EVALUATION OF A COMMUNITY BASED ORAL REHYDRATION PROGRAMME IN RURAL BANGLADESH

By

Ahmed Mastaqur Raza Chowdhury

Thesis submitted to the University of London in fulfilment of the requirement for the degree of Doctor of Philosophy in the Faculty of Medicine.

Evaluation and Planning Centre for Health Care
London School of Hygiene and Tropical Medicine
Keppel Street, London WC1E 7HT

1986

NUMEROUS ORIGINALS IN COLOUR

ABSTRACT

Oral rehydration therapy is a proven method for preventing mortality from dehydration due to diarrhoea. In rural Bangladesh a community based programme, called the Oral Therapy Extension Programme (OTEP), has been teaching mothers how to make and use an ORT solution using local household salt (lobon) and unrefined brown sugar (gur). The programme has been organised by a national non-governmental organization called the Bangladesh Rural Advancement Committee (BRAC). This programme plans to visit 16 million households throughout the country by 1990 and 5 million households had been visited by December 1985. The results from an earlier evaluation of the First Phase of the programme were encouraging. A further more detailed evaluation, which concentrated on determining the usage and safety of homemade lobon-gur solution, was undertaken in 1984 and this thesis presents the findings.

The literature has been reviewed on the problem of diarrhoeal diseases and on the discovery of ORT and its applications. Methodological issues in undertaking the evaluation of such programmes are then considered. This evaluation focussed on usage and safety and was carried out using two main approaches, firstly through an indepth village case study and then by using a household sample survey. The cultural perceptions and practices regarding diarrhoea were studied in the village case study, which revealed that to the population there were four types of illnesses which all had the symptoms of diarrhoea. The sample survey found the usage of the ORT ranged from 2% to 55% of episodes, depending on how usage is defined. The ability of mothers to prepare the ORT solution was also studied and this showed that the ability, although originally good, has declined over time after teaching. The policy and programme implications of these results are discussed and recommendations are presented.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENT

In writing this acknowledgement, the name of Mr F. H. Abed comes first. After founding the Bangladesh Rural Advancement Committee (BRAC), of which he is the executive director, he has given it a distinct identity in the development scenario of Bangladesh. The author has had the privilege of working under him in the organization for the last several years and it is because of his initiative, interest and support that the author has continued working for this thesis. In this connection, the study leave and fellowship offered by BRAC to the author are gratefully acknowledged.

The draft proposal for the evaluation was sent to several key persons for review and comment. Many gave detailed comments and suggestions which were very useful in finalizing the methodology. The names of the following are gratefully acknowledged in this connection: Drs K. M. A. Aziz, D. Bradley, R. A. Cash, W. A. M. Cutting, B. Dick, S. D'Souza, W. B. Greenough III, D. Morley, H. Pickering, P. Smith, J. E. Rohde, S. Zimicki and I. de Zoysa.

The field work for the evaluation could not have been possible without the cordial and helpful cooperation of the author's numerous colleagues at BRAC in Dhaka and in the field. The following are only a few in the list of such persons: J. Ahmed, S. Ahmed, M. R. Chowdhury, K. Dutta, N. Jahan, A. Nath, S. Sarkar, S. Zaman and Mrs M. Rahman. The interviewers and their supervisors whose names appear in Appendix 10 deserve major credit for this work. In this connection, the great assistance provided during the field work by BRAC and the International Centre for Diarrhoeal Disease Research, Bangladesh, in the form of logistical support, computer facilities and chemical analyses of lobon-gur sample solutions are gratefully acknowledged.

Dr H. Pickering, formerly of the Evaluation and Planning Centre at the London School of Hygiene and Tropical Medicine, took the pains to spend a week with the author in the field during the days of the village case study. Her visit was a source of great reassurance in his work and this is gratefully acknowledged.

The author also expresses his thanks to many persons who were present and made comments in seminars given by him at the London School of Hygiene and Tropical Medicine and at the Liverpool School of Tropical Medicine. He particularly remembers a meeting at the Second International Conference on Oral Rehydration Therapy in Washington D. C. in December 1985 with Mr F. H. Abed, Dr R. A. Cash, Dr L. C. Chen and Dr J. E. Rohde. They all found time from their otherwise busy schedule at the conference and made valuable comments on the major results of the present study.

Ms J. Bailey of the Computer Section at the London School of Hygiene and Tropical Medicine has been of great assistance in solving many computing problems and Ms E. Inman and Ms. L. Paul coached the author patiently on the essentials of word processing and enabled him to do the whole thesis by himself.

The Committee of Vice Chancellors and Principals of the United Kingdom (CVCP) awarded the author an Overseas Research Studentship (ORS) under which the fees for the course of study with the University of London was drastically reduced. This is gratefully acknowledged.

The field work for this study would not have been possible without the financial support of the Swiss Development Cooperation and Humanitarian Aid in Berne, who made a generous research grant. Apart from paying all expenses connected with the field work, the Swiss grant enabled the author to participate in a number of conferences and present results from this study. In this connection, the author particularly remembers the help of

Dr Immita Cornaz, a senior advisor to the Swiss Development Cooperation.

My supervisor, Dr Patrick Vaughan, should now be mentioned, as in reality this thesis is, in many ways, the joint efforts of Dr Vaughan and the author. Most of my intellectual indebtedness is to him. He spent two busy weeks during the autumn of 1984 visiting me in the field, travelling from one study area to another and saw for himself the data collection operation. His advice was very helpful in improving the methods and the questionnaire. All through, he has been a source of support and reassurance. It is because of his interest, help and guidance that the thesis was completed so soon. He has been more than just a supervisor to the author.

Last but not the least, I must mention my family members. My wife Neelofar and our son Wameq have been extremely supportive by giving me help and company in London and by staying away in Canada during the field work. I could not do many of my duties to them during these periods. My love and affection remains for them. Today is my birthday and I recall my gratitude to those two souls who brought me to this earth and patiently brought me up.

London
8 January 1986.

A M R Chowdhury

CHAPTER 1: INTRODUCTION

Diarrhoea is recognised as a major health hazard affecting particularly the children in the developing world. Oral rehydration therapy (ORT) has been found to be a proven treatment of choice for most cases of diarrhoea. During the past few years, several community based ORT programmes have been initiated in developing countries. Such a programme has been conducted by the Bangladesh Rural Advancement Committee (BRAC) and it has received international attention. An evaluation of the implementation of this programme was carried out recently by BRAC in collaboration with the London School of Hygiene and Tropical Medicine. This thesis presents findings from this evaluation.

Although it is presented as a single evaluation, with the objective of determining household usage and safety of home-made ORT solutions, it was in fact composed of two separate but inter-related studies. The first part was a village case study which used qualitative research methods and this was followed by a large-scale household sample survey utilising quantitative methods (see Figures 2 and 3).

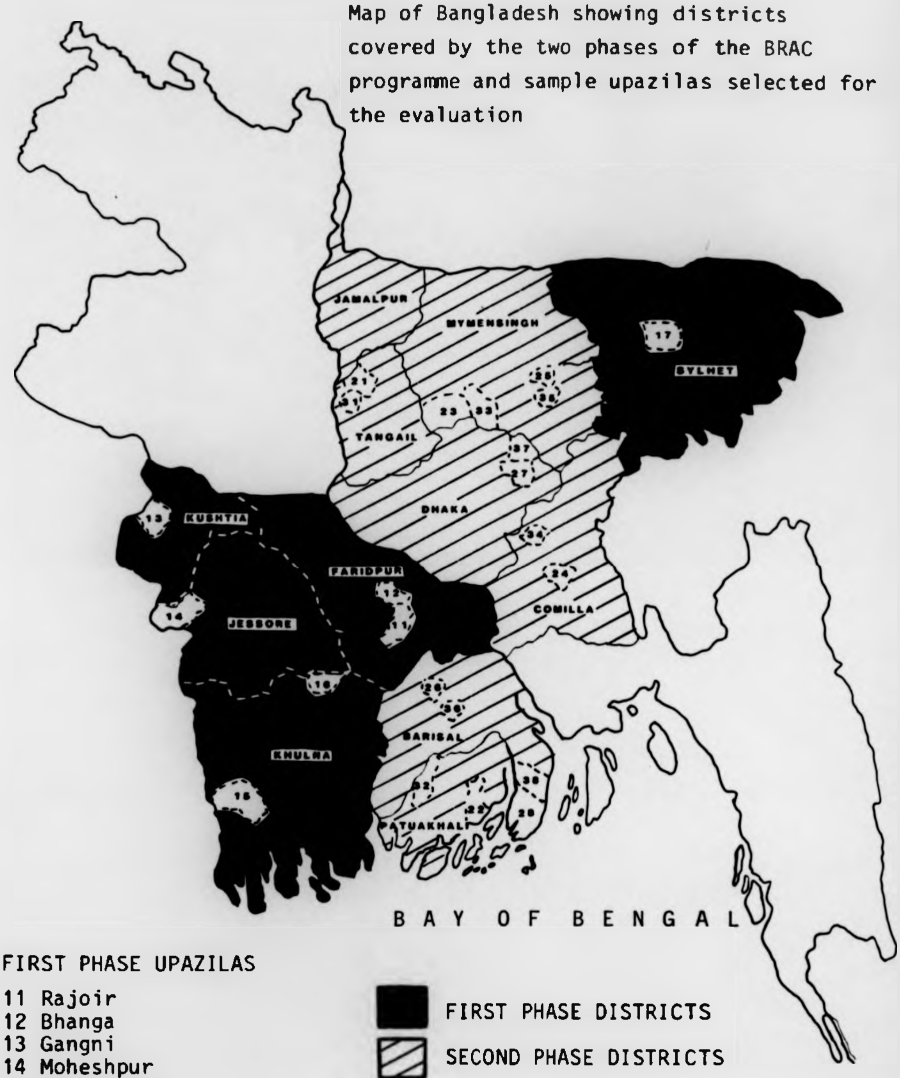
The thesis is presented in several chapters. Internally, each chapter comprises of three broad sections: introduction, major items of information and a short discussion/conclusion.

Chapters 2 and 3 are review chapters. The literature on the problem of diarrhoeal diseases vis-a-vis its effects on mortality, morbidity, nutritional status and other sectors is reviewed in Chapter 2. Methods available for the treatment of diarrhoeal diseases are reviewed in Chapter 3 giving particular emphasis to oral rehydration therapy (ORT). The history, experiences and controversies regarding ORT are all considered in this chapter. Chapter 4 introduces BRAC and its ORT programme. Certain approaches to evaluations used in community based ORT programmes are reviewed in Chapter 5. Problems connected with the measurements of indices, giving particular emphasis to usage, have been discussed. Chapter 6 describes the village case study. The problems and limitations of using this methodology are presented together with the findings. The methodology of the survey study is described in Chapter 7. Problems and limitations of the survey methodology are also discussed and data on the population studied are presented in Chapter 8. The reporting of diarrhoeal episodes and repeatability are also discussed and annual incidences estimated. Detailed analyses of usage data have been presented in Chapter 9, with different usage rates, based on different definitions, are also computed. The question of safety of the BRAC ORT method is taken up in Chapter 10 and results on the knowledge and safety of the method over time are presented. The implications of the findings for other ORT programmes are discussed in Chapter 11. Chapter 12 is the last chapter and is concerned with recommendations.

Most tables are presented in the text. Large and less important tables are, however, presented in the back. References and appendices are also presented in the back of the thesis. The appendices contain examples of the main methods. Photographs and graphs are, however, included in the text.

Figure 1

Map of Bangladesh showing districts covered by the two phases of the BRAC programme and sample upazilas selected for the evaluation



FIRST PHASE UPAZILAS

11 Rajoir
12 Bhanga
13 Gangni
14 Moheshpur
15 Shyamnagar
16 Terokheda
17 Jagannatpur

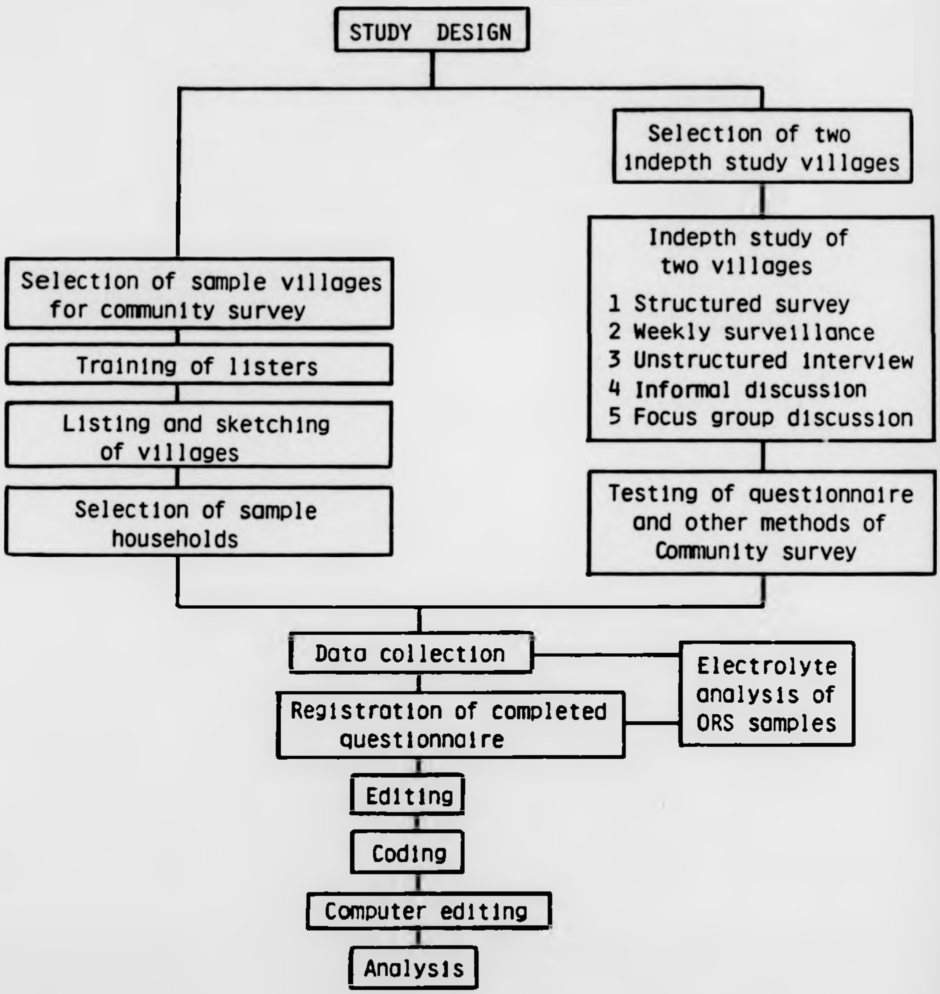
NON-CRP UPAZILAS

21 Gopalpur
22 Galachipa
23 Bhaluka
24 Chadina
25 Tarail
26 Ujirpur
27 Shibpur
28 Char fassion

CRP UPAZILAS

31 Bhuapur
32 Mirzaganj
33 Gafargaon
34 Homna
35 Karimgant
36 Kotwali
37 Monohardi
38 Lalmohan

Figure 2
Sequential steps of the BRAC evaluation



1 Selection and preparatory work for village study

2 Data collection for village study

3 Selection of union and village for survey

4 Listing and mapping of village

5 Training of interviewers

6 Data collection for survey

7 Office editing and coding

8 Computer editing

9 Transfer of cleaned data into tape

Figure 3 Field work time schedule


1985
AUGUST
SEPTEMBER
OCTOBER
NOVERMBER
DECEMBER
JANUARY

CHAPTER 2: THE PROBLEM OF DIARRHOEAL DISEASES

INTRODUCTION

Although it is a global problem, there is a higher incidence of diarrhoea in developing countries and it is children who are the commonest prey to its repeated attacks.

Over the last hundred years or so, scientists have been researching causes, cures and the prevention of diarrhoea. A study of recent literature reveals many discoveries and many of the aetiologic agents that cause diarrhoea have only been identified recently. Oral rehydration therapy has been invented and now established on a firm footing. Advances in genetics has raised the hopes of effective prevention through new vaccines.

Diarrhoea still remains a major health problem and a cruel killer in the developing countries. This chapter reviews the recent literature on the effects of diarrhoea on:

a. mortality
b. morbidity
c. nutrition and
d. economic and other activities.

A review of the mechanisms that cause diarrhoea and the known aetiologic agents is not attempted here.

EFFECTS ON MORTALITY

In most countries of the developing world, infant and child mortality are very high compared to the developed world. This is not very surprising since infant and child mortality are an index of development and the patterns of mortality observed in these countries reflects their overall standard of life. A study carried out in Haiti in the 1950s found child mortality in the developing world five times higher than that in the developed world with children under 5 years of age constituting 50 percent of all deaths compared to 10 percent in the developed world (Sebrell, Smith and Severinghouse, 1959). Behar, Ascoli and Scrimshaw (1958), about the same time as Sebrell, reported that 58 percent of all deaths in rural Guatemala occurred in children under 5 years of age and that one-third of children died before reaching their fifth birthday. Gopalan (1968) in summarising child mortality statistics of the Sixties for India showed that 40 percent of all deaths occurred in children under 5 years of age which, as he reported, was 10 times higher than in the U.K. A good comparison of mortality patterns in the developing and developed worlds is available from the Inter-American Investigation of Mortality in Childhood. The under-5 years mortality rate in the USA was 5.4 per 1,000 and compared to this, El Salvador had 50.5 (Puffer and Serrano, 1973).

The situation has not changed much over the last 30 years or so. A study conducted in rural Bangladesh during the late Seventies found that 53 percent of all deaths occurred in children under 5 years of age, which meant that less than 16 percent of the population bore the burden of more than 50 percent of all deaths occuring in one year. The first five years were found to be the most difficult time in a child's life in Bangladesh and if a child could bypass this period he could expect to live 63 years which is 'not markedly dissimilar from those of developed countries' (Chen, Rahman and Sardar, 1980).

The role that infections plays in the above sad state of affairs is well documented (Puffer and Serrano, 1973; Mata, 1978; Walsh and Warren, 1979; Chen, Rahman, et al., 1980). Diarrhoea is one of the most common causes of death in children. Many publications have appeared during the previous 20-30 years showing the scale of diarrhoeal illnesses in causing child deaths. Walsh and Warren (1979) quoting from World Health Organization and other agencies and individual studies reported that a total of 5-10 million deaths are caused by diarrhoeal diseases every year. This, when compared with deaths from other infections provided in the same report, is the highest toll from any infection. Although a good number of studies are available on diarrhoea-mortality, methodological problems have reduced the scope of comparison between these studies. A recent attempt by Snyder and Merson (1982) calculated that 4.6 million children under age 5 years die from diarrhoeal disease every year in Africa, Asia (excluding China) and Latin America. They selected 22 home surveillance studies and two multi-country mortality studies as a basis for investigating diarrhoeal morbidity and mortality. In the 16 countries whose mortality data were compared, the highest mortality rate from diarrhoea was in children under 2 years of age. For this age group, the median annual mortality rate from diarrhoea was found to be 20 per 1,000 population. For children under age 5, the median rate was 13.6. A study conducted in four Guatemalan villages more than a quarter century ago found a skewed distribution of deaths by age occuring from diarrhoea. For all ages, the diarrhoeal death rates were found to be 115 times higher than in the USA and for the 1-4 age group, the ratio was more than 500 times higher (Gordon, Guzman, Ascoli and Scrimshaw, 1964).

For Bangladesh, it has been estimated that more than 250,000 people, most of whom are children, die every year from diarrhoea (Guerrant and Cash, 1973). The study by Chen, Rahman, et al. (1980) has provided some detailed information on the causes of death amongst Bangladeshi children. For the children under 5 with an overall death rate of 280, diarrhoea accounted for 80 deaths followed by tetanus with 40. As most tetanus occurs in the neo-natal age, the picture is more revealing when the figures for children 1-4 years of age are considered. In this age group, 44 percent of all deaths were due to diarrhoea. Watery and dysenteric diarrhoeas were half-half whereas in infancy watery diarrhoea had a far higher rate (watery 16.8 and dysentery 2.8 per 1,000 live births).

The contribution of diarrhoea to adult mortality is often unappreciated and it has been estimated for Bangladesh that 46 percent of all deaths in 15-44 age group would have been caused by diarrhoea had there been no treatment facility in the area of his study (Chen, 1978). It may be mentioned here that this treatment facility studied by Chen was available to only 160,000 of Bangladesh's 100 million population.

EFFECTS ON MORBIDITY

A study published in 1975 revealed that a child under 2 years of age in Guatemala was ill with diarrhoea 10-14 percent of the time, fever 5 percent and respiratory illness 35 percent of the time (Martorell, Habicht, Yarbrough, Lechtig, Klein and Western, 1975). Being sick for nearly half the year, commented Rohde (1978), for these Guatemalan children illness was practically the norm rather than the exception. In Bangladesh children have been reported as being unwell 75 percent of the time (Black, Brown, Becker and Yunus, 1982a).

The measurement of diarrhoeal morbidity is more difficult than that for mortality, due mainly to the lack of a satisfactory definition of diarrhoea (Snyder and Merson, 1982). Several studies on diarrhoeal morbidity have been reported but there are major differences in the terms used to define a diarrhoeal episode. The definitions have varied from the relatively simple of one 'more than two watery or loose motions in 24 hours', as used in a Bangladesh study (Rahaman, Aziz and Patwary, 1979), to a more complex one in Guatemala, '<1 year of age - 5 or more liquid stools per 24 hours; >1 year - 3 or more liquid or semi-liquid stools preceded by 2 weeks of normal stools' (Scrimshaw, Ascoli, Kevany, Flores and Iscaza, 1967). Some studies have used the mother's definition as a measure of diarrhoeal disease (Moore, Cruz, and Vargas-Mendez, 1966; Leewenburg, Genest, Muller and Patel, 1978). This, however, can lead to an under estimate as diarrhoea occurs frequently in children in the developing world and it is 'not necessarily considered to be an illness by mother' (Leeuwenburg et al., 1978). Snyder and Merson in their cross-cultural review estimated that 744 to 1,000 million episodes of diarrhoea are experienced by the children under 5 years of age in Africa, Asia (excluding China) and Latin America every year (Snyder & Merson, 1982). Walsh and Warren (1979) reported that 3-5 billion diarrhoeal infections take place in Africa, Asia and Latin America each year. This is by far the highest number in the list of all infections cited by them. Had breast-feeding not been widely used in this part of the world, the incidence might have been much higher (Gordon et al., 1964).

Although diarrhoea is generally considered a Third World problem, its incidence in the developed world is not less important. Nearly six illnesses each year for each child under age 2 has been reported in the United States (Fox, Hall, Cooney, Luce and Kronmal, 1972). Similarly, high incidence of the disease has been reported in England (Wharton, 1981). However, the estimated figures for the developing world are even greater. Chen (1978) quoting figures provided by Rohde reported that diarrhoeal morbidity constituted upto half of all illnesses among children. Mata (1973) found 43 percent illnesses associated with diarrhoea in Guatemala. Zijl (1966) compared data from five developing countries and reported an attack rate of 2.4 to 5.8 episodes per child per year. Rohde (1978) computed annual attack rates of 1.5 to 7.5 episodes per child per year from different indepth studies. Assuming an average duration of 8 days per episode (Mata, Urrutia and Gordon, 1967), a prevalence of 3 to 16 percent has been estimated. This implied that 3 to 16 out of 100 children in the developing world expect to suffer from diarrhoea at any given time - 'a staggering morbidity burden by any criterion!' (Chen, 1978).

