# Oral Replacement Therapy in Rural Bangladesh With Home Ingredients



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## Summary

A program was designed to train village women in rural Bangladesh to use oral therapy with home ingredients for treatment of diarrhea. Field workers were paid according to an incentive salary system based on achievement of educational objectives. 8357 village women were taught a short message about oral therapy and a method to make oral solution using a local fluid container with finger and scoop measurements of salt and unrefined sugar. A random sample of 1079 of these women two weeks after instruction showed that all those sampled knew how to make the solution correctly and 98% remembered 7 or more of the 10 points of the health message. The women sampled also made the oral solution. Analysis of 995 of the solutions showed that only four had sodium concentrations greater than 120 mmol/l and all but 28 (3%) had sodium concentrations between 20 and 100 mmol/l. The program showed that safe and effective home solutions for oral treatment can be prepared.

## Introduction

The role of oral therapy in the treatment of diarrhea is well-established.(1) However, despite its obvious advantages over intravenous therapy in a village situation, its application still presents problems with education and the availability of materials in some developing countries. Home measurements of salt and sugar to make oral solutions have been proposed to solve some of these problems, but serious errors have been reported with these methods when standard teaspoons or "finger pinches" have been used.(2,3) To avoid these problems packets, special spoons and special containers have been proposed.(4,5,6,7) All of these modifications introduce unfamiliar materials not available in the home which would seriously complicate the spread of this treatment in Bangladesh. Some also remain skeptical that village women can be taught to make and administer oral solution correctly. (8) Finally, there is the problem of staff supervision which plagues most rural health programs in developing countries. This program has dealt with these problems in a remote, rural area and has developed a method to make oral replacement solution which is safe, cheap, simple, acceptable and available to all. A concise, educational message and a simple organizational framework were both essential elements of the program.

Women were taught to make oral solution by adding one three-finger pinch of salt (up to the first finger crease of the index finger) and two four-finger scoops of gur to one-half seer of tube well or boiled water. This was called the lobon-gur mixture. Lobon is Bengali for common table salt and gur is locally available unrefined sugar which is sucrose. Sucrose has been shown to be an excellent substitute for glucose which has been the standard ingredient facilitating absorption in oral replacement solutions.(9,10) Gur also contains substantial potassium in addition to sucrose. One-half seer is a local measure equal to 457 cc. Preliminary studies of ours and two other independent studies in Bangladesh (written communications from C. McCord and L. Chen) have shown that more than 90% of village women can estimate this volume within $\pm$ 25%.

The core of the program was a simple, concise but comprehensive health message entitled Ten Points to Remember. (see table 1). It is a condensation of all of the information that a village woman needs to know to treat diarrhea with oral therapy. Oral replacement workers(ORW's) used these ten points to train village women to treat diarrhea with oral therapy. The ORW's were all women between 20 and 50 years of age who could read and write Bengali. The goal of the program was to

visit each household in the program area and to teach one woman in the household oral therapy.

During the home visit the ORW taught the woman the Ten Points to Remember and how to make the lobon-gur mixture. She also showed the woman how to measure one-half seer accurately in a container from her home. Following each visit the ORW recorded the woman's name and village. Each home visit took approximately 20 to 30 minutes. Each ORW made a minimum of 10 to a maximum of 15 home visits per workday.

The program staff was composed of a project manager, two monitors and two teams. Each team consisted of a team coordinator, ten ORW's and a service staff. The project manager was responsible for overall supervision of the program, the monitors for ORW evaluation and team coordinators for support and supervision of their teams. Each team was assigned specific villages within one section of the program area and provided with housing in that section. All of the travelling by the staff was done by foot or local boats. After one woman in each household had been taught oral therapy in one section of the program area, the team moved to another section.

The monitors maintained the quality of the program. The method of quality control evaluated the veracity of the ORW reports which listed women taught by each ORW, the knowledge retained by the village women and the skill of

those women in preparing the Lohn-gur mixture. Approximately ten percent of the households visited by the CHW's were selected at random. A monitor visited each of these households, asked the woman who was taught by the CHW ten questions about the health message in oral therapy and requested them to make the Lohn-gur mixture. He took a small sample of this mixture in a knotted sample vial and recorded the results of the interview on an evaluation form. The samples were analysed for sodium, potassium and glucose. This permitted continuous and objective monitoring of the program.

An important aspect of the program was the CHW incentive salary system. Each woman who was interviewed by a monitor was graded according to her answers about the ten points to remember and her skill in preparing the Lohn-gur mixture. There were four grades. Grade A indicated that the woman remembered all ten points and made the Lohn-gur mixture correctly. Grade B meant that she remembered 7,8 or 9 points and made the mixture correctly and Grade C, that she remembered less than 7 points but still made the mixture correctly. Grade D was given if she did not make the mixture correctly.

