association was done in 1998. The results are depicted in Table 2. Majority of trained practitioners were aware of dehydration, its dangers and causes. Sixty-two percent could mention one or two relevant signs of dehydration. Some form of ORT was used by most of them with as many as 52% prescribing salt and sugar solution for patients who could not afford ORS. While all these are positive features, vast majority of them were using latest brands of quinolones (54%) and metronidazole (22%) for watery diarrhea. Anti motility drugs were being used by 44% of practitioners. Only 11% mentioned any relevant preventive practices (Personal Communication, Dr Dilip Mahalanabis).

The factors for non-use of ORS during diarrhea have been sought. A common reason cited for non-use of ORS in children is that the health care provider did not prescribe it. Indeed many physicians registered with Medical Council of India and rural health practitioners do not prescribe ORS because they believe that the mothers want a cure and that ORS does not cure diarrhea. The physicians feel a strong need to prescribe a drug, fulfilling perceived family expectation as well as their own belief among care providers that ORS is more appropriate for correction of dehydration than its prevention results in low prescription and utilization rates. The study done in West Bengal also demonstrated shifting to salt and sugar solution in cases not able to afford ORS by rural practitioners indicating that pricing of ORS may be important. Providing highly subsidized ORS to all private rural and urban practitioners may help in alleviating this problem.

Interestingly, although children in urban areas are more likely to be taken to health care providers, they are also more likely to be treated with home fluids or remedy[1]. This may indicate that the providers including those in health care facilities in urban areas have not been reached with appropriate training. It is also reported that practitioners are less likely to prescribe ORS for diarrhea than for drugs that are dispensed by them, allowing opportunity for a reasonable profit, an important consideration, given the small consultation fees (Personal Communication, Dr Jagdish C. Sobti).

The impact of standard case management on diarrhea associated mortality has not been evaluated in India. Nevertheless, at an institutional level, benefits of introducing ORT based case management have been amply demonstrated. Most important effect of establishing DTTUs has been in decreasing the long duration of stay in the hospital. In a study from a large Delhi hospital, diarheal diseases contributed to one-third of total admissions and were responsible for 20% of deaths. There was a decrease in hospital admission by 13% with the help of proper treatment protocol as well as significant decline in case fatality rate. There was also marked reduction in expenditure for rehydration and drugs[2]. Some weaknesses have been identified in the case management of children brought to health facilities with diarrhea. The important lessons learnt from community based studies conducted in New Delhi are

TABLE 3. Factors Associated with Diarrheal Deaths : Some Lessons from Community Based Studies from New Delhi and their Implications

- **A significant number of deaths occurred in < 3 month old infants, many had visited hospitals but were not admitted because they had no dehydration or obvious signs of sepsis.**
  Implication : Young infants brought to health facilities should be observed for 24 hours to decide about the need for a long admission. In case this is not feasible, repeated periodic assessments should be made on an outpatient basis. All low birth weight and preterm infants with diarrhea should be treated as for septicemia in the first 2 months of life.
- **More than half of the diarrheal deaths occurred in children with severe malnutrition**
  Implication : Severely malnourished children with diarrhea should be treated with systemic antibiotics and micronutrient supplements in addition to ORS. They should be admitted (or have repeated assessments if hospitalization is refused) to a health facility till full recovery from illness and nutritional rehabilitation. If caretakers of low birth weight or severely malnourished infants with diarrhea refuse hospitalization, they should be treated with an oral antibiotic and twice or even once daily intramuscular aminoglycoside injection at home additional to ORT.
- **Some children died after being discharged from a health facility after correction of dehydration.**
  Implication : Careful instructions on how to give ORS at home should be given at discharge.
- **Children dying of diarrhea had often consumed ORS or recommended home fluids but in small amounts**
  Implication : Health providers should emphasize the amounts of fluid necessary for prevention of dehydration.
- **A proportion of children dying from dysentery were treated with metronidazole**
  Implication : All cases of dysentery should be treated with quinolones as first line therapy.

Source : Studies from Gastroenterology and Nutrition Unit, Department of Pediatrics, All Indian Institute of Medical Sciences, New Delhi (Unpublished data)

enumerated in Table 3.

ORS-Concerns About Product Standardization

There is a large variability in the composition of the ORS packets available in the market. The need for product standardization within a certain range has been proposed repetitively. The specific issues of concern cited in different studies include osmolarity of ORS, its sodium and glucose content, and differences in packet size. Instructions about mixing the powder also lead to an undesirable element of complexity to prescribing of ORS. The controversies about the composition of ORS may have been one of the factors that limited the prescription of ORS by the physicians. An effort to promote ORS with an ORS logo has not been successful because its use is prohibited for products that do not meet the

recommendations. Resolutions of these issues through consensus meetings could pave the way for promotion of ORS logo.

