



## Household Teaching of Oral Rehydration Therapy in Rural Bangladesh

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THAT diarrhoea is a major cause of morbidity and mortality in rural Bangladesh is well documented. Oral rehydration therapy is the treatment of choice for most diarrhoeal cases. Packets of oral rehydration salts (ORS) added to the proper amount of water provide an ideal solution for treatment for the vast majority of cases of diarrhoea.

Some problems are encountered in supplying ORS to every household in Bangladesh, however. If every case of diarrhoeal episodes in Bangladesh were treated with packets, millions of packets would have to be produced and distributed annually in a country where more than 90% of the population lives in rural areas and where transportation is poor at best. Cost considerations would also hamper widespread distribution of the packets. The per capita income is only slightly more than one hundred dollars per year and the market system tends to be exploitative, especially when items are in short supply or are in great demand. In addition, success of the packet is dependent on adding the salts to the proper amount of water and administering it correctly. In Bangladesh, instructions on the packet would be inadequate, as more than 80% of the population is illiterate. A nationwide publicity campaign based on mass media would probably have limited success, since only a small number of people have access to a radio.

The packets are ideal in an ideal situation. But such a situation is hardly present in developing countries. To avoid the problems with packets, special spoons and special containers have been proposed. However, this alternative introduces unfamiliar materials not available in the home and the use of teaspoons is also not likely to improve the situation, as every house in rural Bangladesh does not have a teaspoon. More importantly, the size of a spoon may vary so much that it would be unsafe to suggest this.

### THE BRAC METHOD OF ORAL THERAPY:

The Bangladesh Rural Advancement Committee (BRAC) through its long experience, re-

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cognised the need to develop a technique which would, on the one hand, circumvent some of the above difficulties and, on the other, be safe, effective, cheap, simple, acceptable, and readily available in every rural home of Bangladesh. After nearly a year of research and field trials, BRAC developed a health message called 'Seven Points to Remember in Case of Diarrhoea', which are given below:

(1) Loose motion and increased frequency of motion are the first symptoms of diarrhoea. Water and salt contents drain out from the body with each loose motion. If such loose motions continue for sometime, symptoms like vomiting tendency, loss of appetite, indigestion, and spasms of hands and legs may set in. *Loose motion then turns into diarrhoea*, which may prove to be fatal. So necessary measures should be taken in time to save the diarrhoea patients.

(2) In order to save ourselves from this disease, we should drink tube-well or tap water. If such water is not available, water from other sources should be boiled and then cooled before use. Rotten food should not be eaten. All foodstuffs should be covered well so that flies cannot sit on them. Hands and mouth should be washed properly before eating. Remember that breast milk is always harmless. But children fall sick when they suck dirty breasts. So the nipples of the breast should always be kept clean.

(3) The only treatment of diarrhoea is to replenish by any means the water and salt lost. Previously it used to be done by intravenous saline injection. Injectable saline contains water, salt, and glucose. But there are some difficulties in using saline for injections that are not easily available in the village; and since these injections are intravenous, the services of doctor are necessary and moreover, expensive. It is, therefore, necessary to take timely measures so that loose motions do not turn into diarrhoea. The easiest treatment is to administer oral rehydration saline. This saline is also made of salt, water and sugar like saline for injections. But the advantage of it is that it can be prepared right in the house, and it requires only a little bit of salt, molasses, and pure water.

(4) Oral rehydration saline is to be prepared by mixing a pinch of salt with the help of tips of three fingers and a fistful of molasses in half a *seer* (467 ml) of water well stirred. Care should be taken to mix salt, molasses, and water in the right proportion.

(5) Oral saline should be administered immediately after the first loose motion. If it is delayed, it may be difficult to replenish the lost water and salt. As a result, there may be shortage of water in the system of the patient, and he/she may become weak. If dehydration takes place, saline injections become essential.

(6) Adult patients should be given a half a *seer* of oral saline as prepared, after each motion. The children should be given only as much as they want, but at frequent intervals.

(7) Advice in regard to nutrition: During the disease, the patient should be given plenty of water and foodstuffs like rice and curry along with oral saline. In the case of children, breastfeeding by mothers must not be stopped. The patient should be given increased amounts of water and food for at least seven days after recovery. This will help to cure malnutrition and weakness of the patient and minimise the possibilities of his/her falling victim of the disease again.

This is a concise but comprehensive summary of all information that a villager needs to know to treat diarrhoea with oral therapy in his/her own house. Seven Points explain how to prepare and use a *lobon-gur* mixture for diarrhoea and also include some relevant nutritional and other knowledge.