The Snyder and Merson (1982) cross-cultural study found the highest incidence of diarrhoea to be in children under 2 years of age. The median rates were found to be highest for children 6-11 months old. It was 4.3 in African region, 3.5 in Asian region and 2.3 in Latin American region. Leeuwenburg et al. (1978) also found a significantly higher attack rate in children 6-11 months old. In Costa Rica, half of all diarrhoeal illnesses were found to occur in children under 2 years of age (Moore, Cruz and Vargas-Mendez, 1965). Higgins, Floyd and Kader (1955) studied 100 Egyptian children and found only 5 children who did not suffer any diarrhoea during the year-long length of the study. A study from urban Jakarta, Indonesia, provided some data on the duration of diarrhoea in children. Out of 618 diarrhoeal episodes recorded, 511 had a duration of less than one week, 86 had 1-2 weeks, 16 had 2-3 weeks, 4 had 3-4 weeks and 1 had diarrhoea for 4-5 weeks (Joe, Rukomono, et al., 1966). A study in Nigeria found that children spent 10.5 percent of their time with diarrhoea (Tomkins, 1981).

A wealth of information is also available on diarrhoea in Bangladeshi children. A longitudinal study of two villages using intensive surveillance found that diarrhoea was the most common illness after respiratory tract illnesses with the highest incidence in children 2-11 months of age (Black, Brown, Becker, Alim and Huq, 1982b). Chen (1978) reviewed urban and rural diarrhoeal morbidity data in Bangladesh and suggested that diarrhoea was more common in rural areas. He showed for urban and rural areas that morbidity rates were highest in young children and declined with age with 39 percent of all diarrhoeas being experienced by children under 5 years of age. In a retrospective survey in rural Bangladesh, similar differentials were also found (Chowdhury, 1983).

EFFECTS ON NUTRITION

'Infections of almost any degree of severity appear to worsen nutritional status by interfering with food intake and by causing an increased loss of essential nutrients from the body. Conversely, the commonest type of malnutrition, even when subclinical, affects one or more of the resistance to infection'

(Scrimshaw, 1975).

Of all infections, those leading to diarrhoea probably have the most adverse effect on the nutritional status of the children (Wray, 1967; Martorell et al., 1975; Rowland, Cole and Whitehead, 1977). Diarrhoea is the most common illness of nutritional importance (Rohde, 1978). The exacerbating effects of diarrhoea on nutritional status has been shown quite extensively in many settings. Studying the children of Guatemala, Martorell et al. (1975) found that repeated bouts of diarrhoea lead to significantly more growth retardation in both height and weight compared to other illnesses. A strong inverse relationship between diarrhoeal infections and calorie intake in the children of Santa Maria Cauque in Guatemala was found (Mata, 1978). Rowland et al. (1977) reported that diarrhoea was the most significant infection affecting the growth of the Gambian children.

Studies have shown the diarrhoea-associated malabsorption of sugar, nitrogen, fat and micro-nutrients (Rosenberg, Solomans and Schneider,1977) and a reduction in protein-calorie intake have been reported in sick Bangladeshi children (Hoyle, Yunus and Chen, 1980). Similar results were shown in Bangladesh with respect to macro-nutrients (Molla, Molla, Sarkar, Khatun and Rahaman, 1983). Acceleration of catabolic processes leading to higher consumption of nutrient reserves due to diarrhoea has also been documented (Chen, 1983). Although not yet quantified, the direct nutrient losses due to diarrhoea has been long suggested and recently Rahaman (1983) in Bangladesh found an excessive loss of protein in the stools of diarrhoea patients. The link between diarrhoea and nutritional blindness has also been recently suggested (Cohen, Mitra, Regt and Davidson, 1985). Apart from these, diarrhoeal disease causes an indirect effect on the mortality of children after the neonatal period by contributing to deaths from kwashiorkor and from such infections such as measles (Gordon et al., 1964; Behar et al., 1958; Feachem and Koblinsky, 1983).

The reason why diarrhoea retards growth in children is not clear (Black et al., 1982b). Chen (1983) has postulated that the nutritional impact of diarrhoea operates through four 'basic' mechanisms: reduced food intake, malabsorption, increased metabolism and intestinal loss of nutrients.

EFFECTS ON ECONOMIC AND OTHER ACTIVITIES

Many researchers ignore the consequences of diarrhoea for the adult population. Apart from the well documented and previously discussed effects on mortality, morbidity and nutrition, diarrhoea affects the lives of adults in several other ways - some directly and others indirectly. In Bangladesh, it has been calculated that 4.5 adult work days are lost annually due to diarrhoea and as peak diarrhoea morbidity coincides with the harvesting and planting of major crops, the potential impact on economic and other activities is probably higher than this figure suggests (Chen, 1978). Diarrhoea is an illness which causes constant annoyance and restricts movement even when it is not very severe. Resources are spent on medication and this is particularly important to a daily subsistence family. Any extra expenditure on health, which may be considerable in some situations, means a cut in the daily food budget and/or using the village money lenders.

CONCLUSION

The above review intended to bring together the relevant information on the consequences of diarrhoeal diseases, particularly in the developing world. It has been estimated that 5-10 million deaths are caused by diarrhoeal diseases every year and the mortality is greatest in children under 2 years of age. In Bangladesh alone, more than 250,000 people are estimated to die from diarrhoea every year, most of whom are children.

Morbidity from diarrhoea is also alarmingly high. Between 3-5 billion diarrhoea infections are estimated to occur every year in the developing countries, most of which occurs in children under 2 years of age. In Bangladesh, the highest incidence of diarrhoea is found to occur in children 2-11 months old and it is the most common illness after respiratory tract illnesses. The interaction between diarrhoea and malnutrition is well documented in Bangladesh, but the effects of diarrhoea on economic and other activities are less well documented.

That diarrhoea is a major health and nutritional problem is beyond question but unfortunately though, not much could be done to date to bring it under control. The recent few years, however, has seen an increased realisation of the importance of controlling the disease particularly the deaths from diarrhoea. The World Health Organization (WHO) has created a diarrhoea diseases control programme at its Geneva headquarters (Anonymous, 1979) and an international centre for diarrhoeal disease research has been established in Bangladesh (Greenough III, 1983). The Appropriate Health Resources Technology Action Group in London (AHRTAG) has been publishing the 'Dialogue on Diarrhoea' since 1980. Oral rehydration therapy (ORT), a treatment method for most diarrhoeas, has been incorporated as an important element of the UNICEF Child Survival and Development Revolution (Grant, 1985). An international conference on oral rehydration therapy (ICORT) was organised in 1983 to bring world-wide attention to the urgent need to tackle diarrhoea (Cash and McLaughlin, 1983) and a second ICORT was also organised in December 1985. ORT programmes are now being implemented in many developing countries.

CHAPTER 3: ORAL REHYDRATION THERAPY (ORT)

INTRODUCTION

The most widely researched and used treatment for diarrhoea is fluid therapy to combat or diminish dehydration. There are two types of fluid therapy: intravenous and oral. The present thesis is a study of an oral rehydration programme but other methods will be briefly reviewed.

An important therapy for diarrhoea is to continue breast and/or other feeding during and following an episode and this may be combined with fluid and drug therapies. Continued feeding during diarrhoea helps avoid an adverse nutritional effect and hastens quick recovery.

There are a number of anti-diarrhoea drugs which are promoted, but most have very limited usefulness in combating diarrhoea. Antibiotics may be needed in some types of diarrhoea, such as cholera or dysentery but in most cases they are not useful and in many cases they can lead to adverse effects (Rohde et al., 1983).

ORAL REHYDRATION THERAPY (ORT)

It is likely that from time immemorial people were practicing oral fluid therapy for hydration at least in order to quench thirst (Finberg, 1980). In traditional societies of Bangladesh and China, mothers have been using rice soup for diarrhoea for centuries (Greenough, 1983) and rice water is a traditional treatment for gastroenteritis in Indonesia (Kleevens, 1981).

The best therapy for almost all types of diarrhoea is to replace what is lost in the stool. Tracing the history of medical research on fluid therapy takes us back to 1831 when two letters were published in the Lancet. O'Shaughnessy reported the kind of biochemical changes that occurred in the blood of cholera patients and of the first use of parenteral fluid therapy on patients with similar symptoms in the cholera epidemics in Russia and Scotland (Latta, 1831; Lancet, 1832). Dr John Snow, a pioneer of modern germ theory who suggested the connection between impure water and the transmission of cholera disease (De, 1961), applied a 'weak saline solution' through the veins of severely dehydrated cholera patients with partial success (Snow, 1854). The important concept of fluid therapy was thus formulated during the last century.

Intravenous therapy was, however, hardly used after the time of Snow until the 1890s when Rogers used it in Calcutta and brought hospital case mortality down from 61 to about 33 percent (Rogers, 1909; Population Reports, 1980). Early this century, Sellards made improvements on the intravenous saline by adding bicarbonate in order to offset the threat of acidosis (Sellards, 1910). The formula was improved when the use of potassium was advocated (Darrow, Pratt, Fleet, Gamble and Wiese, 1949). The formula thus contained all the elements that are lost through the diarrhoeal stool - water, sodium, chloride, bicarbonate and (Booth and Harries, 1982). During the 1950s and 1960s, the modern scientific formula was determined by examining the electrolyte composition of cholera stool and developing an intravenous fluid appropriate to the fluid lost (Phillips, 1964; Phillips, 1966) and this was successfully used in cholera epidemics in Asia and the Middle East (Population Reports, 1980). Use of the formula has now brought the hospital mortality down to less than one percent (Watten, Morgan, Songhla, Vanikiati and Phillips, 1959; Population Reports, 1980; Pape, 1983).

For the vast majority of world's population, however, intravenous therapy is impractical as it is expensive and difficult to administer. The best alternative is the oral administration of the solution. Oral salt solution was first attempted in Britain about the same time as Latta in early 1830s (Collyns, 1832; Rance, 1832), but it was not until the 1940s or so that the oral therapy was considered to correct and maintain hydration. Oral therapy was used for the first time in the USA to maintain a balance after initial intravenous therapy (Darrow, et al.,1949; Harrison, 1954). Chatterjee (1953) in the early 1950s tried oral solution for the first time in an epidemic situation in Calcutta and treated 186 moderate to severe cholera patients.

Until the role of glucose as a transport medium for sodium was established, glucose was used as a source of calories and better taste. Diarrhoeal disease interferes with the sodium transport across the small intestinal wall and the discovery that glucose can 'carry' sodium and water with it to the small intestine (Curran, 1960), established the scientific basis for the use of glucose in oral solutions. Other workers demonstrated that glucose enhanced the absorption of sodium and water in diarrhoea patients (Phillips, 1964; Taylor, Hare and Phillips, 1968). Soon afterwards it was shown that oral therapy reduced net fluid and electrolyte losses and increased sodium and fluid absorption (Hirschhorn, et al., 1968; Pierce, et al., 1968a). Oral therapy was firmly established as the treatment of choice when in Dhaka and Calcutta it was shown how oral therapy could maintain hydration in adult cholera patients after initial rehydration by intravenous therapy (Nalin, Cash, Islam, Molla and Phillips, 1968; Pierce, et al., 1968b) and that oral therapy reduced the intravenous fluid requirement by 80 per cent (Nalin, et al., 1968). A large trial in Bangladesh successfully administered oral therapy to maintain hydration on adult cholera patients (Cash, Nalin, Rochat, Reller, Haque and Rahman (1970). In a later study, oral therapy was found effective in cholera patients with acidosis (Cash, 1979). Soon oral therapy was tried on dehydrated children with encouraging results (Mahalanabis, 1974; Nalin and Cash, 1971; Hirschhorn, et al., 1973) and successfully with diarrhoea patients with an unknown aetiology (Nalin and Cash, 1970).

Oral therapy is now firmly established as the treatment of choice for most cases of diarrhoea. It has been used successfully in rehydration of 'adults and children, including neonates, patients ranging from no visible dehydration to those with acute loss of 10 to 11 percent body weight (not in shock); persons with vomiting or fever; cases of hypernatremia (upto 168 mEq per liter) and hyponatremia; persons with or without malnutrition; case of cholera, rotavirus diarrhea, shigellosis and diarrhoea due to other causes; and regardless of stool sodium content' (Hirschhorn, 1982).

OTHER EXPERIENCES WITH ORT

One of the most dramatic demonstration of the effectiveness of ORT came under the most adverse conditions during a cholera epidemic in the camps of the Bangladesh refugees in India in 1971. Intravenous treatment facilities were too few to cope with the situation. A treatment centre was set up which cared for 3,700 people, 40 percent of whom were children and almost all were dehydrated and many in shock when they first arrived. The most severe cases were initially given intravenous and then oral fluid only and the death rate was as low as 3.6 percent (Mahalanabis, Choudhuri, Bagchi, Bhattacharya, and Simpson, 1973).

Studies done in several countries suggested that diarrhoea related mortality could be reduced by up to 50 percent if people were given access to and used oral therapy. In the Teknaf project in Bangladesh, the case fatality and diarrhoea mortality rates were studied in a village having village-based depot holders in comparison to a 'control' village (Rahaman, et al., 1979). Case fatality rate in infants in the study village was 0.5% while, in the control village, it was 6.3%. Similarly, annual diarrhoea mortality rates for infants were 0.16% in study village and 1.74% in control village. In the Narangwal study in India in which oral rehydration salts (ORS) were provided in integration with other health interventions, the case fatality rate for children under 3 years of age was brought down from

0.32% in 1971 to 0.14% in 1973. Similarly, the diarrhoea deaths per 1,000 child years of exposure was halved from 14.1 to 7.3 during the same period (Kielmann and McCord, 1977). In a study in Egypt, up to 50 percent reduction in diarrhoea-associated mortality have been reported in children aged between 1 month and 5 years following the introduction of an ORT programme (Mobarak, et al., 1980; Anonymous, 1982). In another project in Egypt, however, no change in mortality was found (Tekce, 1982).

The positive effect of ORT on malnutrition is documented. Field studies among Apache Indian children in USA, and on populations in the Philippines, Egypt, Turkey and Liberia indicate that children with diarrhoea gain weight faster with combined ORT and continued feeding than children in control areas who have diarrhoea but receive no ORT and are fed according to 'customary' practice (Hirschhorn, et al., 1973; Anonymous, 1977; El-Sherbini, Fahmy, Eid, Goda, Eltantawy and El-Sayye, 1978; Population Reports, 1980). Rowland and Cole (1980), however, did not observe any such change in the Gambian children.

Use of ORT at the field level has reduced hospitalization by upto 29 percent in Bangladesh (Chen, Black, et al., 1980). The impact of ORT on morbidity is still unknown (Feachem, Hogan and Merson, 1983).

COMPOSITION AND DANGERS OF ORT SOLUTION

Although most opinions agree on the effectiveness of oral rehydration therapy for most types of diarrhoea, controversy has surfaced on the composition of the solution and on the mode of delivery at the community level.

The Dhaka trial by Nalin et al. (1968), which successfully established the efficacy of ORT in a clinical setting, used the following composition (in mmol/L): sodium 120, bicarbonate 48, potassium 6.5 and glucose 110. There has been a lot of research and debate on this subject since then and it still continues

(Booth and Harries, 1982; Nichols and Soriano, 1977). The World Health Organization (WHO) suggested a formula which, according to Hirschhorn, was 'suitable for most cases of diarrhoea regardless of etiology or age of the patient' (Hirschhorn, 1982). Problems with the shelf life of this formula were encountered. In damp situations, sodium bicarbonate reacts with glucose in the formula and the powder becomes discoloured and less effective. The WHO has recently modified this formula and the following one is now suggested (Anonymous, 1984):

Composition	mmol/L	Ingredients	gram
Sodium	90	Sodium chloride	3.5
Chloride	80	Trisodium citrate	2.9
Potassium	20	Potassium Chloride	1.5
Bicarbonate	30	Glucose	20.0
Glucose	111		
Water	1 litre	Water	1 litre

Numerous studies have been published showing the effectiveness of this or a similar composition in treating most diarrhoeas (Cash, 1979; Cutting and Langmuir, 1980). However the risk of hypernatraemia particularly in children showing symptoms other than cholera, has been feared by some researchers (Nichols and Soriano, 1977; Booth and Harries, 1982) who believe that the net sodium excretion caused by the commonest type of childhood diarrhoea is much less than that found in cholera patients (Molla, Rahman, Sarkar, Sack and Molla, 1981; Booth and Harries, 1982). They also feel that the sodium concentration in adult cholera stool is more than that in paediatric cholera stool (Griffith, Fresh, Watten and Villaroman, 1967; Nichols and Soriano, 1977). Several studies, however, have found identical results with respect to safety and effectiveness when comparing a high (90 mmol/L) and a low (50 mmol/L) sodium concentration. Such studies were done in diverse settings such as Calcutta (Chatterjee et al., 1978) and the USA (Santosham, et al., 1982).

In general, proponents of the higher sodium concentration advocate the use of extra plain water to offset any threat of hypernatraemia, particularly in children (Nalin, et al., 1979) and those preferring low sodium concentration admit that these solutions may be too dilute to be effective particularly in adults with severe diarrhoea (WHO, 1979; Rohde and Hendrata, 1980). However, the range of sodium concentrations that have been shown to give effective results is wide (Baumslag and Mason, 1979; Rohde and Hendrata, 1980) and a range of 30-100 mmol/L of sodium is considered 'safe and effective' (Ellerbrock, 1981). Others consider 40-120 'safe and effective' (Population Reports, 1980).

There is less controversy and dangers associated with other ingredients. Potassium and bicarbonate are probably not essential in mild to moderate diarrhoeas as adjustments may be made more easily by the body (Ellerbrock, 1981). Early replacement of water and salt can reduce acidosis even in the absence of base and eating food rich in potassium can avert hypokalaemia (Rohde et al., 1983).

Glucose is another ingredient. The World Health Organization (WHO) recommends 111 mmol/L of glucose. Fortunately, there is a wide range of glucose concentration at which sodium absorption is facilitated, such as: 14 to 140 mmol/L (Cutting et al., 1981). Sucrose has been found to be an effective substitute for glucose (Nalin, et al., 1978; Sack, et al., 1980). However, relative cost and availability will dictate the use of a particular substrate.

In Bangladesh, the BRAC ORT programme promotes 'gur', a local unrefined brown sugar (Abed, 1983; Bhatia and Cutting, 1984). The use of 'gur' makes a big difference in the cost of oral solutions: it required $1.80 with gur, $7.42 with refined sucrose and $12.00 with glucose to make 100 litres of ORT solutions (Islam, Greenough, Rahaman, Azad and Sack, 1980). Encouraging results have been found also with rice powder (Molla, Sarkar, Hossain, Molla and Greenough, 1982). As rice powder also provides amino acids, there is some evidence which shows that the increased absorption of fluid and electrolytes led to a decrease in stool output and in fluid requirement (Molla, Ahmad and Greenough, 1985; Wong, 1981; Patra, Mahalanabis, Jalan, Sen and Banerjee, 1982). A 50 percent reduction in net stool output has been shown when an ORT solution also contained glycine (Nalin, Cash, Rahman and Yunus, 1970). Recently, Mahalanabis examined the efficacy of glycine in infantile diarrhoea and found that the glucose/glycine/electrolyte solution was superior to the standard glucose/electrolyte solution and most notably that the stool volume in the glycine group was significantly lower than in the other group (Lancet, 1983). But glycine is expensive and further research is currently being carried out on this.

In oral solutions, water is a critical factor. Judicious use of the right volume of water is essential in order to ensure a safe and effective solution, with too little water leading to a too higher concentration of electrolytes. In areas where safe water is difficult to obtain, 'drinking water' may be used. According to Feachem (1981), 'the benefits of an early oral replacement of water and electrolytes far outweigh the possible risk from contaminated water'.

DELIVERY OF ORAL THERAPY: Pre-packaged ORS vs. Home-mixed ORS

Considerable controversy existed about the level of implementation at which ORT be used (Sack, Pierce and Hirschhorn, 1978). Should oral therapy be confined to hospital or clinic situations or can it be promoted for use at household level? Diarrhoea is a considerable problem in the developing world where health care facilities are accessible to only about 10 per cent of the population (Hirschhorn, 1982). It is thus impractical to take care of most diarrhoeal cases in hospitals and clinics. 'ORT must, therefore, be delivered through a community-based program to reach the majority of the developing world's three million villages' (Hirschhorn, 1982). But how to do that? To ensure that each and every diarrhoea patient in the developing world has access to ORT is very difficult, especially with limited resources. Under the auspices of governments and international organisations such as WHO and UNICEF, national diarrhoea control programmes have been gaining ground in many countries. There is little disagreement that the ideal answer is oral rehydration salts (ORS) contained in an aluminium foil or plastic package and mixed with the recommended amount of water.

Many diarrhoea control programmes have been using these packets, which are produced on a mass scale or even as a cottage industy (Population Reports, 1980; Hirschhorn, 1982; Rohde and Hendrata, 1980) and they can be produced for as little as 8 US cents or 6 UK pence (Hirschhorn, 1982). But there are several problems in a developing country situation. Although the per-unit cost is low, the provision of at least one packet (this is not enough in most cases) per episode will require huge resources in a country like Bangladesh where each person suffers approximately two episodes per year (Chen, 1978) and the population is over 90 millions. Alternately, ORT packets could be distributed through commercial channels such as chemists, pharmacists, etc. But the purchasing power of the people is limited and the sellers exploit the situation, particularly when certain goods are in great demand. Lately, UNICEF has been helping national governments to produce ORT packets for free distribution. But in a situation where most people live in rural areas with difficult access, ensuring a proper distribution to the needy is almost impossible. In addition, the correct volume of water is critical and this is difficult to ensure. Instructions on packets may be of little value as many people in developing countries do not know how to read and radio and television have little impact where people have limited access to them (Ellerbrock, 1981). Moreover, the packets have a limited shelf-life.

To circumvent the problems posed in the widespread use of the packets, several alternatives have been suggested. These include the use of locally available ingredients such as common salt to supply sodium and chloride and sugar for sucrose (or glucose) and domestic measures. These are incomplete formulae and do not in most cases contain any potassium or bicarbonate. Several experts feel that this is sufficient to correct mild to moderate dehydration and to save lives (Hirschhorn, 1982). Some programmes, however, have used local unrefined sugar which contains good amounts of potassium (Abed, 1983; Ellerbrock, 1981) and some others recommend eating of additional potassium-rich food such as green coconut (Kuberski et al., 1979). Rice powder electrolyle solution is another promising innovation (Molla, et al., 1982; 1985; Wong, 1981; Patra, et al., 1982).