It was assumed that monitoring approximately ten percent of the households visited by CHW's provided an accurate representation of the quality of their performance. From these results the number of households

visited by each ORW in each grade was calculated. The ORW's were paid according to the number of households visited that month in each grade. They received four Taka(15 taka = $1 US) for each household in grade A, two Taka per household in grade B, one taka for grade C and no payment for grade D. The average ORW monthly salary was 600 taka ($ 40 US). The cost of the program was approximately 6 taka ($0.40 US)/ household visited.

## Results

During 39 days of fieldwork 20 ORW's visited 8359 households. The monitors visited 1079 randomly selected households approximately two weeks after the ORW's. 336 (34%) of the 1079 women interviewed by the monitors were placed in grade A, that is, they knew all ten points and how to make the lobon-gur mixture correctly. 692 (64%) were grade B. Only 21 (2%) knew less than seven points and thus were grade C. There were no grade D.

The women who were interviewed by the monitors were also asked to make the oral solution. Analysis of 996 of these solutions showed that the mean sodium concentration was 47±18 mmol/l. Only 4 (0.40%) had a sodium concentration greater than 120 mmol/l. (See figure 1) Excluding these four samples, the range of sodium concentrations was from 10 to 114 mmol/l. 866 (87%) of the samples had sodium concentrations between 30 and 100 mmol/l. The average potassium concentration was 8.1±2.7 mmol/l and the range

was from 2.7 to 20.1 mmol/l. 111 samples were analyzed for glucose which had an average concentration of 90±29 mmol/l and a range of 40 to 170 mmol/l.

## Discussion

Packets of oral replacement mixture added to the proper amount of water provide an ideal treatment for the vast majority of cases of diarrhea. However, it is currently impractical to supply these to every household in Bangladesh. If every case of diarrhea in Bangladesh was treated with oral therapy, tens of millions* of packets would have to be produced and distributed annually in a country where 92% of the population live in rural areas and transportation is poor. Cost considerations would also hamper widespread distribution of the packets. The per capita income is only slightly less than $100 US per year and the market system tends to be exploitative especially when items are in short supply or are needed immediately. Special spoons and containers present similar problems with supply lines and distribution. In addition, the success of the packet and the special spoons and containers is dependent on adding the mixture to the

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* The population of Bangladesh is almost 90 million. It is estimated that each person needs at least one packet annually.

proper amount of water and administering it correctly. In Bangladesh, as in many other developing countries, instructions on the packet would be inadequate since more than 80% of the population is illiterate. A nation-wide publicity campaign would probably have limited success since only a small number of people ever have a radio.

However, since diarrhoea is such a serious problem in developing countries, all available methods of oral therapy should be employed. The packet and the special spoons and containers could be used for the urban population, while programs similar to this one would probably be more suitable in rural areas. If more than one method is employed in a country, confusion can be avoided through education. Our preliminary studies show that village women here can easily understand the concept of oral therapy and the similarities between the lobon-gur mixture and the packet.

## Conclusion

This program demonstrated that village woman(greater than 90% of this population of women are illiterate) can learn oral therapy, including how to make oral solution correctly from locally available substances using finger measurements, without difficulty. It also provides an example of a workable system to supervise and administer a rural health program in a developing country based on achievement of educational objectives.

## References


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Table 1

Ten Points to Remember

1. Diarrhea is the condition of a patient who has more than one watery stool in a day.
2. Transmission of diarrhea is by the anal-oral route. This means the feces of an infected person or a carrier enters someone else's mouth.
3. Treatment of diarrhea is oral replacement mixture, fluid and food.
4. Oral Replacement Mixture is a mixture of sugar and salt in water. Lobon-gur mixture is one kind of oral replacement mixture.
5. Lobon-gur Mixture is made by mixing a three-finger pinch of salt (upto the first crease of the index finger) to 2 four-finger scoops of gur in one-half seer of tubewell or boiled water and stirring.
6. You should Begin giving lobon-gur mixture after the first watery stool.
7. For children, the amount of lobon-gur mixture should equal the amount of water in the stools. If the mother does not know, let the child have as much as he desires.

   For adults, give one-half seer for each stool.

8. Lobon-gur mixture can be dangerous when:

   1. Too much salt is added to mixture.
   2. Infants and small children are not given small, frequent feedings.

9. A Doctor should be consulted when:

   1. Diarrhea lasts for more than two days.
   2. The patient can not take fluid by mouth.
   3. The patient has severe diarrhea and can not replace the water he loses in his stools with lobon-gur mixture.

10. Nutritional Advice for patients with diarrhea includes:

    1. During diarrhea he should continue to take food and fluid.
    2. After diarrhea he should take more than normal amount of food for seven days.

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