*Lobon-gur* mixture is an oral replacement mixture. *Lobon* is Bengali for common table salt or sodium chloride. *Gur* (a kind of molasses) is locally available unrefined sugar (sucrose). *Gur* also contains potassium in approximately the proper proportions to sucrose (that is, when the *lobon-gur* mixture contains approximately 110 mmol/l sucrose, it also contains between 10 and 20 mmol/l of potassium). The mixture is made by adding a three-finger pinch of *lobon* and a fistful of *gur* in one-half *seer* of water followed by stirring. One-half *seer* is a local measurement equal to 467 ml. In Bangladesh all homes have a container of this size.

*Gur* does not normally contain bicarbonate. But since mild to moderate acidosis is easily compensated by the body, the bicarbonate is not an essential ingredient for patients not in severe shock. Patients in severe shock are not likely to be saved without intravenous therapy.

#### INITIAL PROGRAMME EXPERIENCE: THE PILOT PHASE:

The experience gathered from 12 months of

testing and research on oral therapy was enough stimulus for BRAC to begin a pilot programme on the teaching of oral therapy at the household level. Teams of female oral replacement workers (ORWs) were trained to teach mothers about the *lobon-gur* mixture. During the 12-month pilot phase, nearly 60,000 households (population of about 300,000) were taught about the method. The programme was remarkably successful in educating Bangladesh women to use oral therapy for the treatment of diarrhoea. The experience in this programme provided a strategy for an expanded programme for the entire country.

#### THE PRESENT BRAC PROGRAMME:

Based on its experiences in the pilot phase, a 3-year programme was launched in July, 1980 to teach oral therapy to 2.5 million households (approximately 14 million people) in 5 of the 20 districts of Bangladesh. A description of the salient features of the programme is given below.

*The teaching*—The BRAC programme called the Oral Therapy Extension Programme (OTEP), is essentially a teaching programme. The most important aspect is the face-to-face teaching of the mothers in each and every household of the programme area. The face-to-face strategy facilitates a better relationship between the teacher and the student and hence, enhances the basic understanding of the message. Moreover, such a teaching procedure ensures teaching in all households, which is almost impossible to attain through other methods. Female workers (ORWs) moving in teams visit each village in a *thana* (population 200,000). During the home visit the ORW first introduces herself and engages in friendly conversation with the women. The conversation is gradually shifted to the Seven Points. She invites questions in order to remove confusions and resolve doubts. When the ORW becomes confident that a woman understands the message, she starts to teach her how to prepare the *lobon-gur* mixture. She shows her how to measure half *seer* in a container in her home and marks it permanently. She demonstrates how to measure a pinch of *lobon* and a fistful of *gur*. Then asks the woman to do it herself. Finally she questions the woman to make sure that she fully understands the Seven Points. She also asks for any diarrhoea patient in the locality. She personally visits such patients and treats them. Each teaching session takes about 25-35 minutes. A team contains 7 to 8 ORWs, 3 team co-ordinators (TCs) and one cook. A team covers a union (approximately 3,000 households, or 15,000 to 20,000 population)

in about a month and then moves to the next union in the project area. The TCs are males and are responsible for a number of activities. They visit the village prior to the visit by ORWs and explain the programme to the male members and community leaders, seeking their co-operation and assistance. A village meeting with males facilitates and reinforces oral therapy education. The TCs organise a diarrhoea control campaign in local primary and secondary schools. They are trained to give intravenous fluid should they be presented with a severely dehydrated patient. They also organise meetings with local healers in order to convince them about the efficacy of *lobon-gur* mixture.

*Reinforcement and monitoring*—A separate team, all male, carries out reinforcement of the message and monitoring of the activities. Team members visit a random 5% of the household that were visited by the ORWs about one month before. They inquire about the Seven Points and ask the women to prepare the *lobon-gur* mixture for them. Team members also conduct usage surveys in the villages taught by ORWs. They ask if there was a diarrhoeal episode in the household during the past 15 days and if there was one, what method of treatment was employed. In the day following the interview, they collect a sample of the mixture prepared by women, if there was a use of *lobon-gur* for further analysis. If there was no use of this method, the householder is advised to use it in the future. The team also conducts meetings in the villages to reinforce the programme. The results of the monitoring team are fed back to the ORW team to give them an idea of the outcome of their activities in the programme.