Exposure to Mass Media Increases Knowledge and Use of ORT

Mass media has been extensively used for promoting activities related to family planning and child health but its impact has been seldom evaluated. We identified one report that has evaluated the impact of mass media on awareness and use of ORT. This report is based on further analysis of data from National Family Health Survey. It was observed that the proportion of women who listen to radio or watch television at least once a week was 39% and 27% respectively. Fourteen percent of women reported visiting a cinema or a theatre at least once a month. The percentage of women who knew about ORS packets was 56% in those exposed to electronic mass media as compared to 32% in those who were unexposed. After adjustment for potential confounders like age, residence, education, religion, caste, type of house, availability of toilet, safe drinking water and electricity and geographic region the difference remained statistically significant (49% vs. 37%). Similarly, exposure to electronic mass media had a significant impact on the percentage of children treated with ORS or a recommended home solution (38% vs. 25% unadjusted, 36% vs. 27% after adjustment)[3]. Efforts on use of mass media need to be further reinforced, as it appears to be an effective strategy.

Implications of Findings on Future Program Strategies

Our efforts need to be focused on states like Rajasthan, Madhya Pradesh and Uttar Pradesh where both the knowledge and use rates of ORS are low[1]. Since the knowledge of ORS is low, it indicates that the programs may have been poorly implemented. From the literature it is difficult to gauge how far the degree of involvement of the mass media has contributed to this lack of awareness. It would be worthwhile to compare use rates of ORS and ORT in different states of India with the levels of use of mass media. The Government of Madhya Pradesh had launched the Rajiv Gandhi Mission for control of diarrheal diseases in 1995. There was intensive social mobilization of the community in addition to active participation of the Department of Health, Districts' administration, Public Health Engineering Department, Panchayats, and various community leaders. Such a program can be instituted in areas with low level of awareness.

In states such as Haryana, the knowledge about ORT and ORS is better than that in the above states. The use rates however, are relatively lower compared to the knowledge rates[1]. In these states, in addition to the above measures, particular attention needs to be given to training of health care providers including the professional leaders. It is probable that knowledge of the benefits of shifting from i.v. rehydration to ORT in health care facilities may not have reached the target audience and indeed training of providers has tended to be theoretical than hands-on.

In states with relatively better knowledge and use rates of ORS and ORT, it is important to note that nearly 40% of the households are not aware of ORS[1]. This underlines the need of sustained awareness campaigns through the mass media and health care providers.

The ORS use rates seem to have become constant at about 18% in North India[1]. One of the reasons is the perception that ORS is required only when dehydration sets in. The programs need to attempt to change these perceptions among providers and families. At the least, a key program message should be that every contact with any level of health care providers for diarrhea in a child must result in a prescription of ORS.

A possible strategy for the program is to initiate district wise assessment of ORT and ORS use rates. The planning of any further efforts to promote awareness and practice should be district based. Knowledge of the performance of the program among leaders at the district level is an essential prerequisite for corrective actions. A possible strategy to invoke health competition could be to institute incentives and prizes for the districts with the highest ORS use rates.

Rural practitioners treat vast majority of children with diarrhea. As ORT and nutrition counselling are two areas that are not in conflict with the legal system that prohibits the use of prescription drugs by personnel not qualified in the modern system of medicine, the private practitioners can be effectively trained in these areas. Training of practitioners by Indian Rural Medical Association in West Bengal is an example of success of such a strategy as described earlier.

Particular attention needs to be given to the appropriateness of promotion of use of ORS for treatment of diarrhea under 6 months of age. More focus is required on increasing the frequency of breast-feeding and the amounts of home available fluids that are given. The amounts are more than usual only in 10% and this may leave a proportion of patients with high stool output with smaller than required fluids intake. Case management guidelines are less clear for infants younger than 6 months who are breast-feeding. It has been suggested that WHO ORS should be diluted in 1.5 litres instead of the usual one litre for infants under 2 months of age.

Studies performed in Delhi and other centres around the world have suggested that reducing the osmolarity of the WHO ORS by reducing both the concentration of glucose and sodium has a beneficial impact on stool output and duration of non cholera diarrhea[4]. Whether introduction of low osmolarity ORS would promote greater acceptance of ORS among physicians needs to be investigated by pilot projects.

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