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Mothers learn how to save the lives of children

Mothers in over 5 million Bangladeshi households were taught how to prepare and use an oral rehydration solution containing *lobon* (local salt) and *gur* (unrefined sugar). An evaluation of the results has demonstrated the value of the programme and has shown how improvements can be made in the teaching process as well as in the preparation and administration of the solution. Increased emphasis is now being placed on the danger of too much salt and on the importance of correctly measuring the ingredients. Because *gur* is not widely available at all times of the year, refined sugar is being promoted as an alternative.

During recent years, community-based oral rehydration therapy programmes utilizing locally obtained ingredients have been initiated in many developing countries. The programme conducted by the Bangladesh Rural Advancement Committee (BRAC), a nongovernmental organization, was evaluated after it had been in operation for four years and had reached over 5 million households. Mothers were taught how to make an oral rehydration solution from local salt (*lobon*) and unrefined local sugar (*gur*). Although previous management reviews had suggested that the programme was functioning well, it became important to discover how the local people perceived the usefulness of *lobon-gur* solution, how often

they used it and for which diarrhoeal episodes, and how safe were *lobon-gur* solutions prepared by mothers.

In 1980, after a year of research and field trials, the Committee developed a seven-point health message on diarrhoea and its treatment (1), based on a technique of preparing oral rehydration solution at home with a pinch of *lobon*, a fistful of *gur* and a half *seer* (467 ml) of water. Trained female health workers, called oral replacement workers, visited each household in their localities and trained mothers on the seven points during sessions lasting 20-30 minutes. The mothers were given the opportunity to prepare the solution themselves and were advised to begin using it when the first watery stool appeared.

Another group of workers, called monitors, assessed the quality of the training one month later. The monitoring results indicated that the sessions were of high quality and that about 90% of mothers were

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able to make a safe and effective solution with a sodium concentration of 30-99 mmol/l (2).

It was planned that each household in the country would be visited over several years and that the programme would be carried out in phases. During the first phase, from July 1980 to September 1983, 2.5 million

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households were visited. The second phase, from October 1983 to September 1986, included a new experimental component called the concentrated reinforcement programme, which covered approximately 10% of the unions (subdistricts) involved, each union having an average of 2500 households. The main features of this programme were that the training team stayed in each union for six months instead of the usual one month, and that it carried out additional health education activities in schools, mosques, and meetings, so as to popularize the *lobon-gur* solution. Furthermore, local traditional birth attendants and practitioners were trained and involved in the programme. The standard training programme of one month's duration was continued in the remaining 90% of unions involved in the second phase.

Evaluation

Two approaches to evaluation were adopted. The first consisted of an in-depth study of

villages in one union lasting three months, the second involved a survey of over 7000 households covered by the programme during the first and second phases. For evaluation purposes, an episode of diarrhoea was defined as the production of one or more watery stools during the course of a day. In the interest of compatibility with earlier monitoring results, this broad definition was retained, even though it was realized that it would lead to the inclusion of many mild episodes of short duration for which oral rehydration solution would not be used, thus giving an apparently low overall usage rate. Most other evaluations have employed a stricter definition.

The evaluation was organized and carried out by staff from the BRAC research and evaluation division. The mobile survey teams lived in temporary accommodation in rural areas, the female interviewers working in pairs for safety. Each team had a male supervisor and work schedules were prepared at the headquarters for each area. Each village in the sample was visited and maps were drawn showing all the households where interviews were to be conducted. Every effort was made to hide the fact that the survey teams were organized by the Committee but this was difficult to achieve. Logistical support and supervision for the teams required a considerable amount of travelling by the senior supervisors and the evaluation involved more than six months of intensive field work.

In the village case study, the objective was to determine the people's perceptions about diarrhoea and its treatment, and to investigate why some people used the *lobon-gur* solution whereas others did not. Two villages in the district of Comilla were selected and information was collected by weekly surveillance of all households, by

depth confidential interviews, and by formal and focus group discussions (3).