Preparing a home solution from salt and sugar is more risky as it requires both the ingredients and water to be correctly measured. Broadly there are three such systems of measurements which are in use in different parts of the world. The first one is the plastic spoon to measure salt and sugar (Hendrata, 1978; Morley and King, 1978) which have been successfully used in Indonesia (Rohde and Hendrata, 1980). A two-year field trial in Bangladesh found no difference in the acceptability, use and effectiveness of ORS prepared at home using packets and spoon measurements (Zimicki, Yunus, Chakraborti and D'Souza, 1984). But a special spoon is a foreign element to a home and could, therefore, increase the household dependency. If it is lost, it has to be replaced. Melamed and Segall (1978) experimented with these spoons and observed that variability of the solution could be greatly influenced by the grade of local ingredients. The second system uses household spoons instead of the previous standard one. But because of the wide variability of spoon types and sizes, this has not become more popular with programme organisers.

Table 3.1: Relative advantages and disadvantages of packet and home-mixed ORS for developing countries

Advantages of Packet	Disadvantages of Packet
1. No danger through faulty mixing of ingredients	1. Difficulties in making it available in villages
2. Standardization of ingredients possible	2. May be costly to individual and to government
3. Increased acceptance as it may be considered as a 'medicine'	3. Danger of using an inappropriate volume of water
	4. Increases dependence of families on supplies of packets
	5. Limited shelf-life
Advantages of Home-mixed ORS	**Disadvantages of Home ORS**
1. More easily available when needed	1. Danger of mixing inappropriate quantities of ingredients and/or water volume
2. Families not dependent on outside supplies	2. Thought to be ineffective by villagers
3. No problems of limited shelf-life	3. Opposition to its use from village health practitioners.
4. Use of ORS-rice powder may reduce volume of stool output.	

The third home preparation method uses the finger pinch-and-scoop system. Of the three, this is most widely used and probably the most controversial. Here salt is measured by the three finger pinch and sugar is measured by finger scoop (or fist). Mixed results have been reported on the use of this technique but good results were found in Bangladesh. One month after teaching, more than 90 percent of rural mothers were found capable of preparing a 'safe and effective' solution with sodium concentration in the range 30-99 mmol/L (Ellerbrock, 1981; Cutting and Ellerbrock, 1981; Chowdhury, 1983). Snyder conducted a one year controlled trial in Bangladesh and concluded that ORT could safely be prepared at home using this method(Snyder, 1982). Good results were also found in Uganda (Church, 1972). Other workers have reported poor results. A comparative trial of three home methods found 'too great' variability in the pinch-and-scoop and household spoon methods (Levine, 1980). In a test of the reliability of the pinch technique using four groups of people in 3 countries, an 'unacceptably wide variability' in measured weights was found (Cutting, 1977).

Measurement of water may also be a big problem. Different ORT programmes have used different types of containers depending on local habits and availability. For example, a beer bottle has been used in the Philippines, a coke bottle in Egypt and Indonesia and a formula feeding bottle in Costa Rica. Where standard containers are rare such as in Bangladesh, local popular measures have been used, such as 1/2 seer, equivalent to 467 cc.

In summary it can be said that both pre-packaged ORS and home-mixed ORS have relative advantages and disadvantages and these have been presented in Table 3.1.

HOW POPULAR IS ORT?

This is a difficult question to answer. However, Cutting et al. (1979) have provided some information. In a world-wide mail survey of practitioners, they found oral fluid quite popular, with approximately three quarter of acute diarrhoeas reportedly treated with oral fluid, with homemade solutions being most widely used. However in 28 community based ORT programmes cited in a recent publication, only 6 used homemade solutions (Population Reports, 1980). Information on household level use of ORT is even scantier. Households which were taught the pinch-and-scoop method one month previously were surveyed in Bangladesh and it was found that about 17 percent of all diarrhoea cases, or 35 percent of those treated by any method, used this method (Chowdhury, 1983). However, only 5 percent of interviewed respondents in rural Zimbabwe reported that they gave the solution to a child during the reference period (Zoysa et al., 1984). In Honduras and the Gambia where an ORT campaign is being implemented together with the mass media, nearly 50 percent mothers were reported to have tried ORS at least once (Foote, 1983).

CONCLUSION

We have come a long way since the days of Latta, Snow and Phillips. The chequered history of fluid therapy will bear testimony to the contribution of these souls. Oral therapy has been called the 'most important medical advance this century' (Lancet, 1978).

The technical barrier to preventing diarrhoeal deaths appears to have been largely solved. The greatest challenge now is probably how to apply it (Rohde and Hendrata, 1980). Controversy still exists in the mode of delivery - should ORT be allowed to become a home remedy and if so, how to deliver it at home? Both pre-packaged ORS and home salt-sugar solutions have respective advantages and disadvantages (Table 3.1). As the Lancet put it, 'the more accurate the ORT mix, the more dependent will be the patient on the health delivery system; the less complete and standardized the mix, the more accessible will be ORT. There are trade-offs in both directions' (Lancet, 1981). While distributing ORS packets presents a challenge, the single home solution may prove satisfactory for a vast majority of mild to moderate cases (Cutting et al., 1980). There are reports which suggest that given adequate training and back-up, oral rehydration can be made a form of home remedy (Abed, 1983; Bhatia et al. 1984) but continued monitoring of these home solutions will be needed.

One of the ultimate aims of oral rehydration or any such form of treatment is to reduce mortality but delivering ORT itself will hardly solve the problem. If we assume that mothers are capable of preparing a safe and effective solution, a major question remains: will the mothers give ORT to their children? There is a need for motivation. In other words mothers must feel the need for rehydration and stop believing that 'diarrhoea is part of growing up'. One of the reasons given for the lack of popularity of ORT amongst people is that 'it does not stop diarrhoea' (Chapter 6), but recent research has raised hopes of developing an ORS which reduces stool output as well (Molla et al., 1985).

It should be clear that oral rehydration in itself is not enough to drastically reduce child mortality. The story of Costa Rica may be cited. Diarrhoeal mortality in Costa Rica decreased from 400 per 100,000 in 1930 to about 10 in 1980. As Mata (1981) has described, this has been possible by a combination of reforms in the social, economic, health and sanitation sectors. Thus in order to attain a level similar to Costa Rica, efforts will have to be made to improve all aspects of people's lives. Oral rehydration therapy along with low-cost and easy-to-implement preventive measures (Feachem, et al., 1983) may however go a long way in controlling a vast majority of deaths and illnesses from diarrhoea.

CHAPTER 4: THE ORT PROGRAMME OF THE BANGLADESH RURAL ADVANCEMENT COMMITTEE (BRAC)

INTRODUCTION

Bangladesh came into being in 1971 through an armed struggle after being the eastern province of Pakistan for nearly 25 years. Pakistan itself was carved out of British India in 1947. Despite becoming independent twice (in 1947 and in 1971) the plight of its inhabitants has not improved. With a per capita gross national product of US $120, Bangladesh is now one of the world's poorest nations (World Bank, 1983). Chronic food shortage, natural disasters, illiteracy, primitive agriculture, a low land-man ratio and unstable governments are all part of present-day Bangladesh. Crude birth and death rates of 43 and 17 and a high incidence of disease are another side of the problem. With nearly 600 people per square kilometre, Bangladesh has the highest population density in the world and with a population of nearly 100 million, it is the eigth most populous country.

The government of Bangladesh has been trying to improve the lot of the common people. Unfortunately, very little real improvements have been achieved. To supplement the efforts of the government, several non-governmental organizations (NGOs) have come forward to contribute to the development efforts in their own way. Several of these NGOs are local, meaning that they are managed and run by Bangladeshis. The Bangladesh Rural Advancement Committee (BRAC) is such an NGO. In this chapter we will look at the activities of BRAC giving particular emphasis to its programme of teaching mothers a homebased method for ORT.

BANGLADESH RURAL ADVANCEMENT COMMITTEE (BRAC)

The Bangladesh Rural Advancement Committee, popularly known as BRAC, was formed in early 1972 by a group of Bangladeshi volunteers. The immediate goal was to help save the lives of thousands of refugees returning to Sulla, a remote area in the district of Sylhet. These people sought refuge in the Indian state of Meghalaya during the Bangladesh War of Liberation. With financial assistance from overseas donors, BRAC contributed to the rehabilitation of the people of Sulla and adjoining areas (BRAC, 1975). Soon, however, the volunteers of BRAC realised that relief was not a permanent solution to the problems of illiteracy, poverty and ill health that beset the rural people. The present activities of BRAC were derived from that realisation. Over the following few years, several new programmes were developed which included: a functional education programme based on its own methodology (World Education, 1975), a health and family planning programme (Chowdhury and Chowdhury, 1978; 1980) and cooperative programmes. Some of them were successful, others were not. BRAC has learnt from its experiences (Korten,1980), and it is this quality which ' has given BRAC its flexible and adaptive approach' (BRAC, 1983).

With about 2,500 staff currently on its pay roll, nearly half of whom are female, BRAC is probably the largest NGO in Bangladesh today and its activities are now visible in most districts of the country. Funds come from overseas non-profit organizations and as aid, and in addition BRAC makes a profit from its own commercial ventures. With its headquarters in Dhaka, BRAC is headed by an executive director and its activities are monitored by an elected governing body.

Activities

During the past 13 years, BRAC's activities have expanded both in scope and coverage. The following is a summary of the present activities (BRAC, 1983).

1. Integrated Development: There are three such projects- Sulla, Manikganj and Jamalpur. The Jamalpur project is exclusively for and run by females. Innovative approaches for an integrated development, encompassing all facets of rural lives, are tested and carried out in these projects. The programmes include group

formation, education, income generation and health. There is also a small family planning programme included.

2.Education: In order to create a critical awareness amongst the rural poor about their position in society, as well as to impart literacy and numeracy, BRAC developed a functional education course. This is the forefront in the thrust for development. BRAC is also developing materials for pre-teens who missed or could not continue their formal primary education.

3.Credit: Basing on the finding by BRAC that access to credit at affordable rates was a big impediment to the economic development of the poor, BRAC established a 'rural credit and training project' (RCTP) in 1979. Twenty branches of this project are now functioning in different upazilas and they extend credit to landless groups for gainful economic activities. A large sum of credit has already been disbursed and the loan recovery rate has been over 90 percent.

4.Diarrhoeal Management: A nation-wide programme to teach mothers how to use ORT to treat their children's diarrhoea was started in 1980. This will however be taken up later in greater detail.

5.Training: BRAC emphasises training and a permanent 'training and resource centre' (TARC) was established. This caters to the need of BRAC staff and members of the landless class. Training is also provided to government officers and staff from other NGOs.

6.Communications: The communication and information division supports different programmes with communication materials such as posters, flip charts, leaflets, etc. It also publishes a monthly development journal, 'Gonokendra', with an estimated rural readership of 70,000 people.

7.Commercial Operations: With the aim of reducing dependence on external supports, BRAC has established its own income generating ventures. A modern printing press has been operational since 1977. Recently, a large cold storage was also inaugurated. Profits accruing from these ventures are utilised in financing development projects. There is also a chain of shops, 'Aarong', specialising in rural crafts with two branches in Dhaka and one each in Chittagong and Sylhet. These are retail marketing outlets for handicrafts and products produced by the rural production groups, many of which are organised by BRAC.

8.Research and Evaluation: BRAC runs a research and evaluation division concerned with different programmes, their problems and performance. The Division gathers both quantitative and qualitative information through a variety of research approaches.

THE ORAL THERAPY EXTENSION PROGRAMME (OTEP)

The Bangladesh Rural Advancement Committee(BRAC) has been working in the rural health sector ever since its inception in 1972 when it recognised that diarrhoea was one of the major diseases experienced by the rural people. The BRAC health programme initially distributed packets of oral rehydration salts (ORS) through its paramedics and volunteers. However, they faced several problems with distribution of packets to the villages. Within the Bangladesh context, there were also several other problems to do with feasibility , management and cost (BRAC, 1980). An alternative was tried out. Field research discovered that a pinch of lobon (common table salt) and two scoops of gur (local unrefined brown sugar) when mixed in a half seer (467 cc) of water produced a solution having many essential properties of an ideal ORT solution. Lobon supplied sodium and chloride while gur supplied sucrose (glucose) and some potassium. As these were 'household ingredients', BRAC embarked on a pilot programme to test the viability of teaching this method of ORS to rural mothers on a face-to-face basis. Based on the encouraging experiences of this pilot phase, a nation-wide 'oral therapy extension programme' (OTEP) was launched in July 1980. If the present rate of household coverage continues, the whole country should be covered by 1990. For logistical and funding reasons, however, the programme is being carried out in 3 phases and the first phase ended in September 1983. The second phase which is taking place will continue until June 1986. As there were differences in programme strategy and inputs between different phases, we will deal with each phase separately and highlight the changes in each phase where necessary.

The Pilot Phase

The Teaching of the 'Ten Points to Remember': Based on the discovery that a pinch of lobon (common table salt) and two scoops of gur (unrefined brown sugar) in half seer (467 cc) of water produced a scientifically safe and effective solution, BRAC quickly developed a health message, called 'The Ten Points to Remember' (Ellerbrock, 1981; Population Reports, 1980). These included 'all' the information that a villager needed to know to treat diarrhoea at home, including the preparation and administration of the lobon-gur solution (LGS). Sulla, the oldest project area of BRAC, was selected for the pilot. Several female workers were trained on the 10 points and how to teach these to the village women. These workers had writing and reading skills, were active in health and were aged 20 to 50 years. These female teachers called 'oral replacement workers' (ORWs) were formed into a team which was headed by a male BRAC worker (called team coordinator or TC) and supported by a cook. One mother in every household was visited and taught the 10 points by an ORW. The mother was shown how to prepare and administer the lobon-gur solution (LGS). At the end of a session, which lasted 20-25 minutes, the ORW asked the mother to prepare a solution by herself, which was done to ensure that she had learnt to do it correctly. Before leaving a household, the ORW wrote down the name of the woman taught and her address. In this way the ORWs went from one village to another. In the pilot phase, they covered 3 upazilas and visited nearly 80 percent of all households.

<u>Monitoring</u>: There was a group of male workers called 'monitors'. They visited a sample of 10 percent households about a month after they had been visited by the ORWs to evaluate: (a) the information on the village woman visited by each ORW, (b) how well the village women had remembered the 10 points and (c) the skill and accuracy of these women in preparing the lobon-gur solution. The monitor took a sample of a solution prepared by village woman in a vial for analysis of electrolytes and glucose concentrations. The monitoring results were also used in the incentive salary system for the ORWs. Each woman interviewed by a monitor was graded according to her answer on the 10 points and on her skills in preparing a 'correct' solution. There were four grades. Grade A meant that she remembered all 10 points and made a 'correct' solution. Grade B meant that she remembered 7-9 points and made a 'correct' solution. Grade C meant that she remembered less than 7 points but could still make a 'correct' solution. Grade D was given if a woman could not make a 'correct' solution. Taka 4 was given for households visited in Grade A, Taka 2 in Grade B, Taka 1 in Grade C and no remuneration in Grade D. This meant that an ORW got no remuneration if the mother she taught could not make a 'correct' solution.

<u>Diarrhoea Clinic</u>: During the last part of the pilot phase, a mobile 'diarrhoea clinic' was set up with the ORW team. Patients coming in for treatments were given LGS. Severely dehydrated patients were first given intravenous therapy. The team coordinator was trained to give the intravenous fluids.

<u>Results</u>: In each of the upazilas covered during the pilot phase, nearly 80 percent households were visited and taught the 10 points, with an average number of 11 households covered per day per ORW. The average ORW salary was Taka 600 per month (US$40 at 1979 rate of exchange). Thirty four percent of the women interviewed by monitors were in Grade A, 64 percent were in Grade

B and the rests were in Grade C. None was in Grade D. Analysis of the monitored sample solutions showed that 87 percent were in the 'safe and effective' range (sodium concentration of 30-99 mmol/L). The proportion in the 'dangerous' zone (sodium concentration of 120 mmol/L or more) was less than 1 percent. More results from and description about the pilot phase are available in (Ellerbrock, 1981).

The First Phase

The first phase of the nation-wide oral therapy extension programme (OTEP) ran from July 1980 through September 1983. The overall strategy of the programme remained the same as in the pilot phase, but several changes were made and new features were included into the programme. These changes were:

<u>The Technical Advisory Committee</u>: An international technical advisory committee (TAC) was formed to advise BRAC on technical and other relevant matters concerning the programme. The members were drawn from experts on different aspects of ORT and they met occasionally as and when required. Persons who have served on this committee are listed in Appendix 1.

<u>Formula of the Solution</u>: During the initial period of this phase and during the pilot phase, it was revealed that the village women were confusing one pinch of lobon and two scoops of gur and sometimes using it the other way round, that is one scoop of gur and two pinches of lobon. This resulted in some solutions being too high in sodium concentrations. After some more research, the formula was altered from <u>two scoops</u> of gur to <u>one fistful</u> of gur, which still kept the original concentration of sodium and chloride.

<u>The Seven Points</u>: Some of the 10 points were found to be difficult for village women to remember. For example, the point on the transmission of diarrhoea. As this was not considered

essential information, it was dropped. In this reshuffle of points, some points were amalgamated which finally resulted in a message with 7 points. The ORWs were given refresher training on these new 'seven points to remember'. These are given in Appendix 2.

<u>Team Composition</u>: During the pilot phase, there were two teams of ORWs. Each team consisted of 15-16 ORWs, one TC and a cook. One team required approximately two to three weeks to complete the coverage of an union (approximately 2,500 households). In order to allow each team to spend more time in one union to facilitate increased contacts with villagers, the team composition was changed. The new team had 8-9 ORWs and the responsibilities of the TC were increased. He was required to popularise the method and provide logistical support to ORWs by conducting seminars in schools, bazars, mosques and contacting local health practitioners. The number of TCs in a team was also increased to 3.

<u>Reinforcement Team</u>: The work of the monitors was also increased. They were required to do two more jobs: conduct surveys in a small number of households on ORS usage and do some reinforcement of knowledge through seminars and meetings. The name of the team was changed to 'reinforcement team'.

In the pilot phase, the 10% monitoring samples were selected not with strict randomness. The system of selection was changed in the First phase and the Area managers selected the samples strictly on a random basis using random number tables.

<u>Field Laboratories</u>: Previously all sample solutions were analysed at the Dhaka laboratory of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). As the programme expanded, it became very difficult for them to handle the huge number of samples that were coming in every month. Upon their advice and expert guidance, several laboratories were set

up in the BRAC field offices. Since research at ICDDR,B found that sodium and chloride in ORS were very strongly correlated (r=.98), testing for chloride was thus considered a simple and cost effective proxy indicator for sodium. A simple titrimetric method of estimating chloride was developed by ICDDR,B (Ali and Wahed, 1984). The estimation of chloride in BRAC field laboratories now uses this new method. For quality control, sub-samples of lobon-gur solutions analysed at the field labs are brought to ICDDR,B, Dhaka, for further analysis and analysts from ICDDR,B occasionally visit these field laboratories.

Publicity: Considering that publicity was very important in increasing the popularity of the method, a multi-media publicity campaign was launched from the beginning of the first phase. Huge quantities of printed materials such as leaflets, posters, calendars, flip charts, etc. were produced and distributed in the rural areas. Spots on radio and television were also broadcast. Several bill-boards were also displayed in important public places.

Impact Evaluation: The ultimate aim of OTEP was to reduce diarrhoeal mortality. In order to measure whether there was any such change, the Research and Evaluation Division of BRAC started a study in early 1981 and the data collection for the First phase was completed in 1984 while that for the Second phase will be completed in June 1986. Four upazilas were selected according to a famine liability criterion and programme implementation time. Four other 'comparison' upazilas were also selected. A six-monthly multi-round retrospective survey was undertaken in each of them and a total of 120,000 population were studied. The details of the design of this study are available in Chowdhury and D'Souza (1982). Data from this study are being analysed at BRAC now.

Results: During the first phase, teaching in five of the 21 old districts of the country was completed. These were: Sylhet, Jessore, Faridpur, Khulna and Kushtia (see map in Figure 1). Nearly 2.5 million households were visited and taught the 7 points. This means that nearly 14 million people or about 15 percent of the country's population were covered by this phase. Analysis of sample solutions from routine monitoring revealed that the quality of teaching was being maintained as in the pilot phase. Nearly 90 percent of analysed samples were in the 'safe and effective' range and the proportion in the 'dangerous' zone were negligible (BRAC, 1984). A study on the retention of knowledge was made in a few random areas covered by the programme 3- and 6-months previously. It found that more than 80 percent of the solutions prepared by village women were in the 'safe and effective' range and the proportion in the 'dangerous' zone was 2.5 percent for both the samples (Chowdhury, 1982). Another study investigated the extent of usage of the solution and found that 17 percent of diarrhoeal episodes were being treated with LGS (Chowdhury, 1983).

Cost: Costs of the BRAC programme during the First phase are now available and audited statement of receipts and expenditures is given in Appendix 14.

An amount of Taka 38,720,056 or US$ 1.8 millions was spent during the First phase purely on OTEP. The only items of expenditure which could have also included other non-OTEP activities were some of the evaluation and administrative costs under items 4 and 6 in Table 4.1 below. However, it is not possible to apportion expenditures purely for OTEP and so the full amounts have been given here. Amount spent under different heads are given in the following table which shows that most of the money was spent in supporting the teams of ORWs. Administration and publicity costs were 7 and 2 percents respectively.

Table 4.1: Amount of expenditures under major heads in the First phase of the BRAC ORT programme

Heads of expenditurs	Amount expended		
	Taka (000)	US$	%
1.Recruitment and training	1,749	87,450	4.9
2.Team salaries and supplies	21,727	1,086,350	60.5
3.Area staff activities	5,340	267,000	14.9
4.Impact evaluation	2,057	102,850	5.7
5.Activity evaluation	454	22,700	1.3
6.Administration	2,646	132,300	7.4
7.Vehicles and boats	724	36,200	2.0
8.Publicity	864	43,200	2.4
9.Laboratory	328	16,400	0.9
Total	35,889	1,794,450	100.0

Note: US$ 1.00=Taka 20.00 (1980-83)

External Evaluation: In January-February, 1983, an external evaluation of OTEP was carried out by the Swiss Development Cooperation, a major funder of the programme and ICDDR,B, Dhaka. The evaluation team recommended continued funding of the programme (Bhatia, Cash and Cornaz, 1983). They, however, mentioned some of the inadequacies with the programme that they found through their evaluation. These included: lack of adequate interviewing skill amongst newly recruited monitors and the over-burdening of area managers. Their conclusions and recommendations have been reproduced in Appendix 3 and further details and more results for the first phase are available in (Abed, 1983).

The Second Phase

The second phase of OTEP was started from October 1983 and will finish in June 1986 and aims to cover 7 more districts. It expects to teach 4 million households in the districts of Dhaka, Comilla, Tangail, Jamalpur, Mymensingh, Barisal and Patuakhali (see map in Figure 1). By the end of 1984, 1.5 million households had been visited and taught the 7 points. In December 1984, there were 739 ORWs and 387 TCs working in the field. More than 65,000 sample solutions were analysed at field laboratories for chloride and nearly 10 percent of them have been reanalysed at ICDDR,B. Eighty eight percent of the sample solutions prepared by village women approximately one month after being taught were in the 'safe and effective' range. The proportion in the 'dangerous' zone, however, was nearly 4 percent.