*The incentive salary system*—ORWs, the core workers of the BRAC programme are paid according to a strict incentive system. The woman interviewed during the monitoring is graded according to her answers about the Seven Points and her ability to prepare a safe and effective *lobon-gur* mixture. There are 4 grades: Grade A (a score of total 10 points) is obtained if the woman remembers all 'Seven Points to Remember in Case of Diarrhoea' and makes the mixture correctly. Grade B is obtained if she scores a total 7 to 9 points and makes the mixture correctly; grade C is obtained if she scores less than 7 points, but still makes the mixture correctly; and grade D is given if she cannot make the mixture correctly. From these results, the number of household visited by each ORW in each grade is calculated. The ORW is paid according to the number of household visited that month in each

grade. Taka 4 is paid for each household in grade A. Taka 2 and 1 are paid for grades B and C respectively while no money is paid for scoring grade D. The average monthly salary has been found to be Taka 650 (US \$ 30).

*Recruitment and training of field workers*—The field workers are selected after going through a series of formal and informal procedures. The posts are advertised in national dailies to allow maximum publicity. Interested woman candidates having at least 10 years of schooling, not having children less than one year old nor more than 4 years old are asked to appear for an interview. Aspects such as communication abilities, family background, stamina, recent diseases and present health, intelligence, etc. are assessed before being accepted for a preselection training. The 5-day preselection training is divided into 2 parts—3 days in the class-room and 2 days in field training. This intensive training on the art of teaching and how to live in teams allows opportunities to observe each candidate more closely. Many of the aspects found otherwise difficult to assess are assessed quite easily through this training. Formal tests and role playing are important assessment tools in this stage. In service they are constantly monitored through their incentive salary system and other supervisory checks. The training candidates are selected through a lengthy process. Their pre-service training in most cases lasts 2 months for intermediate passed candidates and 7 days for graduates. Their training goes much beyond that of ORWs and includes, among other things, leadership, communications, paramedics, and programme management.

*Evaluation*—There are 2 aspects of the evaluation process. The programme has a built-in evaluation system. It assesses the programme through regular monitoring of the teaching quality of ORWs and by investigating the extent of utilisation of the method. These results are constantly fed back into the programme for improving the quality. Apart from this, the Research and Evaluation Division of BRAC, an independent unit within BRAC is investigating the impact of this programme on mortality. A population of about 1,30,000 selected through a double stratification is surveyed every 6 months to monitor changes in cause (diarrhoea) and age specific (one to four years) mortality. The design of the mortality study has been presented in a number of forums and also been published by the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) (Chowdhury and D'Souza, 1982). Data from this evaluation are being analysed now. Apart from impact evaluation, the Re-

search Division of BRAC has been active in undertaking other *ad hoc* studies relevant to the programme.

**Analysis of samples**—In order to constantly assess the safety of the home-made mixtures as well as to provide a continuing quality control measure, the sample mixture collected by the monitors are analysed for salt and sugar content. Initially, the samples were transported to Dhaka and analysed by flame photometer for sodium at the ICDDR,B. The cost involved in transportation and centralised laboratory processing led to the establishment of field laboratories in each area where the analysis is done under ICDDR,B technical guidance. The cost of setting up a field laboratory for chloride titration and the training of a locally recruited laboratory worker is less than 400 Taka (approx US \$ 20). The monthly chemical requirement is negligible and the results are available almost immediately. The percentage of the solutions analysed by the field technicians are sent to ICDDR,B for further check using automatic chloride titration methods. The individual results available from the field and ICDDR,B for the month of January, 1983 were matched. Over 93% of samples analysed in the field were within 10 mmol/l of the ICDDR,B analyses.

**RESULTS:**

The results available on the basis of the experiences during the past years are presented here in summary form.

**Programme statistics**—A total of 1,545,827 households were covered during the 2½ years of the programme. As per original plan, the coverage increased over time as more areas were taken under the programme. A summary of the number of households covered in three different time periods is given in Table 1.

Table 1—Showing Households Covered by OTEP between July, 1980 and December, 1982 by Three Time Periods

Time period	Households covered
July, 1980—June, 1981	1,87,604
July, 1981—June, 1982	8,27,387
July, 1982—December, 1982	5,30,836
Total (July, 1980—December, 1982)	15,45,827

During the same period a large number of households were monitored for assessing the performance of ORWs. Initially, a sample of 10% of the households covered by ORWs was monitored every month. As the volume increased, this was later reduced to 5%. An analysis of the monitoring results reveals that over 90% of the households inter-

viewed for monitoring purposes scored either grade A or B. Proportions in grade C and D were negligible.

The latest statistics on field staff strength reveal that there are 903 staffs currently employed with the programme. This includes 525 ORWs, 167 TCs and 81 reinforcement team members.