A community survey was conducted with a view to measuring the usage and safety of the *lobon-gur* solution. The households sampled were those that had been covered by the BRAC teams two years previously in the first phase and a year previously in the second, the latter covering unions where the standard training had been given and others in which the concentrated reinforcement programme had been adopted. Three independent samples (first phase, standard programme, and concentrated reinforcement programme), each consisting of 2500 households, were selected in three stages. The mother in each household was interviewed and information was sought on the usage of *lobon-gur* solution for the four different types of diarrhoea episode over the previous two weeks. Questionnaires were successfully completed by over 90% of households in all three samples. A random 10% subsample of mothers were asked to prepare a *lobon-gur* solution. The interviewers then measured the volumes of the prepared solutions and saved samples in vials for analysis of the sodium concentrations at the International Centre for Diarrhoeal Disease Research in Dhaka. More details of the evaluation methodology are given elsewhere (4).

Perceptions of diarrhoea

The village case study identified four separate illnesses, each clearly understood by villagers, that had symptomatic resemblances to diarrhoea.

Ajirno: diarrhoea caused by indigestion and food poisoning.

Amasha: diarrhoea containing mucus, cause unknown.

- *Dud haga*: diarrhoea occurring only in breast-fed children, caused by ingesting contaminated breast milk.
- Severe, watery, dehydrating diarrhoea, such as that due to cholera.

Ajirno, *amasha* and *dud haga*, were usually considered mild illnesses but it was widely recognized that they could all progress to severe watery diarrhoea and cause dehydration.

Other areas of the country were visited and this classification of diarrhoea was found to be valid and well understood. However, the term used to denote a particular category of diarrhoea varied from area to area. The same classification was used in the community survey, which showed that the commonest type of diarrhoeal episode was *ajirno* (50%), followed by *amasha* (33%) and *dud haga* (12%). Severe watery diarrhoea occurred in only 5% of cases.

Reasons for non-use of *lobon-gur* solution

The village study attempted to discover why people did not use *lobon-gur* solution more frequently. The commonest treatment for diarrhoea involved the use of drugs and allopathic medicines and the second most

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popular was *boneji*, a traditional treatment based on local herbs. *Lobon-gur* was third in popularity and was used in only 4-10% of diarrhoea episodes.

When asked why they had not used *lobon-gur* solution during episodes of diarrhoea, many mothers indicated that the episodes were not of the severe watery kind. This largely explains the much higher usage in episodes of severe watery diarrhoea, as found in the subsequent community survey.

Many people did not have *gur* at home at the time of diarrhoeal episodes. *Gur* is most easily available between January and March; the community survey carried out between October and December found it to be present in only about 10% of households. This undoubtedly depressed overall usage of *lobon-gur* solution. However, for severe diarrhoeal episodes, considerable efforts were made to borrow or buy *gur*.

Unqualified local practitioners and professional health workers commonly had negative attitudes towards the use of *lobon-gur* solution and hardly ever recommended it, except to their poorest clients. They frequently suggested that the administration of *lobon-gur* solution was an inferior treatment.

Usage

Usage was defined as the proportion of episodes of diarrhoea occurring during the

Table 1. Usage rates for *lobon-gur* solution

	Percentages of all diarrhoea episodes in which <i>lobon-gur</i> solution was used		
	First phase	Standard programme	Concentrated reinforcement programme
All episodes	4.1	8.2	9.9
Children 0-4 years	3.3	10.9	11.8
<i>Dud haga</i>	2.0	12.2	12.3
<i>Ajirno</i>	4.0	7.9	9.8
<i>Amasha</i>	1.6	2.9	4.0
Severe watery diarrhoea	25.6	31.6	52.2

two weeks prior to the household interview for which *lobon-gur* solution had been used (5). About half of all diarrhoeal episodes were not treated at all. Usage rates varied from 1.6% to 25.6% for the first phase, from 2.9% to 31.6% where standard training had been given, and from 4% to 52.2% where the concentrated reinforcement programme had been adopted. Overall, usage rates for all episodes were 4.1%, 8.2% and 9.9% respectively (Table 1). Rates for the types of diarrhoea varied widely, the highest being for *amasha*, a diarrhoea involving fluid loss. For severe watery diarrhoea, usage ranged from 25.6% in the first phase to 52.2% in the concentrated reinforcement programme. A very high proportion of severe cases received some form of treatment: about half of the severe diarrhoea cases given some *lobon-gur* solution. There was a significantly higher rate in the second phase than in the first, and a significant difference between the rate delivered by the concentrated reinforcement programme (52.2%) and that of the standard programme (31.6%) in respect of severe diarrhoea.