The Concentrated Reinforcement Programme (CRP): During the second phase, a new strategy was adopted on a limited pilot scale. One union out of 10 in an upazila received a new 'concentrated reinforcement programme' (CRP). This union is selected in such a way that it encompasses the major communications of the upazila with the expectation that the programme carried out in this union will disseminate to others. The basic feature of this new approach is that the teaching team stays in this union for a longer period of six months, which allows more time to interact with people, treat more cases of diarrhoea and undertake public health activities that reinforce and hasten LGS acceptance. The objectives of CRP are:

1. Treatment of diarrhoeal patients with LGS
2. Creation of female health cadres to promote health education.
3. Upgrade the skills of traditional birth attendants
4. Educate mothers on the practice of colostrum and supplementary feeding.
5. Reinforce knowledge about LGS
6. Encourage rural health practitioners to treat diarrhoeal

patients with LGS.

During the period until December 1984, 52 unions in 52 upazilas were covered by the CRP (BRAC, 1985). It should be emphasized here that the CRP is being carried out only in about 10 percent of the unions. In the rest of the unions (non CRP), the normal single teaching programme is continuing.

DISCUSSION

A description of the Bangladesh Rural Advancement Committee(BRAC) and its Oral Therapy Extension Programme (OTEP) has been presented in this chapter. Some photographs showing some typical Bangladeshi village scenes and activities of OTEP are given in Figure 4.

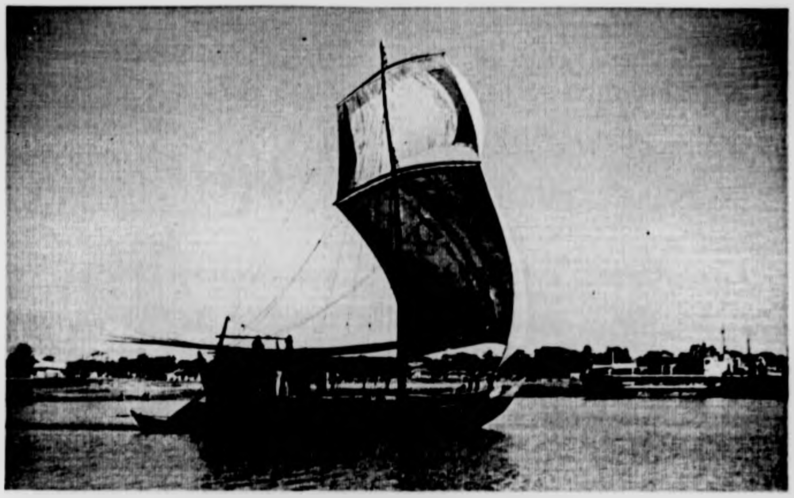
Over the last few years or so, BRAC has established its own position in the developmental efforts in rural Bangladesh and it is now the largest non-governmental organization (NGO) in Bangladesh. With its two and a half thousands staff, BRAC activities are now felt in several thousand villages.

Diarrhoea is a recognised health hazard in Bangladesh. BRAC has responded to it by initiating a programme of teaching people about an ORT method which is 'safe, easy, cheap and readily available at homes' (BRAC, 1980). Over the initial four and a half years of the programme, more than four million households in 12 of 21 districts of the country were visited and taught the method. The BRAC programme is the largest face-to-face ORT teaching programme in the world (Bhatia and Cutting, 1984) and has also earned a great deal of international recognition (Rohde, 1984; Bhatia, Cash, et al., 1983). A study carried out at ICDDR,B and cited in Bhatia, et al. (1983) showed the better capability of mothers taught by BRAC in preparing a safe and effective solution in comparison to several other projects in Bangladesh (see Appendix 15).

The results available from the BRAC programme are interesting. The dissemination of knowledge, as it appears from the results of the monitoring, look very promising. There may, however, be several questions regarding the validity of the monitoring results. Is there any collusion between the monitors and ORWs? Are the monitors as well supervised as ORWs? The system followed by BRAC seems to take care of any direct collusion between a particular monitor and a particular ORW (they hardly see each other and the monitors do not know which ORW taught which household) but what if they 'favour' their fellow workers in general? The supervision of monitors still remains a problem to be solved effectively (Bhatia, et al., 1983). The sacking of several monitors (Sarker, 1985) suggest weakness in the procedure. Although small independent studies (Chowdhury, 1982) confirmed the monitoring results, the system of controlling the quality of teaching and its monitoring could be further improved.

Although the effect of this programme on mortality is not yet known, the usage rate for ORT has not been so encouraging. If the usage is not increased, a reduction in mortality can hardly be expected.

The concentrated reinforcement programme (CRP), a new pilot scheme within OTEP, is attempting to hasten the acceptance of the method but is still in an experimental stage and merits careful study. It is also important from another point of view. Although it covers only about 10 percent of the total OTEP area, it is in fact costing about a quarter of the total amount spent by the whole programme (BRAC, 1983).



The riverine Bangladesh

Tilling the land for rice cultivation

Photographs by: Patrick Vaughan
John Paul Kay
M. Chowdhury

Figure 4: Selected photographs from BRAC ORT programme

Oral replacement workers

rkers (ORWs)

Teaching a mother about the 7 points

Helping a mother to measure the ingredients

A mother with solution prepared by herself

Monitoring the performance of ORWs

Meeting with community leaders

BRAC posters on display inside a house

CHAPTER 5: EVALUATION OF COMMUNITY-BASED ORT PROGRAMMES

INTRODUCTION

Since the late 1970s many community based oral rehydration therapy (ORT) programmes have been initiated in developing countries (Population Reports, 1980; Cash and McLaughlin, 1983). Most of these programmes, however, have been short-term pilot projects designed to answer specific questions, such as whether sucrose-based solutions were equally as effective as the glucose-based ones or whether inclusion of glycine in oral rehydration salt (ORS) solutions decreased stool volume. In contrast, less information is available on programmes which were designed mainly to provide education and services on an on-going basis (Population Reports, 1980). Programmes also differ in scope and approach, which make inter-programme comparisons difficult. Some distribute packets of ORT (Corrales, Melara and Bonnano, 1983) and some spoons for measurement of salt and sugar (Zimicki, et al., 1984), while others teach how to use finger measurements with home ingredients (Ellerbrock, 1981). Administration of these programmes also differs. Some use depot holders (Rahaman et al., 1979), some teach selected elderly women or 'bari mothers' (Bhatia, et al., 1980; Chen, Black, et al., 1980), some teach individual mothers (Abed, 1983) while others communicate through the mass media (Oldfield, 1983; Shepard and Brenzel, 1985). In many programmes the use of ORS is an integral part of the on-going health delivery system (Kielmann and McCord, 1977).

The ultimate goal of these ORT programmes is the reduction of mortality from diarrhoea leading to dehydration, mainly in children. This chapter discusses ORT programmes, some results they obtained and reviews some important indices used to evaluate community-based ORT programmes with particular reference to those promoting homemade solutions. Since programmes differ, so will the indices required for evaluation purposes. Problems associated with measurement of these indices will also be touched upon with special attention being given to the usage of ORS by households.

SOME LARGE ORT PROGRAMMES

In this section the evaluation results from four projects carried out in different settings in the developing world are briefly presented. An elaborate discussion of the BRAC programme in Bangladesh was done in the previous chapter.

The Egyptian Programme

In 1978, the Egyptian 'Strengthening Rural Health Delivery' (SRHD) project was started by the Egyptian Ministry of Health in collaboration with the United States Agency for International Development. From May to October 1980, a diarrhoeal control study on the costs and effectiveness of different delivery systems of ORT, was conducted by the SRHD. Villages were assigned to six study cells according to the following scheme (Mobarak, et al., 1980).

Cell 1: No input ('Control 1')

Cell 2: 'Oralyte' packets were made available at facilities and health personnel were made aware of the importance of ORT as a treatment method for diarrhoea ('Control 2')

Cell 3: Oralyte was distributed during home visits and mothers were instructed in its use ('Oralyte: Home distribution')

Cell 4: Oralyte was distributed to all shops and pharmacies free of charge. Shops were allowed to charge a nominal price for them ('Oralyte: Commercial sources)

Cell 5: Mothers were instructed to prepare ORS by mixing 5-6 level teaspoons of granulated sugar with a half level spoon of salt, in one litre of water. The juice of lemon, if available, was added ('Sugar and salt: Home prepared')

Cell 6: A prepackaged sugar (sucrose) and salt mixture was delivered to homes by the nurse in the same way as in Cell 3 ('Salt and sugar:Prepackaged home distribution').

In all cells, health education was carried out by the nurse and other staff of the health centres. At home, education to mothers was provided once every 4-6 weeks by the nurse.

Evaluation was carried out through a household survey and by analysing mortality records from health centres. There were two surveys: one after 3 months and the other after 9 months of teaching and home visits. These surveys revealed that sugar and salt were almost universally available in households but there was variation in the size of spoon. Use of correct teaspoon size increased from 72 percent after the first survey to about 95 percent in the second survey. Ability to correctly measure one litre of water increased from around 80 percent to about 95 percent, but it remained constant at 1.5 percent in 'Control 2'. The evaluation also looked at the safety of the methods by measuring the sodium concentration of the solution prepared by mothers. In all the study areas (Cell 3 to 6), the proportion in the 'dangerous' zone (sodium of 120+ mmol/L) were under 5 percent except for the 'Commercial sources' where it remained over 20 percent in both surveys. However, these results should be considered in the context of expected concentrations in each cell. For example, in Cell 5 where the home solution was promoted, the expected concentration was 40 mmol/L but the first survey found a mean concentration of 59 mmol/L (50% more than expected) while the second survey found 48 mmol/L (20% more than expected). The first survey was conducted after 3 home visits and the second survey after 9 visits. Usage was based on the consumption of prepackaged ORS, but the usage of homemade solutions was not measured.

Impact on mortality in different cells was also studied. Overall, from a mean mortality rate of 22 per 1,000 children per six months in 1976/77, the rate dropped to 10.5. Of the four treatment cells, Cell 4 (Oralyte: 'commercial sources') did worst. The confounding effect of a simultaneous vaccination campaign was not, however, adequately studied.

The Indonesian Programme

Indonesia was amongst the first countries to adopt the use of ORT and a national programme was started in 1981, based on health centres. The staff at these centres also train local 'volunteer' health workers who provide ORT treatment from their houses. The treatment is based on 'Oralit' packets (to be dissolved in 200 ml or 1 litre water), antibiotics, hospital care, and education about oralit and homemade salt and sugar solutions. Virtually all villages are within 5 km of a health centre or a subcentre.

Recently an evaluation of this programme was done in four purposively-selected districts. Although the evaluation concentrated on cost issues, some information on use is also available (Shepard, Brenzel and Nemeth, 1985b; Lerman, Shepard and Cash, 1985). The evaluation found that between 32 and 88 percent (with a mean of 61) of diarrhoeal episodes were treated with ORS, including both oralit and homemade solutions (Lerman, et al., 1985). As mentioned by Shepard et al. (1985b), three of the four districts had higher than average rates and thus the usage rates found may be upwardly biased. Winardi, Soedarto, Sosroamidjojo and Koiman (1983) have provided some more information on the Indonesian programme. They found that 'oralit' was not fully accepted by health workers or local people. They quoted surveys which showed that 30 to 50 percent mothers had heard about ORS and that about 15 percent had used it. Nothing, however, is available about the safety of the solution, particularly the homemade solution prepared by mothers or 'volunteer' health workers.

The Honduran Programme

In Honduras the control of diarrhoeal diseases programme was organised following the findings of various studies and experiments (Corrales, et al., 1983). PROCOMSI, Honduran mass-media and health practices project, was one of them.

The project was started by the Honduran Ministry of Public Health in cooperation with the Academy for Educational Development and the US Agency for International Development and was designed to test the acceptability and effectiveness of 'Litrosol' packets through a campaign based on the extensive use of mass media, including radio and printed materials. The knowledge and behavioural objectives and the strategy for behavioural change were developed using intensive research (Kendall, Foote and Martorell, 1984). Radios were owned by 67 percent of the population and 60% mothers listened to the radio daily.

Concerning knowledge dissemination, a half of the mothers could name 'Litrosol' after six months of the campaign and this rose to 75 percent when the campaign ended 2 years later. The proportion of diarrhoea episodes in which a packet was used increased from 9 percent after 6 months to 33 percent after 12 months. It went down to 18% after 18 months but went up again to 35 percent after 2 years. Nothing is known about the reason for this sudden drop after 18 months (Shepard and Brenzel, 1985).

The Gambian Programme

The programme in The Gambia is another using mass media similar to the Honduran programme, but the programme strategy differed in several respects. First, the Gambian project promoted the use of a homemade salt-sugar solution. There was a 'Happy Baby Lottery' for mothers to win small household items if they correctly mixed the solution. Contrary to the BRAC programme where the incentive was given to health workers, here it was given to mothers. Finally, the project was conducted throughout The Gambia. Thirteen field surveys were done for the programme evaluation. The use of the solution rose from 3.6 percent to 72.7 percent of all diarrhoea episodes. The proportion of episodes treated at home also increased from 29.5 to 81.2 percent. However, these rates may be an overestimate because of repeated visits to the same households. Although a control group was studied simultaneously, nothing was said about how this control was maintained when the total population was exposed to the radio broadcasts. No result was provided on the safety of the solutions prepared by mothers (Shepard, et al., 1985a).

INDICATORS AND THEIR MEASUREMENT

The following discussion presents a choice of selected indicators which can be used in evaluating a community based ORT programme.

Availability of Ingredients

Programmes which promote home mixing of salt, sugar and water assume that people have easy access to these ingredients. As this has a direct bearing on the widespread use of the method, the actual availability of these ingredients and the appropriate utensils should be investigated, as was studied by Mobarak, et al. (1980) before and after the Egyptian programme was started. Where relevant, the seasonal availability of ingredients (e.g., harvesting of sugar-cane) should also be investigated.

Study of Perceptions

The perception by the people about the types, causes and treatment of diarrhoeas and other relevant matters should be studied before starting a programme. As has been shown in Honduras, such a study helps understand the cultural determinants of the success of an ORT programme (Kendall, et al., 1984). There are different types of beliefs and practices regarding diarrhoea in different cultures and some programmes may need to include educational components in order to change unscientific or harmful practices. These types of research problems are often better addressed by social anthropological and indepth village case study approaches.

Knowledge of ORT and Changes Over Time

The immediate task of an ORT programme is to transmit knowledge about ORT and how this is done varies from programme to programme. Thus in a programme promoting the use of packets, the required knowledge will be about the packet and how to make the solution from it. Retention of knowledge changes over time and these should also be studied as reinforcement of knowledge may be necessary.

Obtaining information on knowledge may not be difficult. In Honduras, a programme to promote the packet 'Litrosol' has been going on for some time (Corrales, et al., 1983). The following question could be asked to mothers covered by that programme: 'What is Litrosol?' A further question can be asked about how to make ORS from Litrosol. Obtaining information on knowledge has been made an integral part of the BRAC programme in Bangladesh. One month after teaching, a random sample of mothers are asked about each of the 7 point message taught to them (Abed, 1983).

Safety of Solution and Changes in Safety Over Time

An element of risk is involved with the preparation of ORT solutions since an excessive amount of sodium in the solution may cause hypernatraemia which can lead to death. An over-diluted solution, on the other hand, may be less effective (Chapter 3). An evaluation should include information on how effective are mothers in preparing a 'safe and effective' solution. This is particularly important in programmes promoting lay measurements of ingredients such as salt, sugar and water. Studies on the safety of prepared solutions need to be done on a continuing basis and over time following the instructions given to mothers. Many authors have looked at the safety aspect of ORT programmes. Mobarak et al. (1980) studied the sodium concentrations in the home prepared solutions in the Egyptian programme. ORS sample solutions were obtained after 3 and 9 home visits and were analysed for sodium. Chen et al. (1980) studied the ability of village depot holders and mothers to prepare solutions in the Matlab programme in Bangladesh, four months after the programme was started. This safety aspect has been continually monitored in the BRAC programme in Bangladesh (Abed, 1983) and the drift in the ability of mothers has also been studied in this programme upto 6 months after teaching (Chowdhury, 1983).

A high concentration of sodium in ORT solution can be caused , in case of packets, by a reduced volume of water. In the case of the home mixing of ORS, the amount of salt is also important. Where measurement of salt is difficult or cumbersome, measurement of sodium concentration and water volume may be sufficient.

Measurement of safety is not difficult since mothers can be asked to prepare a solution in front of the interviewer and a specimen retained in a vial. In case the mother feels embarassed at being examined, the volume of water may be measured after the solution is made. A sample of this solution then may be saved in a vial or a safe container and analysed at the laboratory for electrolytes and glucose. In order to prevent deterioration, the sample should be kept in a refrigerator or in a cool place and analysed as quickly as possible. Although there is a controversy regarding the range of sodium concentration at which a solution is 'safe and effective', there is general agreement that solutions containing a sodium concentration of 120 mmol/L or more are 'dangerous' (Chapter 3).

Usage of ORS and Changes Over Time

By usage, we mean the proportion of diarrhoeal episodes in which ORS was given as a method of treatment in a given period of time. In areas where multiple methods (e.g., packets and salt-sugar) are promoted, individual programmes may be interested in knowing their own share of the total usage. Usage is a very important indicator of the success of a programme. The ultimate goal of reducing diarrhoeal mortality cannot be achieved unless there is a 'good level' of usage. Changes in usage of the method over time is also important. This is particularly so in a programme which includes a single instruction to mothers and has little or no reinforcement. Many authors have studied usage (Kielmann, et al., 1977; Chen, Rahman, et al., 1980; Mobarak, et al., 1980;

Lechtig, et al., 1983). Unfortunately few have pointed out the methodological problems in the measurement of usage which concern problems of definition as well as methodological ones, such as:

The Definition of Diarrhoea: Different researchers have used different definitions of diarrhoea. Some are very straight forward while others are quite complicated (Chapter 2). Such definitions are used by researchers or programme implementors according to their respective research objectives. The BRAC programme in Bangladesh defines diarrhoea as 'one or more watery stools per day'. The question asked on diarrhoea should conform to the definition used in the concerned programme. There is another dimension to this problem. There may be a gap between the understanding of the people and what the programme teaches. Returning to the BRAC example, it was found in the village case study (Chapter 6) that the villagers recognise four different types of diarrhoeal illnesses. The word 'diarrhoea' also means to villager a particularly severe form of diarrhoea and about 5 per cent of all diarrhoeas were found to be of this particular type (Chapter 8). Thus the use of the word 'diarrhoea' in Bangladeshi villages would result in a severe under-reporting of actual incidence of all diarrhoeas in those areas. Thus in designing questinnaires, efforts should be taken to utilise local perceptions and practices.

Reference Period: The specification of the reference period to which the events will relate is another problem. The ideal reference period is one year, but it cannot be used in retrospective surveys of diarrhoeal disease because of memory relapse. In such a situation, the best is to ask about current experiences: 'are you having a diarrhoea now?'. This would, however, result in the identification of a very small number of cases unless an enormously large sample is taken. A one-week reference period has been used by some studies (Curlin et al., 1977; Chowdhury and Ahmed, 1983). Some have followed a two-week recall (Chapter 7; Oldfield, 1983) while others a longer period

(Peterson et al., 1960; Victora, Smith and Vaughan, 1985). Precision decreases as the reference period is elongated (Blum and Feachem, 1983).

Reporting of Episodes: In a retrospective household survey, the information is usually collected from a single person such as mother or another adult. This may, however, result in under reporting, or less usually, over reporting. If an adult has a mild diarrhoea, for example, they may keep it to themselves. In such cases the proxy collection of information on diarrhoeal incidence may cause under reporting. On the other hand, collection of information from every person is cumbersome, time consuming and costly.

Questions on Use: The question, 'was (method) used during the illness?', is probably too leading a question. A better way of asking would be: 'what treatment method was undertaken?'. The reliability of a response on use is, however, very difficult to probe or confirm and so reliance has to be placed on the respondents' reply.

Reporting of Use: Use is probably better reported than diarrhoeal episodes, since making of the solution at home requires preparations which may not go unnoticed to other members of the house, particularly the mother. Such a differential in reporting may cause the usage rate to be artificially high, particularly in non-severe cases where diarrhoea episodes may be underreported in comparison to use of ORT.

Measurement of Effective Use

How effectively the ORT solution is used may be even harder to measure. In order that the solution is effective in producing rehydration, it has to be 'safe and effective', started at the right time and taken in appropriate quantity (as much as is purged). Samples of the actual solutions that were drunk are difficult to collect, particularly through retrospective surveys.

However, a proxy solution can be obtained by asking the person who originally made it during the illness to prepare it again. A sample of this solution when analysed for electrolytes and glucose would indicate whether the solution was 'safe and effective'. Knowing the time of start could be found by asking: 'after how many watery stool did he/she start taking the solution?'. However, it carries the problem of memory relapse and reporting bias. The information on the quantity of solution taken is even harder to know. Whether the amount taken equalled the volume of loss is difficult to report by any person. The question, 'how many times did the person drink the solution', is not specific as the total volume may be taken in several small doses. The question, 'how many times was ORS prepared during the illness?', is probably better as it specifies the total volume prepared. But it still has the disadvantages of memory relapse and reporting bias and does not reveal how much of the solution was actually consumed or how it related to the volume of fluid loss. A participant observation method of research may be a better approach of studying effective usage.

Mortality and Cost

The ultimate aim of an ORT programme is to reduce diarrhoea-related mortality. A related but useful index may be a lower case fatality rate. The measurement of change in mortality is extremely difficult. It requires a huge sample, a large expenditure, enough time and a sound methodology. Even if these are made available, other problems of measurement still remain. Most notable is that of specifying the cause of death. Surveillance of a reasonably large population on the causes of death using expert supervision, may be a possible way of looking at change in mortality. But mortality surveillance is expensive, time consuming and may contain the 'Hawthorne effect' (Rossi and Freeman, 1982). In Bangladesh, a study to measure change in mortality has been utilising multi-round retrospective surveys (Chowdhury and D'Souza, 1982). A recent study has looked at the problem of measuring changes in childhood mortality and suggested a new approach of utilising hospital or clinic based information on new births (Hill and Macrae, 1985). But this method will have limited applicability in areas, such as Bangladesh, where most births are delivered at home.

Cost is the last, but not the least important, indicator of the success of an ORT programme. Programmes giving better or equally good results with smaller cost are more efficient. Cost-effectiveness should be considered in evaluating a programme. The best index in respect of cost-effectiveness is probably cost per death averted. Other cost-effectiveness measures may be: cost per user or cost per household covered (Shepard, 1983). The cost data have to be estimated from available figures on the programme expenditure.

DISCUSSION

In this chapter we discussed four ORT programmes in different parts of the world. Most of them studied mortality, cost effectiveness and overall usage. Impressive results were found in several of them but a number of limitations in evaluations of these programmes have been pointed out. The usage rate according to severity of the episodes and 'effective usage' have been infrequently included in evaluations and many bypassed the question of the safety of the solutions. The programmes in The Gambia and Indonesia promoted home prepared solutions but we know nothing about the availability of the ingredients in their areas.