The total budget for the 3 years of the programme was 35.6 million Taka or 2.3 million US dollars. Until December, 1982 (that is, during the 2½ years), 23.2 million Taka had been expended. Thus the amount expended to teach a single household was Tk 23 or US \$ 1.00. However as the major capital expenditures have already been incurred, the per household cost may in fact decline by the end of the programme period. It may be mentioned here that Tk 14.24 was allocated per household in the budget.

**Chloride analysis**—A sample of the *lobon-gur* mixture collected by monitors are analysed in the field laboratory for chloride. The results of these analyses are available for the past 2½ years. They reveal that about 90% are in the safe and effective range (chloride concentration of 30-99 mmol/l). The proportion of the sample in different concentration groups is given in Table 2.

Table 2—Showing Distribution of Chloride Concentrations as Observed in Different Time Periods of the BRAC-OTEP Programme along with Sample Statistics

Chloride concentration (in mmol/l)	Safety and effectiveness	Time period		
		July, 1980-July, 1981-June, 1981	June 1982	July, 1982-December, 1982
<30	Safe but less effective	8.3	1.5	1.2
30-99	Safe and effective	89.9	94.5	90.3
100-119	Effective but potentially dangerous	0.7	3.1	6.5
>119	Dangerous	0.6	0.9	2.0
n		3,903	33,603	18,892
Mean (mmol/l)		64.2	66.0	68.0
SD			21.8	

**Consistency of results**—The laboratory results indicated that the quality of the programme in terms of teaching how to prepare the *lobon-gur* mixture has been well under control across the

periods. The differences as seen from the analyses appear to be negligible. However, in order to know whether these and other differences are statistically valid, the F ratio was calculated to test the means. This ratio was calculated for the following:

(a) Differences in chloride concentrations over time (391 random samples taken from a randomly selected area). (b) Differences in chloride concentrations between different areas (567 random samples from 8 areas in the month of February, 1983). (c) Differences in chloride concentrations between different teams of ORWs (368 random samples from 8 teams in a randomly selected area). No significant difference was found in any of the above categories. This indicates that the results are consistent across different sources of variation and the programme has attained maturity.

**Retention of knowledge**—Chloride concentrations discussed so far are based on samples which are collected between 15 and 30 days after teaching. A study was commissioned by the Research and Evaluation Division of BRAC to assess the knowledge retention over a longer time. A random sample of 250 households in each of the areas covered by the programme 3 and 6 months previously was surveyed. The results showed that the women retained the knowledge equally well after 3 and 6 months of teaching as they did after 15 to 30 days.

**Usage**—Unlike retention of knowledge, the acceptance of oral therapy (measured in terms of usage of the method in diarrhoeal episodes) depends on complex sociocultural factors. The BRAC programme is essentially an intervention programme and has both positive and negative qualifications. During the initial year of the programme problems were encountered in gaining acceptance. Several studies were undertaken to identify the bottlenecks. Consequently, several programme changes were effected. The situation improved. But the usage rate range available from different areas remains very wide (8% to 80%). One of the important reasons for low usage is the perception of the people about diarrhoea itself. Mild-to-moderate cases are not considered a disease worth medication, and, hence, about half of the reported patients are treated with no method at all. However, if this group is left out using no

treatment, the acceptance rate shoots up considerably (average 35%). Though this acceptance figure may appear low, this is a first recruitment of a single-exposure programme. The socio-cultural setting of the community along with this understanding may suggest that there should not be much concern about the usage rate.

**Mortality impact study**—The mortality impact study was started in April, 1981. A population of about 1,30,000 in different project areas is being studied every 6 months through retrospective surveys (Chowdhury and D'Souza, *loc cit*). Data collection on 3 surveys, including the baseline, has been completed. Not unlike any retrospective survey, the data on details were found to be under-reported in the first round. Several techniques were employed subsequently to improve the death recording and better results are now coming in. Data from these surveys are being analysed to construct a correction factor for estimating the missing events.

#### CONCLUSION:

Programme characteristics and available results of the programme of oral therapy have been presented. The programme sailed along quite comfortably and faced no major problems. The objective of teaching oral rehydration therapy to the target households is being fulfilled. The results indicate that the programme has attained maturity in terms of teaching quality. It has established beyond any doubt that home-based therapy is possible in a developing society and that even the illiterate mothers are well capable of understanding a health message and preparing a safe and effective solution for diarrhoea in the house. It has also demonstrated that a large public health educational programme can be successful in a rural developing society without sacrificing the quality of the programme. The different components of the BRAC are only indicators of the factors that may affect the successful completion of the programme.

#### REFERENCE

- Chowdhury AMR, D'Souza S—Working Paper No 27, Dhaka, Bangladesh, International Centre for Diarrhoeal Disease Research, 1982.