Safety

Analyses of sodium concentrations in the results for the first phase were considerably better than those for the second phase (Table 2). In the latter, 18% of standard programme samples had sodium concentrations in excess of 119 mmol/l; they were potentially the most dangerous. Since over 90% of the solutions were in the 30-99 mmol/l range a month after delivery (1), the deterioration is perhaps attributable to a lack of reinforcement of knowledge and use. There was no significant difference between the standard programme and concentrated reinforcement programme in respect of safety.

Why were the results worse in the second phase? Three reasons are postulated. There was an increasing concern during the first phase about low usage and it is probable that there was a greater emphasis placed on usage and less on the dangers of *lobon-gur* solution during subsequent teaching by oral replacement workers in the second phase. Because of very rapid expansion of the programme in the second phase, an acute shortage of experienced supervisory staff developed. Finally, the shortening of the original ten-point message (2) to seven points (1) reduced the emphasis placed on the dangers of mixing too much salt in the solution. The effect of alterations in water volume on the concentration of sodium was investigated, but it was found unlikely that this was a major cause of the higher sodium concentrations (4).

Costs

During the 39 months of the first phase, US\$ 1.8 million were spent on visits and teaching at an average cost of \$ 0.72 per household. The cost per child under 5 years of age was \$ 0.69.

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The finding that linked high usage of *lobon-gur* solution with severe diarrhoea was very encouraging since these episodes are the most likely to be fatal. The reduction in the ability of mothers to prepare a safe and effective *lobon-gur* solution was disturbing and clearly needed careful attention from programme organizers. The main fault appeared to be the use of too much *lobon* or common salt. Water volume was a much less important factor: the *seer*, used in measuring the water for the *lobon-gur* solution, is widely employed in rural Bangladesh for almost every food item. The problem has now been corrected — mothers are no longer making

Table 2. Sodium concentrations in *lobon-gur* solutions

Sodium concentration (mmol/l)	Percentages of samples		
	First phase	Standard programme	Concentrated reinforcement programme
< 30 (safe but of reduced effectiveness)	4.4	2.5	1.8
30-99 (safe and effective)	71.4	63.3	50.4
100-119 (effective but potentially dangerous)	9.5	16.0	22.2
> 119 (dangerous)	14.7	18.2	25.6

solutions containing excessive amounts of sodium. A recent survey conducted in areas where mothers had been taught one year previously found only 2.5% of samples with sodium in excess of 110 mmol/l.

The second phase of the oral rehydration programme ended in September 1986, since when BRAC has decided to employ more child survival strategies. Along with oral rehydration therapy, attention is being given to immunization, the distribution of vitamin A capsules, and the training of

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traditional birth attendants. The lessons learned during the evaluation have been applied in the planning and implementation of the new child survival programme. Several changes have been made to the oral rehydration therapy component of this

programme. The seven points have been restructured and the oral replacement workers now talk much more specifically about the four different types of diarrhoea. Refined sugar is being promoted as a substitute for *gur* and a field trial to study the acceptability, feasibility and safety of oral rehydration solution containing rice powder has started. Greater emphasis is being given to the dangers of too much salt and to the importance of correctly measuring the ingredients. Mothers are advised to continue feeding children and to give *lobon-gur* solution in *amasba* cases and, if the patients do not improve, to see a physician.

The concentrated reinforcement programme has been discontinued since it was only marginally more effective than the standard programme. It was also much more expensive and permitted the teams to visit far fewer households. In place of individual training, the joint instruction of mothers from neighbouring households has been adopted in the belief that group reinforcement and acceptance will encourage increased usage.

The evaluation has provided fresh impetus to BRAC's work and has made it possible to

adopt new policies and replan health activities. Without undertaking such evaluation, health managers will find it hard to know the real effectiveness of their interventions and hence will not be sure whether their efforts are worthwhile. □

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