Some evaluation indicators of ORT programmes have also been discussed. Table 5.1 shows different programmes, including those of BRAC and the four others discussed at the outset of this chapter, by whether these indicators were studied. All these programmes looked at usage but in unstandardized ways and by using different definitions. Some considered the number of packets distributed (Chen, Rahman, et al., 1980), some including the present study used the number of episodes of diarrhoea as the denominator (Shepard, et al., 1983a) while others asked the question, 'what did you do the last time you had diarrhoea ?' (Lechtig, et al., 1983). Some also reported the proportion of households or mothers who reported having used ORT solution at least once. Least studied were effective use and local perceptions. In the BRAC programme, however, all indicators have been studied.

Regarding the approaches to evaluation research, no one method is ideal for evaluating all indicators. For example, qualitative research methods are probably necessary to evaluate changes in perceptions whereas quantitative survey methods would be advantageous in other situations where quantified information is needed on a large scale.

Changes in some of these indicators over time need to be evaluated. It will be to the advantage of the programmes to know, for example, the proportion of mothers preparing a 'safe and effective' solution at different time periods following the original instructions. This information would help in formulating reinforcement or reinstruction techniques and timings.

The indicators may be broadly summarised into two categories.

1. Process indicators: Availability of ingredients
   Study of perceptions
   Knowledge about ORT
   Safety
   Usage and effective usage

2. Impact indicators: Mortality/Case fatality
   Cost effectiveness

As has been indicated, the complexity of measurement increases when evaluations proceed from process to impact studies. The process category indicators are less difficult to measure and most difficult is the measurement of impact. As evaluation resources are limited, programmes would be advised initially to look at the former and impact should only be looked at when encouraging results are found by the process evaluations. For example, if the effective usage in a programme is not 'encouraging', there would be hardly any strong reasons to expect a fall in mortality. Skilled personnel and other resources available for evaluation are, in most cases, very limited and thus every effort should be made to make the best use of what is available.

Table 5.1: Selected ORT programmes and their use of evaluation indicators

Country/ Programme	Reference	Type of ORS used	Indicators Studied							
			Avail-ability of ing-redients	Perc-epti-ons	Know-ledge	Safety	Usage	Effe-ctive usage	Mort-ality	Costs
Bangladesh/ BRAC	Present study/ Chowdhury and D'Souza, 1982	Salt-Sugar	*	*	*	*	*	*	*	*
Bangladesh/ Matlab	Chen et al., 1980	Packet	N.A.			*	*			
Egypt/ Menoufia	Tekce, 1982	Packet	N.A.				*		*	
Egypt/ SRHS	Mobarak et al. 1980	Packet/ Sugar-salt	*			*	*		*	*
Gambia	Shepard, et al. 1983	Sugar-salt			*		*		*	*
Guatemala	Lechtig, et al. 1983	Packets	N.A.		*		*		*	*
Honduras/ PROCOMSI	Shepard, et al. 1983	Packets	N.A.	*	*		*		*	*
Indonesia	Lerman, et al. 1983	Packet/ Sugar-salt					*		*	*

N.A. (Not Applicable)

CHAPTER 6: THE VILLAGE CASE STUDY

INTRODUCTION

Like most other health programmes, epidemiological information has commonly been used in planning most ORT programmes, but the limitations of such data are well known. Some programmes have found a high non-use, partly explained since planners ignored, or did not seek out, information on the socio-cultural background of the population, as well as the local beliefs and perceptions concerning the health problem to be tackled (Hielscher and Sommerfeld, 1985).

Few ORT programmes appear to have taken these socio-cultural aspects into consideration. Kendall, et al. (1984) showed how the use of ethnographic research ('ethnomedicine') helped shape an ORT programme in Honduras and Zoysa, Carson, Feachem, Kirkwood, Lindsay-Smith and Loewenson (1984) studied perception and treatment of childhood diarrhoea in Zimbabwe and emphasized the need to consider 'local perceptions about illness and its control' in designing any health care activity, such as an ORT programme.

Although no social anthropological or village study was done in connection with the original BRAC ORT programme in Bangladesh, other rural development programme experiences were widely used in designing the ORT programme. Frequent visits to the programme and interaction with villagers helped make several programme changes (Chowdhury, 1980; Chowdhury, 1982; Chowdhury, 1983). When these ad hoc programme changes led to no significant improvement in the level of acceptance, there was a need for an indepth study. All the changes in the programme that had been effected were based on impressions and the merit of an indepth study were thus considered enormous. This chapter concentrates on this study dealing with objectives, methodology and results.

OBJECTIVES

These were to:

1. determine the people's perceptions, beliefs and customs concerning diarrhoea and its treatment
2. know the attitudes toward lobon-gur solution (LGS) as a remedy for diarrhoea
3. determine the reasons why some people do, but many more do not use LGS
4. determine whether different methods of ORT (such as LGS, packets, etc.) lead to confusion
5. determine the attitudes of village health practitioners towards LGS.

In addition, the village case study provided an excellent means to test different research methods for the more comprehensive survey to be carried out in a sample of unions from the BRAC ORT programmes. Given the time, the objectives were somewhat ambitious.

METHODOLOGY

A simple, low cost and quick methodology was adopted for use in this study. However, it involved a number of steps.

Selection of Village: Two villages were to be selected in such a way that

a) one of them has been recently covered by the BRAC ORT programme and the other would be covered following the case study (to allow studying the second village before and after the programme)

b) the villages were also to be covered by the government ORS packet distribution programme

c) they should be close to each other (preferably in the same upazila) for comparison and logistic reasons

d) they should be not far from a river system and thus represent a typical Bangladeshi village.

Daudkandi upazila in Comilla district was selected, partly because it was reasonably close to Dhaka by road. The villages were, however, selected from two different unions. A residence for the research team was also an important criterion in selecting villages. Thus Majidpur village in Majidpur union (programme) and Mirzanagar in Govindapur union (comparison) were finally selected for the study. Both of them are very close to the river Meghna. The villages are isolated during the whole of the monsoon because of floods and the only transport at that time is by the country boats. It takes approximately 2 to 3 hours to reach the villages from the nearest point on the Dhaka-Comilla roadway. The main study took place in the months of July to September 1984. The flood was particularly severe that year and the majority of the crops could not be saved from early flood waters. During monsoon, the major pastime is fishing. Most agricultural activities take place during the period between the monsoons when crops are planted and harvested. If the floods are not early, the crops are saved and the poverty is less severe. The villages are situated approximately 30 miles upstream from Matlab, the place where the International Centre for Diarrhoeal Disease Reasearch, Bangladesh (ICDDR,B) has its field laboratory and treatment centres. The villages and Matlab share a similar ecology.

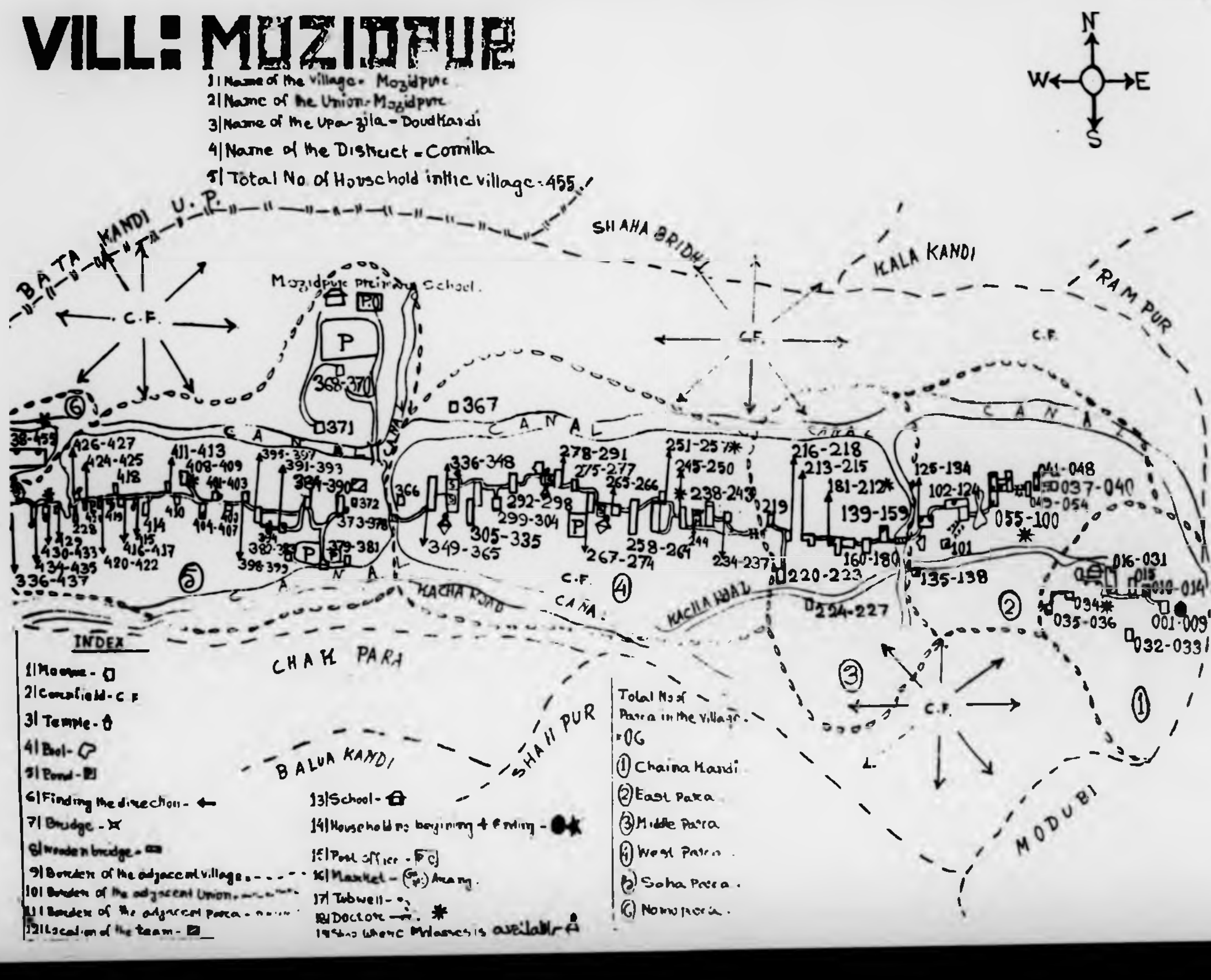
Selection of Staff and Training: Using past experience the author selected the staff from amongst BRAC's own field staff. Eight females and two males were selected and the class-r ɔm training for structured interviews was held at Majidpur while the field practice was organised in a nearby village. Training for other methods of data collection were held on an on-going basis. All the training was conducted by the author himself. After the training, the staff were divided into two teams for the two villages. As Majidpur was much larger (422 households) there were six female and one male staff. The remaining two females and a male comprised the team for Mirzanagar (178 households). The author divided his own weekly time between the villages by spending 4 days in Majidpur and 2 days in Mirzanagar.

Methods of Information Gathering: A number of data collection methods were employed in the study. Although they overlapped each other, they are discussed separately.

Listing and Mapping: At the beginning of the study, the whole village was listed by households. This helped find the exact number of households by para (cluster of households named after some or other characteristics of the inhabitants). A map (or sketch) showing each household and important landmarks was drawn (see Figure 5).

Structured Survey: After the listing was completed, the structured survey was begun. The questionnaire was designed keeping in mind the objectives of this study plus a larger survey which was to follow. Several demographic and socio-economic characteristics were included in the questionnaire, which also had questions on diarrhoea in the past one week and its treatment. One of the subtle purposes of this study was to discover effective ways of asking questions that would distinguish severe cases of diarrhoea from others. The entire village was covered in six days. In the second week, weekly surveillance for diarrhoea started. Households were visited on the same day each week and asked about diarrhoeal episodes since the last visit and what treatment, if any, had been undertaken. This surveillance continued throughout to the end of the study. This survey and the on-going surveillance helped in a number of ways. A rapport was established between the villagers and survey staff. Households using and not using lobon-gur solution could be identified. Influential people including local practitioners were identified and the author was introduced to them. Although efforts were made to keep the identity of the team separate from BRAC ORT teams in order to avoid some bias, the interest of the team failed to do this in most cases. This was, however, carefully considered in the interpretation of the data.

Figure 5: Sketch-map of Majidpur village



Unstructured Indepth Interviews: As the surveillance passed its second week, preparation was started for the in-depth interviews. A check-list was drawn up and likely subjects were identified. The head or spouse in the households using or not using LGS, males and females from different economic and social groups, influential persons, health practitioners, etc. were in the list to be interviewed. Compared to the structured survey in which a respondent was interviewed by a single person, the indepth interview was conducted by a pair of interviewers- one chatting with the interviewee while the other took notes. The initial purpose of this interview was to uncover ideas on different issues as set out in the objectives. The interview started with the question of local concern- flood and gradually led to the main theme. The interview of the males was done by the author himself with his male colleague taking notes. Two female staff of the team, who were better than others for rapport and at asking questions, were selected for the female indepth interviews. The author himself listened to many female interviews from a distance and took his own notes. In the evening, the author studied the interviews again and discussed with his colleagues any ideas arising from them. Such ideas were given special emphasis in the subsequent interviews to check for convergence and agreement. A total of 35 indepth interviews were carried out- 25 in Majidpur and 10 in Mirzanagar.

Focus Group Discussion(FGD): The technique of FGD has been borrowed from market research (McDaniel, 1979). Recently this technique has been successfully used in family planning attitude research (Folch-Lyon and Trost, 1981; Suyono, Piet, Stirling and Ross, 1981). It has also been used in ORT research in Honduras (Meyer, et al., 1983). Focus group discussion is a semi-structured discussion meeting of people of similar characteristics (sex, age, socio-economic status, etc.). The researcher's job in this discussion is merely to facilitate and lead it towards its objective. In an ideal FGD, the participants are preferably strangers to each other so that they can express their views on key and sometimes sensitive issues without fear or prejudice (Folch-Lyon, et al., 1981). In our FGDs, however, the latter criterion could not be adhered to as all participants had to be from the same village. This did not however, in the opinion of the author, make much difference as the participants became very free and frank after the initial warming up. The discussions were held with landless males, landless mothers, mothers-in-law of lower middle class category, elites and health practitioners. A total of 7 FGDs took place- 5 in Majidpur and 2 in Mirzanagar. All the discussions each of which had 8-10 participants were held in the place where the research team was staying. The female discussions were facilitated by two female staff. The author listened to them from an adjacent room. The author himself worked as facilitator in the male discussions. A tape recorder was used to record the whole discussions. Replaying of it later helped locate information missed in notes. The FGDs turned out to be very useful tools in eliciting ideas. These discussions were also organised in other parts of the country during the larger survey which was held after the village study.

Informal Discussions: There were no previously selected informants for this study but the author utilised his free time in talking/gossiping with visitors, the cook (who was from the same village), neighbours (one of whom was a popular practitioner), landlord, shopkeepers, boatmen, etc. Through such informal discussions, many key issues surfaced. As these were merely 'gossips' over a cup of tea, the information could be gathered and verified in a subtle way and sometimes with more precision. This method continued throughout the length of the stay in the village.

Problems and Limitations: The first problem was that the flood devastated the area during the study period. However, the team members soon became used to it. A boat was hired on a full-time basis to take the staff to the households. The flood also created mud and slippery surfaces. Rain and storms sometimes delayed particular jobs. The first village (Majidpur), where most of the work was carried out, was long in shape and the author was staying at one end (see map). In flooded villages, this was quite a handicap for quick and easy movement, particularly for female members of the team. After about 4 weeks work, one female staff member contracted chickenpox. She had to be sent to her home in another district during her recovery. However, other females were very enthusiastic and shared her work. Problems were faced in doing the male indepth interviews, since the men were busy fishing and the interview took 2-3 hours. There was also fear and suspicion about the actual purpose of such interviews. However, with persuasion and with the help of elites and elders, several interviews took place. Similar problems were encountered in focus group discussions. A token payment for the time spent was however particularly welcomed.

With all these problems, the study had its limitations. It was neither a fully anthropological nor a sample survey research study. The author thus had to be particularly cautious in analysing and interpreting what he found and had seen in the village. Fortunately, the objective did not include any issues that were culturally very sensitive. He was careful in what he was looking for. There was no attempt to quantify any of the findings. The results appeared valid for these villages and some information was later cross-checked with information from other areas. Some agreed, others did not. The results presented here should thus be interpreted with caution.

RESULTS

Perceptions: 'Diarrhoea is dreadful and I prefer not to make mention of it. It used to be a big problem previously but not so common now. If it gets someone, he can hardly think of surviving without visiting Matlab' (the treatment centre of ICDDR,B).

To an outsider, such a statement from a village elder in Bangladesh would sound ludicrous. How does this match up with what the epidemiologists and planners contend, that diarrhoea is endemic in Bangladesh? They are not wrong either. The village study helped unfurl the mysteries behind these two apparently opposing contentions.

It is a matter of perception and terminology. Interviews and discussions with villagers revealed four different local illnesses that have similarities with the scientific symptoms of diarrhoea. This became clearer when looking for a means to distinguish between severe and non-severe diarrhoeas and it was found that the term diarrhoea covers four different types of illness. In the following pages we take a look at each of these illnesses and examine how each is perceived by the villagers.

1.Dud Haga: This diarrhoea is attributed exclusively to breast-feeding. The babies' stools are watery and they cry because of the abdominal pain. Dud is milk and Haga is stool. The aetiology is that the breast milk gets polluted and hence there is an excessive flow of it. The colour of the stool may even resemble what the mother has eaten. The action taken can either be to stop breast-feeding or stop the mother from eating green vegetables, fish or meat. 'Dud haga' is also called 'Batashi haga'. Batash is wind and if a mother catches 'bad wind', her breast will be heavy with polluted milk and when the child sucks this breast he will have 'Batashi haga'.

Many consider having 'Dud haga' as part of growing up and hence it requires no treatment. Some may try LGS out of curiosity. If the 'Dud haga' persists for a long time (the period could not be defined), the mother may herself take and/or give the baby 'pani pora'(ritual water) or 'tabiz'(amulet). Others (in such or worse circumstances) may go to a local practitioner for a 'Dud injection'. This is a peculiar remedy practiced in this area. A small amount of breast milk is extracted and taken in a cup. The practitioner takes 2 cc of it in a syringe and then dilutes it with 1 cc of 'distilled water' from an ampoule. This diluted milk is then injected back into the mother's arm. This 'lightens' the breast and the child gets cured. "I have tried this on at least 50 cases and all were cured", boasted one practitioner who is also a teacher in the local primary school. Most of the practitioners practice this but many would hesitate to admit it. 'The mother comes to me and asks for it. If you don't comply they will find someone else and you lose your patient'. Majnu, a local practitioner, does not believe in 'Dud injection'. Instead he gives 'Atropin' injections to lighten the breast. Nepal, another practitioner, however does not agree with local practitioners about the causes of 'Dud haga'. He, an arts graduate and whose wife participated in the 'Palli Chikitshak' (village doctor) training programme, feels that it is caused by sucking the unclean breast and nipples.

2. Ajirno: This diarrhoea may be experienced by people of any age. The main cause is indigestion due to over-eating or food poisoning and the symptom is stool with water or of broken consistency accompanied by abdominal distension and a griping of the stomach.

This is hardly considered a disease. When the stomach gets tired, one gets 'Ajirno'. The cure is simple- rest the stomach. The headmaster of the local primary school had 'Ajirno' because he ate too much 'Kathal'(local jack fruit). He took a little salt and rested his stomach for a full day. He was alright the following morning. If one cannot stop eating, remarked one, we ask him to take green coconut water and glucose. Lobon-gur solution may aggravate the 'Ajirno' as it contains 'gur', confided one practitioner. (Like 'Dud haga', there were also instances of LGS use in 'Ajirno'.).

3. Amasha: This is a diarrhoea which is experienced by people of different ages. Unlike 'Ajirno', there is very little or no watery stool. The stool is mucousy which may or may not be accompanied by blood. This is considered a disease but the aetiology is not clear. It requires treatment and the most popular treatment is 'Boneji', which is an informal school of medicine practiced by elderly women, the art of which they inherit. There are some who practice it for a fee. They use different herbs and mix them with juices of different fruits and other materials. It is different from 'Kabiraji' (Sarder and Chen, 1981) in the sense that Kabiraji medicines are patent and the Kabiraj is a recognised practitioner. Any herb which is bitter is good for 'Amasha', informed Reshu Bibi. Most popularly used herbs are: Tia Manka, Khan Kuni, jute leaves and black arum. Ori Bibi is a 'Boneji' practitioner and she treats all sorts of illnesses. Her treatment for 'Amasha' is two fold: juice of 'Kachulla pata' is given at the crown of the head three times daily for three days plus juice of 'Khankuni', guava and 'Kool' are mixed together and eaten on an empty stomach every morning for three days. Normal food is withheld. Soft unfluffed rice of 'Kaon' type may be given with mustard oil. Most 'Boneji' practitioners would not tell me their recipes.

4. Diarrhoea/Cholera: This type of diarrhoea may be experienced by anyone. This is a serious disease and takes lives when it comes. It is like 'Ajrail'(Angel who takes life), a curse from God and one can have it if they are disobedient to Him. One can also have it if people walk through the graveyard or crematorium. Others feel that this is caused by eating bad or rotten food. Children get it when they eat mud and sand. The common symptoms

are: frequent purging stool which looks like rice-cleaned water, weakness which makes it hard to even walk, sunken eyes, thirst, continuous vomiting, reduced urine, etc.

'Dud haga' and 'Ajirno' are not 'Diarrhoea'. Severe 'Ajirno' or 'Dud haga' when accompanied by vomiting may turn out to be 'Diarrhoea'. For 'Diarrhoea' the best treatment is given at Matlab (30 miles downstream). If one cannot afford that, then people go to a local practitioner who may give intravenous (i.v.) saline and capsules (antibiotics). For 'Diarrhoea', according to the local practitioner Nepal, LGS or packet saline may be given but sulpha drugs will be necessary to cure the patient.

It appears therefore that the above are four different diseases, or conditions, which have similarities with the scientifically described symptoms of diarrhoea. Villagers distinguish between them quite uniquely, specify the aetiology and deal with each differently. Thus what the village elder meant by 'Diarrhoea' was not the diarrhoea of epidemiologists or planners. It was the severe type of diarrhoea. This finding in a Bangladeshi village may not be unique. We know of 'empacho' or 'caida de mollera', etc. in Honduras (Kendall, et al., 1984), the five types of folk illnesses in north-east Brazil (Nations, 1982), 'Behdi', 'Dosham', etc. in south India (Lozoff, Kamath and Feldman, 1975) or those found in rural Zimbabwe (Zoysa, et al., 1984). All these are diarrhoeas but villagers consider them as different conditions. Every society has its own perception about a disease. They do have about diarrhoea. What is produced in this small description is probably only a fragment of perceptions that people have about diarrhoea in rural Bangladesh. Anthropological methods are probably better tools in investigating these perceptions and they are necessary in planning ORT programmes (Zoysa, et al., 1984).

Reasons for Use and Non-use of LGS

One of the major objectives of this village study was to learn why some people do and others do not use the lobon-gur solution. The overall usage rate increased during our stay in the village. It was 17 percent during the first weekly survey and it rose to nearly 30 percent during the last few surveys. No reason can be found for this sudden increase except that as weeks passed, the villagers took the research team more as people from BRAC. Usage figures for this village should thus be interpreted with caution.

Our interest was, however, not so much in computing usage rates for the village, but in investigating the non-users. The weekly survey was very helpful in identifying the non-users of LGS and based on indepth interviews with non-users and other relevant persons, such as health practitioners, a range of reasons emerged which explained why some people did not use the LGS. These findings are presented below.

'It Wasn't 'Diarrhoea'': The majority of non-users reported that they did not use LGS because their illness was not 'Diarrhoea'. 'The ladies (meaning BRAC ORWs) told us to drink it for 'Diarrhoea' or cholera. We don't have 'Diarrhoea' or cholera in the village',commented one village woman. Hafizuddin's young boy had watery stool. When asked why he went to his aunt for 'Boneji' when LGS could be prepared at home by his wife, he replied, 'we were not sure if Abul had 'Ajirno' or 'Diarrhoea''. There were some cases of severe diarrhoea ('Diarrhoea') also where LGS was not applied either. In a focus group discussion of mothers-in-law, one participant reported that her grand daughter had 'Diarrhoea'. Her daughter-in-law wanted to give LGS to her daughter but she took her to Siddiqur, a local practitioner, who gave her intravenous fluid and capsules. At this stage, another participant commented that she should have given LGS which was similar in action as the intravenous fluid. 'You are joking', she replied, 'why then is saline (i.v.) white and lobon-gur is red?'.

'It Didn't Work': There were some who had used the solution previously, but it did not work on those occasions and they lost faith on it. A boatman's story: "My 3-year old boy had 'Diarrhoea' and we gave him lobon-gur twice. Although it was good and effective with other people, it could not cure him. I took him to a doctor at Gauripur (a bazaar-cum-riverport on the Dhaka-Comilla highway) who gave him saline (i.v.) and capsules. I had to spend Taka 300 for this treatment. If the lobon-gur was effective, this poor man's money could have been saved". One BRAC field staff narrated his story. He had taken a short training at the ICDDR,B treatment centre in Dhaka about the management of diarrhoea. A young patient was given ORS, but his mother wanted him to be given intravenous fluid. The dehydration was not severe enough to require this and the ICDDR,B staff politely tried to impress upon her the effectiveness of ORT. She could not be convinced and took her son away.

'Gur Not Found': Non availability of gur was cited as a reason for not using the LGS. If the gur is available at home, it becomes much easier for mothers to use LGS. In the village, gur was not found as frequently as salt in households. The price of gur at Majidpur was Tk 12 a seer while that of sugar was Tk 14. (In some other areas of the country the price was similar (Ittefaq, 1985)). Although the price of sugar was a little higher in Majidpur, its social value is much greater. It is a status symbol. Thus those who purchase a sweetener prefer sugar. BRAC teaching does not say anything about the use of sugar when gur is not available. Thus if there is no stock of gur at home, they seldom go to purchase it for making LGS. Moreover, it is not available in every local shop. Out of 7 shops in Majidpur, 1 had only gur, 2 had both gur and sugar, 1 had only sugar and 3 had neither gur nor sugar. The extent of non-availability of gur may vary between different areas and seasons. During the survey which followed this study, the lack of gur was found to be alarming in Terokheda in Khulna district. The interviewing team ran short of gur for their own use as well as for supplying to mothers for making a sample solution. No shop or bazaar was found in the locality which had gur and finally the team supervisor had to get it from another bazaar 10 miles away. If this is the case, we cannot expect all mothers to use LGS. Availability at home is more important as confidence in the method is still not so strong. If they have to spend money on buying gur, they would probably prefer to spend it in buying a 'medicine' from a local practitioner in whom they have trust.

'Problem with the Method' : There were some people who did not use it because of some problems with the method itself. The headmaster of the local primary school had 'Ajirno' and had starved himself the whole day. When asked why had not used LGS he replied, 'I am a busy man. I have to be busy all the time. Its too cumbersome to make this'. Some feel that it is quite difficult to feed the young babies. Even a doctor who was doing an MSc course at the London School of Hygiene and Tropical Medicine remarked: 'I worked at the Dhaka Shishu (children) Hospital for some time. I found it very difficult to feed ORS to the babies'. Others did not like the smell of this solution.

'Attitudes of Health Practitioners': There are a lot of local practitioners giving service to the people in the rural areas of Bangladesh (Claquin, 1980; Feldman, 1983; Sarder and Chen, 1981). The local practitioners are popular, active and acceptable to the villagers. LGS was taught to mothers by a group of strange women and there is no resident promoter of it who lives in the village. No practitioner was found who actively promotes LGS. During the stay in the village, the author talked with all practitioners irrespective of their school of medicine. They all praised LGS and many said they actively promoted its use. But how well do they promote it? This is very important as a positive attitude of a practitioner goes a long way in building confidence and trust in the method. Unfortunately no proof was found which supported their claim that they promoted it. In some instances they even rendered a disservice by giving it a low status.

Siddiqur is the head of local government dispensary. 'Whenever a diarrhoea patient comes to me I ask him to take LGS', informed Siddiqur. During our stay we came across several of Siddiqur's diarrhoea patients. When asked what did he prescribe, the responses were anything but lobon-gur. Similar cross-checking with patients of other practitioners proved that they were lying to us about their role as a promoter of LGS. 'How can a doctor suggest lobon-gur which is against his business?', whispered one teacher. On the contrary, they created a subtle impression that LGS was an inferior type of cure. 'My husband suggests lobon-gur if the patient is poor and cannot pay for the capsule or packet of saline', said Siddiqur's wife. When a mother was asked why she did not give LGS to her child, she replied, 'the doctor said it does not work'. Others gave the impression that it was not a medicine. 'Although my husband is a doctor', says Anukul's wife in a pleasing tone, 'I will try lobon-gur because it is available at home'.

Other Results

Confusion with Packets: The villages were covered by the government's National Oral Rehydration Programme(NORP) which distributes packets through village based depot holders and through the local government dispensaries. One of the objectives of the present study was to see if simultaneous programmes for both packets and lobon-gur solution (LGS) created any confusion in the minds of the people. During the stay of the team in the village, several instances were found where packets were used, but it was less commonly used than LGS. Approximately 20 per cent of households interviewed were found to have seen the packets.

Packet was not a household word like LGS. Most packets that were reported to have been used were received from the local government dispensary. Some doctors at Gauripur also prescribed it and they were bought from there. There was, however, no confusion in the minds of the people as packets were treated like any other medicine. There was no sign of its promotion in the village as a household remedy.

Spread of Knowledge: We looked at the spread of knowledge from two angles. We were interested to see how much knowledge about LGS had spread to neighbouring unions and our study at the second village, Mirzanagar, allowed us to do this. At the time of our work, all the unions around Mirzanagar were already covered by the BRAC programme and the message was being aired through the Dhaka station of Radio Bangladesh. To our surprise, we found no trace of the ORT knowledge in the village. (There was one woman who learnt about it in another upazila while she was visiting her mother). It was not clear whether the isolation created by floods was in anyway responsible for this poor diffusion of knowledge.

The ORWs visit about 80 percent of the households in the village. We were interested to see the extent to which the women in the remaining 20 percent households learnt how to make the solution. In the survey at Majidpur, we asked of every household if any woman in that household was taught the preparation of LGS. Those answering 'no' were later asked to prepare a sample solution for us. These solutions were later analysed at the ICDDR,B, Dhaka. The results are presented in Table 6.1. It shows that 64 households or nearly 15% of all village households were not taught the method and that in nearly one-fifth of households was a solution made with a 'dangerously' high sodium level. The reason for not being taught was mostly absence from home during the time of the visit by ORW. Although they were not taught, they had learnt it from their neighbours or from children who had learnt it at school. The table shows that the dissemination of this knowledge had occurred. Unfortunately, no comparison can be made as no similar samples were collected from the households which were taught in the village. However, the proportion with sodium concentration of 120 mmol/L or more (18.8%) is similar to the 18.2% found in the non-CRP households (see Chapter 10). It may be mentioned here that Majidpur was a non-CRP village and the teaching in this village had been done about six months prior to the collection of these samples.

Table 6.1: Distribution of sodium (in mmol/L) concentrations in solutions prepared by women who had not been taught how to prepare the LGS

Sodium	No.	%
<30	1	1.5
30-99	45	70.3
100-119	6	9.4
120+	12	18.8
Total	64	100.0
Mean	88.7	mmol/L

DISCUSSION

The village case study was undertaken to elicit information from villagers concerning the relevance of the BRAC ORT programme and another purpose was to field test research methods, particularly the questionnaire, for a future household survey.

There is a great deal of merit in a combination of data collection methods (WHO, 1984) and combining them can probably be done in a number of ways. For example, analysis can be made separately for results obtained through each method and these analyses can then be collated. However, a different approach was undertaken here, which relies on accumulating evidence for conclusions, based on the findings from a variety of different approaches. This may be called 'convergent evidence'. Weekly retrospective surveys were used to identify village subjects for indepth interviews. Ideas coming from interviews were particularly explored in following interviews. Conclusions were then further checked for convergence through focus group discussions and informal discussions. Information found to be true for this village was then taken to other areas. The existence of four types of diarrhoeal illness, which in the scientific sense are all diarrhoeas, was found to be strongly understood in the village. Several other districts in Bangladesh were subsequently visited and indepth interviews took place with relevant persons. Evidence for the existence of four types seemed to converge, although different terms were used to denote a particular type. What was 'Dud haga' in Majidpur turned out to be 'Buni haga' in Sylhet and 'Bau batash' in Barisal. Another example is the peculiar treatment of 'Dud haga' using 'Dud injection'. Fortunately, this treatment method did not converge and was not reported anywhere else. The 'convergent evidence' method of research was fruitfully used in this study.

As stated above, the study unfolded the existence of four types of illnesses with diarrhoeal symptoms. These are clearly perceived and identified in most cases and people have different ideas about their aetiology and about their severity. They are cared for in different ways. Villages are very likely to be confused when BRAC workers use the operational definition of diarrhoea and ask villagers to give LGS if they have 'one or more watery stool'. To the villagers 'Diarrhoea' clearly means severe diarrhoea or cholera. It is not easy for them to change their perception and start believing that they are all really one kind of diarrhoea. As the word diarrhoea is more often used by ORWs, the villagers believe that LGS is a cure for 'Diarrhoea', by which they mean severe diarrhoea. That is why probably, as will be seen in a later chapter, we have more users amongst the episodes considered 'Diarrhoea'. The perception of villagers regarding diarrhoea and its treatment is crucial for any ORT programme. The more it is understood and applied by health workers the more successful will they be in attaining their goal.

Thus one of the major reasons of non-use was the gap between the perceptions of villagers and teaching of the ORT method. Other reasons for non-use have also been presented. But in the view of the author, who spent two months in the village, the greatest failure of the programme was its inability to gain credibility in the eyes of the villagers. It is not yet believed in strongly and the OTEP messages are still external and treated as some mystery. It is neither considered a modern medicine nor identified as a traditional one, such as 'Boneji'.

Another major reason for non-use centres on the role of local practitioners, as they have the confidence of the people for health matters. Unfortunately, they were not allies, despite the fact that BRAC has tried to involve these practitioners (BRAC, 1983). Clearly the OTEP can have very limited impact given that LGS comes in direct competition with the business interest of these practitioners.

Availability of gur may be another impediment and the simultaneous promotion of sugar may provide more flexibility to the people and thus improve usage of LGS.

Unlike other systems of medicine, LGS does not have a promoter who is based in the village. Thus it needs to possess something spectacular to attract popularity, as LGS does not lead to a quicker recovery. One way of ensuring a place for LGS in the village is to understand more about the people and their behaviour and shape the programme accordingly. Another or a complementary way may be to organise a strong communication message to offset all behavioural and physical constraints, as has been tried in Honduras and the Gambia (Foote, 1983; Oldfield, 1983). Otherwise, it will not be long before people probably forget about LGS, its correct preparation and use.

CONCLUSION

From the results presented in this chapter, the following conclusions can be drawn.

1. The village case study, which used socio-anthropological methods and the 'convergent evidence' method of research and utilised a variety of social research techniques, proved to be very useful in clarifying and understanding the people's perceptions about diarrhoea.

2. Four types of diarrhoeal illnesses were recognised by the villagers, each of which had symptoms resembling those of diarrhoea. These were: Dud haga, Ajirno, Amasha and Diarrhoea. The people considered them as separate diseases with different aetiologies and often separate treatments. 'Ajirno' is, however, not always considered a disease worth medication, whereas 'Diarrhoea' or severe watery diarrhoea or cholera, is considered a serious illness which probably will need treatment.

The replicability of these findings in other parts of Bangladesh was tested and it was found that although the names used to denote different types differ from area to area, the four types were equally present and understood in all those areas.

3. Causes for the infrequent use of LGS revealed such major reasons as a gap in understanding between the teaching message by the BRAC ORWs, who put an emphasis on the word diarrhoea, and the perceptions by the people that this meant severe diarrhoea ('Diarrhoea'); the poor availability of gur; and the antagonistic attitudes of village health practitioners.

4. The village was also covered by the ORS packet distribution programme of the Bangladesh government. There appeared to be no confusion by the villagers between packets and LGS since packets were only found in health centres and pharmacies and people considered them similar to other medicines for diarrhoea, such as

antibiotics.

5. A small study to test the diffusion of knowledge of how to prepare LGS was made by asking mothers in households which had not been taught by ORWs to make a test solution of LGS and this showed that about 18% of households produced a solution in the 'dangerous' range for sodium concentrations.

CHAPTER 7: OBJECTIVES AND METHODOLOGY OF THE HOUSEHOLD SAMPLE SURVEY

OBJECTIVES

The aim of the survey was to provide a quantitative evaluation of certain process indicators of the BRAC oral therapy programme, including both the first and second phases (Chapter 4). The specific objectives of this evaluation were the following:

a) To compare the ability of mothers to prepare a safe and effective solution in the First Phase, non-CRP and CRP areas.
b) To compare the usage of LGS in First Phase, non-CRP and CRP areas.
c) To identify the users of the BRAC ORT method from non-users in the First Phase, non-CRP and CRP areas by socio-economic and other characteristics.
d) To study the effect on usage of the promotional programmes carried out through the radio and schools.

METHODOLOGY

The Reference Population

The objectives of this evaluation study, together with the nature of the programme, necessitated the following populations to be treated independently:

a) First phase areas
b) non-CRP areas
c) CRP areas

Accordingly independent samples were drawn from each of these areas. However, in each phase the programme was carried out over several years. For example, the first phase was from July 1980 to September 1983 - a period of more than three years- and areas in the first phase were covered one, two and three years ago.

Thus the choice was to select samples from areas which had been covered either one, two or three years ago. In the second phase (non-CRP and CRP), however, the areas had been covered not more than one year previously (second phase started in October 1983 and the survey was to be conducted in October-November 1984). The choice for the second phase non-CRP and CRP populations was largely determined by those areas which had been covered one year ago, but a choice had to be made for the first phase. For comparability with the second phase, the one-year gap period since the ORT teaching appeared worthwhile, but the study called for comparisons over a longer period. The actual reference populations thus included the following:

a) Areas covered by the first phase programme two years before the survey. Since the survey was to be conducted in October-November 1984, this meant all areas covered by the programme during October-November 1982.

b) Areas covered by the non-CRP programme one year before the survey, that is, all areas covered by the non-CRP programme during October-November 1983.

c) Areas covered by the CRP one year before the survey, that is, all areas covered by the CRP during October-November 1983.

Henceforth, we will call each of them a separate study.

Sample Size

The ultimate sampling unit was a household, defined as a group of persons eating from the same kitchen and sharing a common living place. The teaching of ORT is done by BRAC on a household basis and a household in Bangladesh is well defined and clearly understood. Two main objectives of the study, as set out above, determined the sample size. The question of determining the ability of households to prepare ORT can be done through prepared solutions, but for usage the determination of sample size was not straight forward. Previous studies conducted by BRAC revealed that a diarrhoea episode was found in 20 percent households when the reference period was set at two weeks and that the usage rate for ORT was around 20 percent of episodes (Chowdhury, 1983). Based on these estimates it was reckoned that 2,500 households would be required to be surveyed to come up with 100 cases of household usage for a recent episode. An arbitrary size of 100 users was considered the minimum for analysing the usage data. The distribution of the sample down to the lowest level (viz., village) was done by proportional allocation.

Sample Selection

The total number of households to be selected for each study was fixed at 2,500. Considering the advantages of cluster sampling, a three stage technique of selection was adopted. The following were the considered advantages of this kind of selection:

a) Ease in selection
b) Ease in field work and logistics
c) Advantages of low cost
d) Good precision compared to cost
e) Popular in similar studies.

First Stage Selection: During October-November 1982, the BRAC programme was being conducted in 7 geographical 'areas'(former sub-divisions). During October-November 1983, the programme (both non-CRP and CRP) was being done in 8 such 'areas'. In order to include all such areas in the sample, all 23 areas were included for sampling. These 23 areas comprised 7 from the First phase and 8 each from non-CRP and CRP areas. From each of these areas, one union was selected with probability proportional to size of the union, using the number of households in the union. It may be mentioned here that a union is the smallest administrative unit with an average population of 20,000. The households covered by the programme in each village and union were made abailable by the BRAC programme office. The programme covers approximately 80 percent of households in a village or union (BRAC, 1983). Thus the programme coverage figures had to be multiplied by 1.2 in order to find the estimated household size of the village or union. The upazilas where the selected unions are situated are indicated in the map given in Figure 1.

Second Stage Selection: From each of the unions selected in the first stage, five villages were selected with probability proportional to size, the size being measured in terms of househods in the village, as in the first stage selection. As is common practice (Government of Bangladesh, 1978), the 'village' size was restricted to 50-400 households. Villages with households exceeding 400 households were divided into two or more artificial 'villages' and each of them was considered, for our purpose, a separate village. However, villages with less than 50 households were amalgamated with a neighbouring village. The total number of villages selected for each study were as follows:

First phase- 35
Non-CRP- 40
CRP- 40

The complete list of selected villages (indicating also whether they are combined with or divided from) and the number of sample households is available in Appendix 4.

Listing and Selection in Third Stage: The selection of households needed a list of all households in the village. A group of seven listers were trained to list households in the village and make a village sketch-map showing households and important landmarks. These listers were then sent to the selected villages. The listing schedule included the following:

Serial no. of household
Name of head of household(HHH)
Father/Husband's name of HHH
Location of household in village

The listers also collected names of important persons in the villages to whom help could be sought by the following

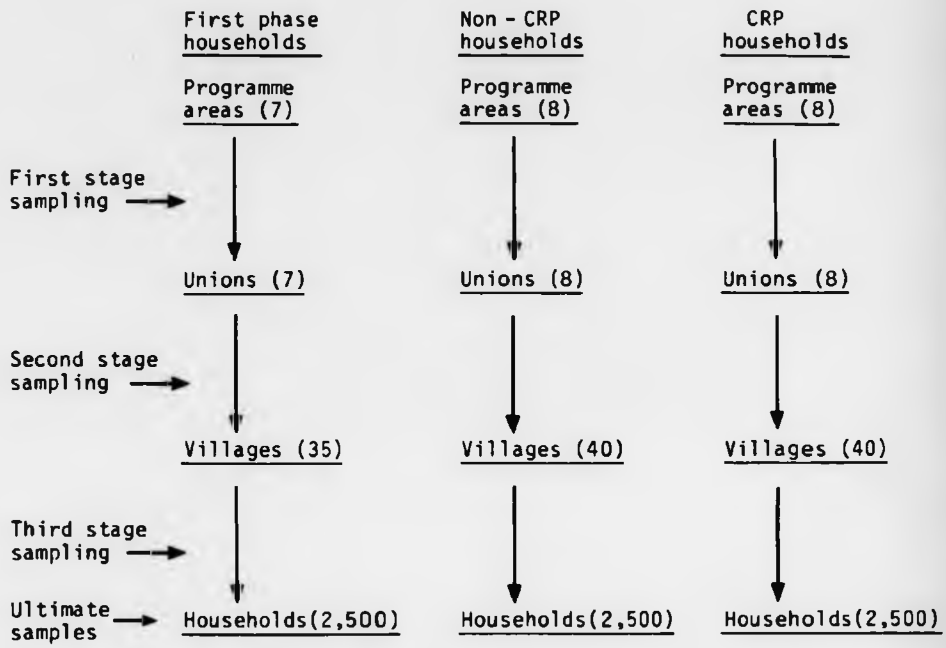


Figure 6

Stages in sampling of households

interviewing team and arranged possible accommodation for these teams. Specimen copies of the listing schedule and sketch-map of a union are given in Appendix 5 and 6 respectively. Specimen sketch-map of a village is given in Figure 5.

The sample households in each village were selected systematically from the listers list of village households with a random starting point. A selected household in the listing schedule (shown in Appendix 5 by a circle around their serial no.) was transferred to a new sheet for the interviewing team and given a sample household number (Appendix 7).

Table 7.1: Sampling fractions in different stages of sampling

Selection stages	First phase	Non-CRP	CRP
Selection of Programme areas			
No. of programme areas	7	8	8
No. selected	7	8	8
Sampling fraction (f)	1	1	1
Selection of Unions			
No. of unions in selected programme areas	59	62	24
No. selected	7	8	8
f	0.12	0.13	0.33
Selection of Vilages			
No. of villages in selected unions	106	123	122
No. selected	35	40	40
f	0.33	0.33	0.33
Selection of Households			
No. of households in selected unions	17,185	27,673	27,790
No. selected	2,500	2,500	2,500
f	0.15	0.09	0.09

The selection of the household sample by different stages has been illustrated in Figure 6. Table 7.1 shows the different sampling fractions in different study areas. Because of differences between the programme in each area and the sampling fractions, pooled estimates were not computed.

Selection of Households for Collection of Sample ORS : After the list of sample households was transferred to a new sheet, a fresh selection of a sub-sample was made for the collection of fresh samples of newly prepared lobon-gur solution. A 5 percent random selection was made. This is shown in Appendix 7 by a circle around the serial numbers. The 5 percent sample was later raised to 10 percent in order to obtain a sufficient number of samples.

Selection and Training of Field Staff

The core of the staff were the female interviewers who collected information from mothers. The interviewers were young adults as the work required a lot of long walking in difficult areas of the countryside. The interviewers had at least 12 years of schooling. Some interviewers came from the Research and Evaluation Division of BRAC, but others were BRAC field staff selected by the author. A total of 25 females were trained, including 8 interviewers who had previously worked in the village study (Chapter 6) who proved themselves invaluable during the training programme. Initially only four males were selected for the training programme, who had worked as listers and two of them had also worked in the village study.

The Training and Resource Centre (TARC) of BRAC at Savar (20 miles from Dhaka) provided an ideal place for the training programme where six days were spent on training. The first day was used to introduce the study. The author conducted the training with help from one of his colleagues at the Research and Evaluation Division of BRAC. An interview manual was distributed for studying overnight and the second and third days were mainly devoted to role playing exercises. It was a lengthy process requiring each trainee to understand the questionnaire as well as the art of interviewing. After each role playing session, there were group discussions and comments. The fourth day was spent in the field doing four interviews per interviewer. The author observed their performances and noted difficulties and inadequecies. After the day's work, all questionnaires were checked. During the evening, the day's work was discussed, the interviewers raised problems and the author presented his observations and his evaluation of their performance. All the questionnaires were returned to the respective interviewers with the errors marked.

The same process was repeated on the fifth day. On the sixth day, all the points raised during the past five days were discussed again. The interviewers were then introduced to the control forms such as the Interviewer's Daily Record Sheet (Appendix 8). Aspects of team discipline were discussed. The evening was spent specifically with the male supervisors of the teams whose duties and responsibilities were emphasized. The 'Interviewer's Manual' and 'Supervisor's Manual' (BRAC, 1981a; BRAC, 1981b) which were developed by the author and published by BRAC were distributed for reference.

The Questionnaire

Although many of the questions asked were standard ones and have been asked in many surveys, there is always room for improvements and adaptations. The village study which preceded this survey provided an opportunity to field test the draft questionnaire, which then underwent a series of changes and improvements. The most important changes were made in the questions used to identify the different forms of diarrhoea as perceived by the villagers. But how far is that true in other parts of Bangladesh? A quick appraisal was made through short trips to some other BRAC areas and discussions were held with relevant people in Dhaka. It was found that although the names differed from place to place, the four types of diarrhoea found for Comilla villages were similar in other areas of the country. The final questionnaire used in the survey is given in Appendix 9. The same questionnaire was used in all three study areas.

Although the questionnaire was finalised and printed before the start of the interviewers' training, two changes were made subsequently. An unimportant question on marital status in Part A (Household Composition) took too long and was then dropped. During the period of data collection it was realised that the availability of <u>gur</u> in households was not as common as had been believed previously. A question was thus included on the availability of gur in households when the survey was about half way through. It is unfortunate that such an important question was overlooked.

Field Organization

<u>Composition of Teams</u>: A maximum of four interviewing teams could be supervised properly by the author himself and by his colleagues. Based on the author's past experience with the Bangladesh Fertility Survey and BRAC, six interviewers with one supervisor formed a team and four teams were thus organised. One interviewer was kept in reserve to fill in for emergencies. During the survey it was felt that one supervisor was not enough to look after all the team activities and a male assistant was added, who assisted the supervisor in 'repeatability' checks (see later in this chapter). Each team also included a male cook. Eight of the interviewers had worked with the author in the village study. To spread their experiences equally over all the four teams, each team included two of them. The composition of the teams is given in Appendix 10.

<u>Assignment</u>: The whole schedule of work was finalised before the start of data collection. There were 23 unions in 23 different upazilas to be covered and these were assigned to the teams, mainly according to the geographical proximity and logistical

support. Each team worked in unions from the three study areas in order to try and minimise the effect of inter-team differences on inter-study differentials. Two of the supervisors were comparatively new to the work. Hence during the initial period of data collection, they were assigned sample areas closer to Dhaka for closer supervision. The schedule showing the assignment of sample areas to teams is given in Appendix 11.

Within a team, the assignment of sample households to individual interviewers was the responsibility of the supervisor. During the evening, the supervisor assigned each interviewer her next day's work, which included new interviews, reinterviews and collection of sample ORT solutions. The number of interviews done per day increased as the interviewers became experienced over time.

Collection of Sample Lobon-gur Solutions: Samples of lobon-gur solution were collected from two types of households:
- those which were selected for the purpose and
-those where the solution was reported to have been used during the previous 2-week period for the treatment of a diarrhoea episode.

The supervisor assigned interviewers to visit these households, to complete a short questionnaire (Appendix 9) and have the mother prepare a solution. The interviewer carried gur and a spoon but obtained all other items and ingredients (such as measuring utensils, salt and water) from the household itself. After the woman had made the solution, the interviewer measured the volume in a graduated cylinder and then saved a sample of it in a screw-cap vial and returned the remaining solution for consumption by the household members. The interviewers were asked not to identify themselves as BRAC workers as this could create a bias. If they found a fault in preparation which could lead to a dangerous solution (too much of salt and/or too little of water), they were permitted to reteach the mother after they have collected the solution. This was done to improve the mother's skill and for ethical reasons. The solution was saved and the vial was labelled with the proper identification.

Supervision

Supervision is a very direct way of ensuring quality. Direct supervision of the data collection was provided by the team supervisor at the time of interviews and through reinterviews and consistency edits. The latter was done on every questionnaire in the evenings. Any inconsistent answers were probed, sometimes requiring the interviewer to revisit the household the following day. The control sheets for interviewers and supervisors were also useful in keeping track of the activities of the team.

The next line of supervision was provided by the author and his colleagues from the Research and Evaluation Division of BRAC. Each of the 23 unions covered by the interviewing teams was visited either by the author or his colleagues during data collection. Apart from checking the completed questionnaires for errors and listening to interviews, they also conducted several reinterviews. In a typical reinterview the author picked up a completed questionnaire and conducted a part or full reinterview. The visits by the author and his colleagues were made without any prior notice. This helped a great deal in ensuring a reasonable quality of the data.

The author in turn had his work supervised by BRAC and by his academic supervisor at the London School of Hygiene and Tropical Medicine who visited the author in the field and spent two weeks in supervising the work in Bangladesh.

Repeatability Checks

A system of repeatability checks were introduced in the data collection process. Households reporting a diarrhoeal episode during the reference period and households which were selected for LGS sample collection were included in the repeatability checks. The purpose was to see how far the reported diarrhoeal incidences, as well as their treatment methods, were correctly reported. The purpose of including the second type of households (viz.,LGS sample households) was to see how far the non-reporting of episodes was correct. Within two days of encountering a diarrhoeal episode, the supervisor asked another interviewer to do a reinterview of it. The interviewer was not shown the original questionnaire nor was she told who was the original interviewer. After the second interview, the supervisor matched the two questionnaires on the following items of information:

- diarrhoeal episode
- line no. of patient
- type of treatment.

If all these items agreed, the repeatability was complete and the supervisor stapled the two questionnaires together. In case of a 'no match', the supervisor conducted a third interview and kept all three questionnaires together. In some areas some repeatabilty checks could not be done because of adverse weather or difficulties with transportation. The author during his trip to different teams also conducted several repeatabilty checks by himself.

The Work at Office

As soon as the data collection in any union was complete, all the materials pertaining to the survey (e.g., complete and incomplete questionnaire, control sheets, sample lists, sketches, sample LGS solutions) were sent to the survey office at BRAC's Dhaka Headquarters. The next stages of processing the data are discussed below.

Registration: At this stage all the questionnaires were individually checked for completeness and all completed questionnaires were entered in a register and given a unique serial number called the converted serial number. The last entry on a register thus showed the total number of households which were successfully interviewed.

Electrolyte Analysis: After the labels on vials had been checked against their respective questionnaire at the registration stage, these vials were sent to the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) laboratories in Dhaka for electrolyte analysis using flame photometry. Because of the cost per specimen analysed, only about 10 percent of the solutions were analysed for glucose. As soon as the analysis was complete, the results were sent back to the survey office.

Editing and Coding: Questionnaires needed detailed editing at the office. A group of editors, who had masters degrees were recruited and trained on the essentials and techniques of editing and coding. A manual was prepared for the purpose. Apart from consistency checks, the editing included conversion of land units into decimals, the type of household (e.g., whether a nuclear or joint ,etc), working out the repeatability status (Appendix 13), etc. The editors also transferred the electrolyte results on to the questionnaire. A sample of the edited questionnaires were rechecked by the author and his colleagues.

As soon as the editing was complete, the questionnaires were coded according to a code plan which comprised four 80-column card types:

Card type 1: Household characteristics
Card type 2: Individual members characteristics
Card type 3: Diarrhoeal episodes and treatments
Card type 4: Electrolyte results

The coding was done by a group of coders who had done the editing as well. All the codings were checked for errors.

Data Entry into Computer: The first step towards computerisation was the transfer of coded information onto a computer and storage on diskettes. This was done at the computer centre of the Squibb Pharmaceutical company in Dhaka. These entries were verified on a 100 percent basis.

Restructuring and Computer Editing (Cleaning): During coding, cost consideration necessitated coding of multiple households on one card. To avoid unnecessary problems at the analysis stage, the data were restructured. This resulted in having one card per household/individual/episode/solution. Once this restructuring was complete which was done by employing simple programs, the data were subjected to the final editing or cleaning. This cleaning checked the data for major inconsistencies and code ranges. A standard edit package with minor modifications was used in this operation. The cleaning was done using the computers at ICDDR,B, Dhaka.

Transfer on to Tapes: The data cleaned through the series of operations reported above, was finally transferred on to computer tapes at the computer centre of the Bangladesh University of Engineering and Technology, Dhaka. This tape was finally brought to London for analysis.

Analysis: The newly installed package program SPSS X at the University of London Computer Centre (ULCC) was conveniently utilised to analyse the data. The particular facilities provided by this package in analysing data with complex data sets were of invaluable help.

Problems and Limitations

In discussing the problems and limitations of the study, we will consider four major areas.

Safety of Homemade ORT Solutions: This was one of the major concerns of the study. When the survey was half way through, it was decided to raise the sample ORT solutions from 5% to 10% because the required sample size had been underestimated. This obviously put a limitation on the analysis. The time between the collection of sample and their analysis in Dhaka was approximately two weeks in most cases. In a few cases, the solution spilt out of the vial and hence no analysis could be done on them. During the collection of sample solutions, the volume of solution prepared was measured which was taken as a proxy measure of water volume. The actual volume of water added was thus lower than the solution volume recorded.

Usage: This was another area of concern and problems associated with the measurement of usage have been discussed in Chapter 5. These are: problems of definition, the use of 2-week recall, reporting of episodes and use, etc. The repeatability system was introduced in the survey to check some of these problems. But this could not be done without encountering new problems. There was an interval of 2 days between the first interview and repeatability check interview. In several cases, the two did not match not because of the interviewers' fault but because a new problem had arisen. For example, a new person may get diarrhoea or they may start a new treatment method between the surveys. Or, the respondent may not know, on the first day, that a certain member of the household had a mild diarrhoea. When this person is interviewed on the second interview, they might report this illness. Such discrepancies made the repeatability analysis quite difficult. In our analysis, however, such cases were considered 'not matched'.

In a large number of cases, the repeatability interview could not be done, mainly for logistical reasons. In some cases, the repeatability could not be done when one of the teams ran short of repeatability questionnaires. The number of repeatability questionnaires supplied to each team was decided with some assumption about their requirement. But in some areas (particularly in CRP) there were more episodes and users than anticipated which caused this shortage.

Seasonality: The timing of the survey was important as it was done over a 2-3 months period during October-December 1984. Would the results be different if the survey was done at any other period or over a whole-year? The results on the ability to prepare LGS are unlikely to be different. However, we were also interested in knowing the extent of usage and this is also unlikely to be affected unless there was a diarrhoea epidemic situation (October to December is just before a peak diarrhoea season in Bangladesh and this period probably represents an average one for incidence). The seasonality in the availability of gur may, however, be of more importance. This period is also just before the winter gur season (gur from date-juice is produced in winter) and its availability is likely to be low. A study conducted by BRAC in January-February 1985, which is the gur production season, found upto 50% households had gur (Fakir and Ahmed, 1985) and this is higher than that found in this present study.

General: This survey carries all the limitations of a retrospective survey. However, all efforts were made to take care of these problems. In order to remove a bias that might be created by the use of BRAC workers as interviewers, the blue sarees and bags used by these BRAC workers were not allowed to be used during the survey. Also, the interviewers were not allowed to reteach unless they found a serious error in the preparation of the sample solution. A major error for retrospective surveys in the developing countries is in the reporting of age and in this survey heavy reliance was placed on an event calendar to estimate age (Appendix 12).

Most of the interviewers at some times previously had worked as ORWs. The decision to engage former ORWs as interviewers was made deliberately. The author's previous experience showed that these women could very quickly and successfully be trained as interviewers because of their communication skills. Through proper training and supervision, it was hoped that the bias that might be created by their involvement in data collection would be limited. Unlike the ORWs, the interviewers were paid on a monthly basis.

The interviews took place in public so that other women and children were present but men were hardly present. The interviewers through their communication skills prevented others from prompting or influencing the answers of the interviewees.

A focus group discussion

An interview in the community survey

Figure 7: Selected photographs from BRAC evaluation

An interview being listened by the supervisor

Dr Patrick Vaughan observing an interview

Editing and coding in the Dhaka office of BRAC

Analysis of electrolytes at the ICDDR,B, Dhaka

Computer editing at the ICDDR,B, Dhaka

BRAC poster at the Second International Conference on Oral Rehydration Therapy in Washington D.C. during December 10-13, 1985, also showing some results from the present evaluation

CHAPTER 8: THE POPULATION STUDIED AND DIARRHOEA EPISODES

INTRODUCTION

As stated in the previous chapter, a sample of 2,500 households were selected for interview in each of the three studies (viz., First phase, non-CRP and CRP). In this chapter background information on the survey is presented, including response rates, characteristics of the respondents and on the reporting of diarrhoeal episodes. Incidence rates for the 2-week recall period are presented and estimated rates for a year are computed.

RESULTS

Response Rate and Respondents

As stated above, a total of 7,500 households were selected for interview in the three studies and of these, 6,910 households were finally interviewed, giving an overall response rate of 92 percent. The major reason for non-response was non-availability of an eligible respondent at the households. A population of 42,349 was counted in the surveyed households, making an average size of households at 6.1 persons. The above information for each study area is presented in Table 8.1.

Table 8.1: No. of households surveyed, rate of non-response found and population counted by study areas

Information	First phase	Non-CRP	CRP
No. of households selected	2,500	2,500	2,500
No. of households surveyed	2,329	2,289	2,292
Non response (%)	6.9	8.5	8.3
Population enumerated	14,772	13,943	13,634
Average size of households	6.3	6.1	5.9

Information on the respondents themselves have also been tabulated. These are presented in Tables A.1 to A.4. As can be seen in these tables, most respondents were aged 25-44 years (53 percent), female (85 percent), wives of head of households (61 percent) and most did not know how to read or write a letter (77 percent).

The Population

Table 8.2 shows the age distribution of the study population About 45 per cent of the survey population were under 15 years of age, which agrees closely with the Bangladesh national age structure (Government of Bangladesh, 1978) and that of Matlab, Bangladesh (Ruzicka and Chowdhury, 1978). The sex ratio was 101.5 males per 100 females (Table 8.3). Literacy of the population aged 5 years or over was assessed but about three quarters of them did not know how to read or write a letter (Table 8.4).

Table 8.2: Age distribution of the survey populations compared to that for Bangladesh

Age group (years)	Bangladesh % *	First phase No.	First phase %	Non-CRP No.	Non-CRP %	CRP No.	CRP %
<5	15.2	2415	16.4	2254	16.2	2097	15.4
5-14	32.8	4289	29.1	3987	28.6	3859	28.3
15-24	18.5	2922	19.8	2571	18.4	2596	19.0
25-34	11.9	1856	12.6	1868	13.5	1811	13.3
35-44	8.6	1224	8.3	1205	8.6	1146	8.4
45-54	6.2	947	6.4	879	6.3	902	6.7
55+	6.8	1103	7.4	1160	8.4	1213	8.9
Total	100.0	14756	100.0	13924	100.0	13624	100.0

*Source: Computed from (Government of Bangladesh, 1978)

Table 8.3: Sex distribution of the survey populations compared to that for Bangladesh

Sex	Bangladesh	First phase		Non CRP		CRP	
	%	No.	%	No.	%	No.	%
Male	51.3	7340	49.7	7165	51.4	6831	50.1
Female	48.7	7431	50.3	6778	48.6	6802	49.9
Total	100.0	14772	100.0	13943	100.0	13634	100.0

Table 8.4: Population (aged 5 years or more) by whether can read or write a letter

Information	First phase		Non CRP		CRP	
	No.	%	No.	%	No.	%
Knows how to read or write a letter	2724	22.3	3013	25.9	3290	28.7
Does not know how to read or write a letter	9518	77.7	8629	74.1	8181	71.3
Total	12242	100.0	11642	100.0	11471	100.0

N.B. Comparative information for Bangladesh is not available.

Reported Diarrhoeal Episodes

The denominator for usage of LGS is number of diarrhoeal episodes reported over the previous 2 weeks. Four separate questions were asked to elucidate the incidence of the four diarrhoea types of 'Dud haga', 'Ajirno', 'Amasha' and 'Diarrhoea' (please see questionnaires in Appendix 9). Episodes reported for each of these were pooled together to give an estimate of total diarrhoea episodes over the 2-week period. A total of 4,547 episodes of diarrhoea were reported. Between 0.4 and 0.9 diarrhoea episodes were reported per household over the 2-week reference period. When converted into annual incidence, it meant an estimated incidence of 1.8 to 3.8 episodes per person per year.

Table 8.5: Reported diarrhoeal episodes in previous two weeks and estimated incidences by study areas

Information	First Phase	Non-CRP	CRP	Total
Diarrhoea reported	1027	1550	1970	4547
Households visited	2329	2289	2292	6910
Ep./HH/2 weeks	0.44	0.68	0.86	0.66
Ep./person/2 weeks	0.07	0.11	0.14	0.11
Estimated annual incidence per person	1.81	2.89	3.76	2.79

Ep.-Episodes, HH-Household

As seen in Table 8.5, there appears to be a large difference between the study areas on the number of episodes reported and on the estimated incidences. We will now make some further analyses to examine the reasons for this discrepancy.

First the performance of each team of interviewers will be examined. Although the interviewing teams were not assigned to one study, the work that the each team actually carried out was not well spread over the three study areas. Due to transport and supervision difficulties, and therefore mainly for logistical reasons, the teams were not equally assigned to all three study areas.

Table 8.6: Number of households interviewed, diarrhoea episodes reported and episodes per household by survey teams

Survey Team	First phase HH	First phase Epis	First phase Ep/HH	Non-CRP HH	Non-CRP Epis	Non-CRP Ep/HH	CRP HH	CRP Epis	CRP Ep/HH	Total HH	Total Epis	Total Ep/HH
1	-	-	-	622	804	1.2	1023	1394	1.3	1644	2199	1.3
2	1552	474	0.3	248	110	0.4	-	-	-	1800	584	0.3
3	-	-	-	876	295	0.3	716	245	0.3	1592	540	0.3
4	777	551	0.7	543	341	0.6	554	331	0.6	1874	1224	0.6

Ep-Episodes, HH-Household

Table 8.6 shows very similar figures for episodes per household found by each team in all three study populations but it also shows large differences between the interviewing teams themselves. These differences are due largely to Team 1, which reported 4-times higher than Teams 2 or 3. The question is: Is the difference a real one or has it been caused by a bias in the team's methods? The five upazilas covered by Team 1 were all in a single ecological and geographical zone, close to the Bay of Bengal (see map in Figure 1). Table 8.7 shows the episodes reported by Team 1 in their different upazilas which are arranged according to the chronological order of data collection.

Table 8.7: Upazilas covered by Team 1 in chronological order with number of households covered and diarrhoeal episodes recorded by study areas

Upazila	Study	Househods Covered	Episodes Found	Ep/HH
Galachipa	Non-CRP	277	325	1.2
Mirzaganj	CRP	295	321	1.1
Kotwali	CRP	330	319	0.9
Lalmohan	CRP	397	755	1.9
Char Fass-ion	Non-CRP	345	479	1.4

Ep- Episodes, HH- Household

There is a sharp difference between the performance in different upazilas with the number of episodes reported per household in Lalmohan upazila being double that of Kotwali. Lalmohan is very close to the Bay of Bengal and two big rivers flow down on either side of it. Of the upazilas covered by Team 1, Kotwali is farthest from the Bay but most of the upazilas covered by other teams were even further. There appears to be no clear upward or downward trend over time in the reporting of diarrhoea. Examination of the performance of each interviewer in each team can be seen in Table A.5, which shows that inter-interviewer differences were not large within each team. When the differences between teams on the reporting of some other population characteristics were examined (see Tables A.6 and A.7), no similar differences were found. Given this evidence, a real difference in the incidence of diarrhoea between the areas covered by Team 1 and other teams seems a strong possibility. A recent study has found increased survival of vibrio cholerae in saline water (Miller, Draser and Feachem, 1984), but another area close to the sea in Khulna district and covered by Team 2 did not show such a high incidence.

Diarrhoeal Episodes by Age and Sex: Table 8.8 shows the reported diarrhoeal episodes by the age and sex of patients. Approximately 30 percent of diarrhoeal episodes occurred in children under 5 years old. This figure seems to hold in all three study areas. Males had more diarrhoea episodes except in the 15-44 age group when females had a consistently higher proportion. Women in this age group have young children who could, therefore, be more exposed to diarrhoea infections. This may have also been caused by a reporting bias as most of the respondents and interviewers were females of this age group.

Table 8.8: Reported diarrhoeal episodes by age and sex of patients

Age	First phase			Non-CRP			CRP		
(years)	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-4	156	149	305	274	239	513	300	279	579
%	31.1	28.5	29.8	35.5	31.3	33.5	32.5	27.5	30.0
5-14	110	120	230	207	197	404	265	262	527
%	21.9	23.0	22.5	26.8	25.8	26.3	28.7	25.8	27.2
15-44	148	199	347	175	249	424	219	337	556
%	29.5	38.1	33.9	22.7	32.7	27.6	23.7	33.1	28.7
45+	87	54	141	115	77	192	139	138	277
%	17.5	10.4	13.8	15.0	10.2	12.6	15.1	13.6	14.1
All	501	522	1023	771	762	1533	923	1016	1939
%	100	100	100	100	100	100	100	100	100

Incidence of Diarrhoaea by Age: Annual diarrhoeal incidence rates have also been estimated by extrapolating from the 2-week rates and Table 8.9 shows these for major age groups. Incidence rate amongst children under 5 years of age was highest and varied from 3.3 in First Phase areas to 7.2 in CRP areas. The average rate for all groups varied from 1.8 to 3.7. Readers should, however, be cautious in interpreting these rates as they are based on a 2-week recall during the months of October to December 1984 and a peak diarrhoea season follows immediately after this period in Bangladesh. However, the incidence at the time of the survey probably represents an average situation between the low and peak incidence of diarrhoea by months.

Table 8.9: Estimated 2-week and anuual incidence rates of diarrhoea episodes per person, by age groups

Age group (years)	Estimated Incidence					
	First Phase		Non-CRP		CRP	
	2-week	Annual	2-week	Annual	2-week	Annual
0- 4	0.13	3.28	0.23	5.92	0.28	7.18
5-14	0.05	1.39	0.10	2.63	0.14	3.55
15-44	0.06	1.50	0.07	1.95	0.10	2.60
45+	0.07	1.79	0.09	2.45	0.13	3.40
Total	0.07	1.8	0.11	2.9	0.14	3.7

Episodes by Type of Diarrhoea: As reported at the outset of this chapter, questions on diarrhoeal diseases were asked according to the four types as found in the village case study (Chapter 6), and Table 8.10 shows total episodes of diarrhoea by study areas. There is good agreement between the different study areas with respect to their relative proportions. Approximately one half of all diarrhoeas were of the 'Ajirno' type, whereas

Severe diarrhoeas were about 5 percent. About one-third were of 'Amasha' type which has a close symptomatic similarity to dysenteric diarrhoeas. Such a high proportion of this type is worth noting as half of all diarrhoea deaths in children between 1-4 years are due to dysenteric diarrhoeas in rural Bangladesh (Chen, Rahman, et al., 1980). Proportions in 'Dud haga', although appears to be small, should not be underestimated as this type of diarrhoea occurs only in breast-feeding children.
As this survey was the first of its kind utilising this classification of diarrhoea, there are no directly comparable data available. However, the fact that the classification appears to give such consistent results between different areas suggests that it is a valid one for future research studies.

Table 8.10: Reported Diarrhoeal episodes by type and study areas

Diarrhoea	First phase		Non-CRP		CRP	
Type	No.	%	No.	%	No.	%
Dudhaga	118	11.5	191	12.5	250	12.9
Ajirno	516	50.4	804	52.4	930	47.9
Amasha	338	33.0	461	30.1	679	35.0
Diarrhoea	51	5.0	78	5.0	81	4.2
All	1023	100.0	1534	100.0	1940	100.0

Incidence Rates of Diarrhoea by Type and Age: The episodes of each type of diarrhoea have also been analysed by broad age groups and estimated annual incidence rates calculated for each cell. Table A.8 presents the full results. Table 8.11 shows the incidence of each type of diarrhoea by age group. The highest incidence occurred in 'Ajirno' type which varied from 0.9 in the

Table 8.11: Estimated annual incidence of diarrhoea per person by type of diarrhoea, age groups and study areas

Age group (years)	First Phase	Non-CRP	CRP
(a) Diarrhoea type: 'Dud Haga'			
0- 4	1.27	2.20	3.10
5-14	0	0	0
15-44	0	0	0
45+	0	0	0
Total 'Dud Haga'	0.21	0.35	0.48
(b) Diarrhoea type: 'Ajirno'			
0- 4	1.20	2.17	1.96
5-14	0.94	1.77	2.30
15-44	0.77	1.11	1.35
45+	0.90	1.29	1.73
Total 'Ajirno'	0.91	1.50	1.77
(c) Diarrhoea type: 'Amasha'			
0- 4	0.68	1.37	1.90
5-14	0.37	0.68	1.08
15-44	0.64	0.74	1.11
45+	0.82	0.99	1.57
Total 'Amasha'	0.59	0.86	1.29
(d) Diarrhoea type: 'Diarrhoea'			
0- 4	0.13	0.17	0.22
5-14	0.08	0.18	0.17
15-44	0.09	0.10	0.13
45+	0.06	0.16	0.10
Total 'Diarrhoea'	0.09	0.14	0.15

First Phase areas to 1.8 in the CRP areas and the lowest occurred in 'Diarrhoea' type which varied from 0.09 to 0.15. In almost all types and study areas children under 5 years of age had the highest incidence. The top portion of this table gives the distribution of 'Dud haga' episodes by age groups. As expected, all episodes occurred in children under 5 years of age. It may be worth remembering here that 'Dud haga' is a diarrhoea which occurs amongst breast-fed children (Chapter 6).

Repeatability of Interview Data

The information collected on usage was subsequently subjected to repeatabilty tests. Because of logistical and time constraints this was done only on a subsample basis (see Chapter 7). Households were reinterviewed by another interviewer on questions on usage and the supervisor then matched the two questionnaires on the following items of information:

- diarrhoea episode
- identification of patient
- type of treatment

If all these items agreed, the repeatability was complete. In case of a disagreement (on any one, two or all three items), the supervisor conducted a third interview by himself and all three questionnaires were returned to the BRAC Dhaka office, where the editors made a thorough check on these items and assigned each episode one of the 'repeatability status' codes (see Appendix 13).

The results for repeatability status are given in Table 8.12. A second interview was done in 78.6% of episodes in First Phase, 47.8% in non-CRP and 54.6% in CRP areas. In most cases where the interviews did not agree, a third interview was done by the supervisor. Out of these, 91% in First Phase and non-CRP and 84% in CRP agreed with each other or with that of supervisor's when matched for selected items. In CRP, a large number of 'disagreed' interviews could not be reinterviewed by the supervisor because of transportation problem in the coastal areas. The numbers in categories 2 and 4 are comparatively small and probably have less reliability than others. A separate analysis was made to see if interviews from categories 1 and 3 were similar or different in any characteristics such as: age, sex, literacy and religion (Tables A.9, A.10, A.11 and A.12). Interviews from households with repeated interviews turned out to be similar to those from with only one interview as no appreciable differences were observed between the matched and single interview episode groups with respect to these characteristics and in the analyses of usage in the next chapter, both groups of interviews have been included.

Table 8.12: Diarrhoeal episodes according to repeatability and interview status

Repeatability and Interview	First phase		Non CRP		CRP	
Status	No.	%	No.	%	No.	%
1. Two interviews matched (codes 2,4,5,7,10)	741	72.1	626	40.5	796	40.5
2. Two interviews disagree but no third interview conducted (code 3)	68	6.6	113	7.3	278	14.1
3. Interviewed only once by interviewer (codes 1,12)	210	20.4	787	50.9	849	43.2
4. Interviewed by supervisor only or supervisor found previous interviews different (codes 6,8,9,11)	8	0.9	19	1.3	43	2.2
Total episodes	1027	100.0	1545	100.0	1966	100.0

DISCUSSION

This chapter has mainly considered the background information from the community survey. Out of a total of 7,500 households, 6,910 or 92 percent were successfully interviewed. The non-response in all study areas was around 8% and is a little higher than the 5% found by the Bangladesh Fertility Survey (Government of Bangladesh, 1978). The average household size of 6.1 persons is comparable to the finding by the same survey. The respondents were mainly the wives of heads of households and are most likely to know most about household matters, including their children's sickness.

The age distribution of the population surveyed was close to that of the national age structure with people under 15 years of age being 45% in the present survey. The sex ratio of 101.5 males to 100 females is, however, smaller than the national ratio of 105 (Government of Bangladesh, 1978) and that of Matlab's 104 (Ruzicka and Chowdhury, 1978) and the reason is unknown. About three quarters of people aged 5 years or more did not know how to read or write a letter.

The question of repeatability was examined. It was found that a second interview was done in 50-80% of episodes. Out of those, 91% in First Phase and non-CRP and 84% in CRP agreed with each other or with that of supervisor's when matched for selected items.

The reliability of the data with respect to the reporting of diarrhoeal episodes was examined and differences with respect to different study areas and survey teams were encountered. It was, however, concluded that differences were due to both differing incidence rates and in the detection of these by the teams.

Approximately 30 percent of all episodes occurred in children under 5 years of age and this can be compared with results from two other studies. Chen (1978), in his longitudinal study of

Matlab in Bangladesh, found 39 percent of the episodes occurring in children under 5 and Chowdhury (1983), in a retrospective study conducted in the First phase areas of BRAC in August-September 1982, found 37 percent episodes under age 5 years. Assuming that the reporting of episodes over a two-week recall in the months of October to December, 1984, was representative for the whole year, annual incidence rates have been calculated which varied from 1.8 episodes per person in First Phase areas to 3.8 in CRP areas. The distribution by age was highly skewed, with the annual incidence in children under 5 years of age varying between 3.3 in the First phase to 7.2 in CRP. An annual incidence of 4 was found in Matlab, Bangladesh, for children in this age group (Chen, Huq and D'Souza, 1981).

In general, males appeared to experience more diarrhoeas except in 15-44 age group where females had consistently higher rates across all study areas. Most of these females are mothers and it has long been postulated that they have higher attack rates of diarrhoea because of higher risk due to constant personal contact with children (breastfeeding, feeding, child care, cleaning) (Chen, et al., 1981; Merson, Black and Khan, 1978). Chen et al. (1981) also found a 10% higher attack rate in male children under 5 years of age.

This study is the first to use the 'four diarrhoea' concept (Chapter 6). Although no comparative quantitative data is available, there is good evidence from the qualitative village study to suggest that the concept is a valid one. Most of the other available data gives incidence data according to the aetiological agent. 'Dud haga' is said to occur in breast-feeding children and in this study all 'Dud haga' episodes were reported in children under 5 years old (Table A.8). Rotavirus diarrhoeas occur mostly in children. Black et al. (1982a) in their longitudinal study in rural Bangladesh found that approximately 14 percent of diarrhoeas were rotavirus cases. Our study found a 12 percent share of 'Dud haga'. Although 'Dud haga' may include diarrhoea of other aetiologies such as E. Coli, it should be remembered that the data for the present study were collected in a retrospective survey in the months of October-December. As the rotavirus diarrhoeas occur mostly in the cool months of December and January (Black, et al., 1982a) and E. Coli diarrhoeas occur mainly in the hot months (Black et al., 1982b), 'Dud haga' in our study may have included many rotavirus cases. Nothing can probably be said about 'Ajirno' as this may include all the different types of known and unknown aetiological agents. They are probably in the range of 'mild to moderate'. They were the most frequently occuring type (50%). A third of all diarrhoeas were in the 'Amasha'group. It is in many symptoms similar to dysenteric diarrhoea. Bangladesh and parts of West Bengal in India experienced a dysentery epidemic in 1984 at about the same time as this survey (Rahaman, 1984) and such a high incidence of 'Amasha' may be due to that. However, such a high incidence of 'Amasha' should be considered seriously as half of all diarrhoea deaths in 1-4 age group in Bangladesh is due to dysenteric diarrhoea (Chen, Rahman, et al., 1980). The fourth type is 'Diarrhoea' which includes severe diarrhoea. About 5 percent of episodes were found to be in this category. Studies conducted in Matlab, Bangladesh, found that approximately 1 percent of diarrhoea patients brought to hospital were suffering from this type (Chen, 1978). Cases brought to hospital in a Bangladeshi rural area represent only a fraction of cases occurring. The 5 percent of episodes found to be in the 'Diarrhoea' group may be a rough estimate of the proportion of episodes needing rehydration. In our study there were a few cases in which intravenous solutions were used as a method of treatment. These solutions are normally used only in severe cases and two-thirds of these solutions in our study were found to have been given to the 'Diarrhoea' cases (not presented in the text).

CONCLUSION

From the results presented in this chapter, the following conclusions can be drawn.

1. The response rates for the selected households in the survey were over 90% and the surveyed population appeared to be representative of Bangladesh.

2. Diarrhoeal incidence was assessed by asking a 2-week recall question about the occurrence of each of the four main types of diarrhoea in the household. When these episodes were pooled and the annual incidence calculated, high rates were found varying from 1.8 to 3.8 episodes per person per year, which are higher than all previously recorded rates for Bangladesh. If these rates are representative of the true annual incidence they indicate a high level of morbidity from diarrhoeal diseases.

3. Approximately one third of all diarrhoeal episodes occurred in children under 5 years of age and the estimated annual incidence in this young age group was double the average for each study area.

4. In general, males appeared to experience more diarrhoea except in 15-44 age group where females had higher rates. Women in this age group have more contacts with children who could, therefore, be more exposed to diarrhoea infection.

5. Of the diarrhoea types, 'Ajirno' accounted for nearly a half of all episodes and 'Amasha' about a third. The proportion for 'Diarrhoea' was about 5%. All reported cases of 'Dud haga' occurred in children under 5 years of age.

6. The consistent results found in the different study areas using the new classification for diarrhoeas suggests that such a classification by type is a valid one for use in future research and evaluation studies.

CHAPTER 9: USAGE OF LOBON-GUR SOLUTION

INTRODUCTION

A major objective of the present study was to determine the usage of the lobon-gur solution (LGS) at different intervals of time after households had been taught the importance and use of LGS by BRAC. Usage was defined as proportion of episodes of diarrhoea in which LGS was used during the 2 weeks prior to the survey. Results on the usage pattern are presented in this chapter.

RESULTS

Treatment and No Treatment of Diarrhoea Episodes

Our experience with similar surveys on previous occasions showed that nearly a half of diarrhoeal patients are not given any treatment whatsoever (Chowdhury, 1983; BRAC, 1985). Similar results were also found in the present survey. Approximately 47 per cent in the First phase, 38 in the non-CRP and 42 per cent in the CRP areas were given no treatment at all. The results are presented in the following table.

Table 9.1: Diarrhoeal episodes by treatment or no treatment and study areas

Treatment	First phase		Non CRP		CRP	
given	No.	%	No.	%	No.	%
No treatment	443	46.8	534	38.3	678	41.8
Some treatment	503	53.2	860	61.7	945	58.2
Total	946	100	1394	100	1623	100

Usage Amongst All Episodes of Diarrhoea

Table 9.2 shows the total usage of ORT for all episodes including users and non-users of any treatment method. It shows a low usage of LGS of 4 percent in the First phase and twice this in the non-CRP and CRP. When usage rates were computed for each type of diarrhoea, a somewhat different picture emerged (Table 9.3). Usage was high in the 'Diarrhoea' (severe diarrhoea) type compared to other types.

Table 9.2: Usage of Lobon-gur solution amongst all diarrhoeal episodes by study areas

	First phase	Non CRP	CRP
Total episodes	946	1394	1623
Episodes treated with LGS	39	114	161
% using LGS	4.1	8.2	9.9

Table 9.3: Usage (%) of LGS according to diarrhoea types by study areas

Diarrhoea Type	First phase Total Episodes	First phase % Using LGS	Non-CRP Total Episodes	Non-CRP % Using LGS	CRP Total Episodes	CRP % Using LGS
'Dud haga'	101	2.0	164	12.2	203	12.3
'Ajirno'	477	4.0	735	7.9	778	9.8
'Amasha'	317	1.6	418	2.9	572	4.0
'Diarrhoea'	51	25.6	76	31.6	69	52.2

Usage amongst all diarrhoea episodes was analysed by age and sex of patients which showed that males had a slightly higher usage rates in the First phase and CRP areas. Usage amongst children under 5 years of age was higher than their respective averages in the non-CRP and CRP areas (Table A.15). These differentials will be further considered in the next section.

Usage Amongst Episodes Treated with At Least One Method

Although the BRAC programme hopes that a high proportion of diarrhoea patients will use lobon-gur solution (LGS), it is ambitious to expect all mild diarrhoeas also to use LGS. If it is assumed that people resort to a treatment method only when they consider it necessary, we could examine usage for those diarrhoea episodes which resorted to some treatment. In other words, the denominator could include only those episodes which were given 'any treatment'. In the next part of the analysis that follows, those in the 'no treatment' group have been excluded. Thus the number of episodes for further analysis then become: 503, 860 and 945 in First phase, Non-CRP, and CRP respectively (Table 9.1).

Tables 9.4 and 9.5 show the usage of lobon-gur solution according to two different denominators. Table 9.4 shows the usage rates when the 'no treatment' episodes are excluded from the analysis. Here the usage almost doubles to 7.7, 13.2 and 17.0 percents respectively for First phase, non-CRP and CRP.

Table 9.4: Usage of LGS amongst episodes using atleast one treatment method by study areas

	First phase	Non CRP	CRP
Total episodes	503	860	945
Episodes treated with LGS	39	114	161
% using LGS	7.7	13.2	17.0

Table 9.5 shows the usage of lobon-gur solution in the three studies compared to other methods of treatment. Since multiple treatment methods were used for some episodes, total treatments exceeds the number of episodes. It shows that the proportion of LGS used was 6.6, 10.1 and 13 percents in the First phase, non-CRP and CRP respectively. Although low, LGS was in third position. The commonest method was the allopathic or modern Western system of medicine, which was used in 58.5, 42.9 and 43.7 percent of treatments respectively. The second most popular method for treating diarrhoeas was 'Boneji', a local household method which uses different herbs for different types of diarrhoea. This method is mostly practiced by the older women in the households, who may charge a small fee (see Chapter 6). LGS was used between 4 and 13 times (First phase and CRP respectively) more frequently than ORS packets and fifteen patients had been given intravenous solutions.

Table 9.5: Comparison of different treatment methods used for diarrhoeal episodes

Treatment methods	First phase		Non CRP		CRP	
	No.	%	No.	%	No.	%
Allopathy	343	58.5	483	42.9	542	43.7
Boneji (herbal)	81	13.9	314	27.9	317	25.6
Lobon-gur solution	39	6.6	114	10.1	161	13.0
Homoeopathy	39	6.6	63	5.6	57	4.6
Kabiraji	29	4.9	50	4.4	68	5.6
Packet ORS	10	1.7	19	1.7	13	1.0
Intravenous solution	5	0.8	2	0.2	8	0.6
Others	41	7.0	80	7.2	73	5.9
Total treatments	587	100.0	1125	100.0	1239	100.0
Total episodes	503		860		945	
Treatment per episode	1.2		1.3		1.3	

Comparisons with Other BRAC Surveys

These results can be compared with those found in the multi-round surveys conducted by the Research and Evaluation Division of BRAC as part of the mortality impact study and done in four pairs of upazilas of the First Phase programme. In each pair there was a programme upazila and a comparison upazila. Of the five rounds of surveys, the first was the baseline and the remaining four were the follow-up surveys. In the programme upazila, the programme was introduced after the baseline while in the other , the programme was introduced after the second follow-up. Details of the methodology are given by Chowdhury and D'Souza (1982). Results on the usage pattern are now available for one pair of upazilas (BRAC, 1985) shown in Table 9.6. These LGS usage rates are based on episodes which were given any treatment method.

Table 9.6: Usage of lobon-gur solution amongst episodes using at least one treatment method in two upazilas of the First phase in different follow-up surveys

Survey Sequence	Goshairhat*		Jajira**	
	Approx. time after teaching	usage(%)	Approx. time after teaching	Usage(%)
Baseline	-	N.A	-	N.A.
Followup 1	4-6 months	14.3	-	0
2	10-12 months	30.7	-	0
3	16-18 months	21.5	4-6 months	40.9
4	22-24 months	14.4	10-12 months	33.6

*Programme started after Baseline survey

**Programme started after Second Followup survey

Source: computed from (BRAC, 1985).

Results for the follow-up number 4 in Goshairhat are comparable to those of the present survey (Table 9.4) as they are both carried out approximately two years after household teaching. This 14 percent compares to the present study's 8 percent who were using the method. The author has been involved in the mortality impact study and remembers that these two upazilas (viz., Goshairhat and Jajira) were on the better side with respect to usage. Unfortunately, results from other upazilas are not yet available. If Goshairhat is really on the upper side of the usage results found in different upazilas of the mortality study, the usage found in the present study seems to be plausable. However, why Jajira had higher (40.9%) usage rate than Goshairhat (14.3%) was not mentioned in the BRAC preliminary report (BRAC, 1985).

Usage of LGS for Different Diarrhoea Types

As stated in Chapter 7, questions on diarrhoea were asked according to the four types which had previously been found to be commonly and easily understood by villagers. We now examine LGS usage according to these types for episodes which were given some form of treatment.

Table 9.7: Usage of lobon-gur solution according to different type of diarrhoea and study areas

Diarrhoea Type	First phase		Non CRP		CRP	
	Total Episodes	% Using LGS	Total Episodes	% Using LGS	Total Episodes	%Using LGS
Dud Haga	50	4.0	115	17.4	115	21.7
Ajirno	210	9.0	351	16.5	357	21.3
Amasha	193	2.6	321	3.7	406	5.7
Diarrhoea	50	26.0	73	32.9	67	55.2

Table 9.7 shows an interesting aspect with respect to our knowledge and understanding of usage. Similar to that seen in Table 9.3 for all episodes of diarrhoea, there is a big difference in usage rates of LGS between different types of diarrhoea, the most striking being for the 'Diarrhoea' type. Lobon-gur solution seems to be much more popular for severe diarrhoeas, being used in about 1/4, 1/3 and 1/2 of episodes in First Phase, Non CRP and CRP areas respectively.

Table 9.8 is a modified version of the earlier table and shows how in each study the LGS users are distributed between diarrhoea types. In the first phase, of all lobon-gur users one-third came from the 'Diarrhoea' type and nearly a half from the 'Ajirno' type and very few from 'Dud haga'. In both non-CRP and CRP areas the proportion in the 'Dud haga' has increased, suggesting that relatively more users in second phase were being recruited from 'Dud haga' type of diarrhoea.

Table 9.8: Distribution of LGS users by diarrhoea types

Diarrhoea	First phase		Non CRP		CRP	
type	No.	%	No.	%	No.	%
'Dud haga'	2	5.1	20	17.5	25	15.5
'Ajirno'	19	48.7	58	50.9	76	47.2
'Amasha'	5	12.8	12	10.5	23	14.3
'Diarrhoea'	13	33.4	24	21.1	37	23.0
Total	39	100.0	114	100.0	161	100.0

Usage of LGS by Type of Diarrhoea, Age and Sex

Usage rates have been computed for different age and sex groups. Table A.16 gives usage rates amongst users of at least one method of treatment by age, sex and study areas. The highest usage rates were found in the 5-14 years age group (11% against an average rate of 8% in First phase areas, 14% against 13% in non-CRP and 23% against an average of 17% in CRP). The School programme of OTEP (Chapter 4) covers children from this age group and this may partly explain the difference. The lowest usage was found amongst older people aged 45 years and over. Except for the First phase, usage rates amongst children under 5 years of age in non-CRP and CRP areas were slightly higher than their respective average rates. When examined for sex differences in usage rates, it appears that males had a slightly higher rates than females in all study areas except non-CRP.

Results presented in Table A.17, which gives usage rates for LGS for each type of diarrhoea by different age groups, have the limitations of small numbers in some cells. Not much difference is observed here between age groups within each diarrhoea type.

Usage Excluding 'Amasha'

For 'Amasha' the symptom is a mucousy stool with minimal fluid loss in most cases and it is not mistaken for watery diarrhoea in rural Bangladesh. Oral therapy is probably not a treatment of choice for most of these cases. As the total number of diarrhoea episodes contains a high proportion of 'Amasha', it is interesting to look at usage when these 'Amasha' episodes are excluded from both the numerator and denominator.

Table 9.9: Usage of lobon-gur solution with 'Amasha' episodes excluded

	First phase	Non CRP	CRP
No. of diarrhoea episodes excluding 'Amasha'	539	310	539
No. using LGS	34	102	138
% using LGS	11.0	18.9	25.6

The usage of LGS now shows a 50 percent increase when 'Amasha' cases are removed from the analysis (Table 9.9).

Usage by Individual and Household Characteristics

Data on current use has been presented so far. Although the total number of lobon-gur users in each study were small, the relationship between the use of LGS against other methods of treatment and different individual and household characteristics is now examined. The following characteristics were considered: age, sex and duration of illness of the patients, profession of head of household, amount of land owned, ownership of a radio, type of household (i.e., nuclear, joint or extended), presence of any school-going child and availability of gur in the household. Only duration of illness had a statistically significant relationship with the use of LGS in each study area ($p<.05$) when tested by using the chi-square statistic. Lobon-gur solutions were preferred in diarrhoeas of shorter duration. Diarrhoea which lasted longer were probably of 'Amasha' type which were previously found to have least users of LGS.

Ever Used

The concept of ever used has been more widely applied in family planning studies. In family planning current users means those who were using a family planning method at the time of survey. Ever users includes those who used a method previously plus those who are using one currently. Because of the short time period over which a person would use LGS, use of this concept for lobon-gur solution (or for any ORT method for that matter) is a bit different. Current users would include those who were using the method at the time of survey plus those who reported to have used it in a recent past (2 weeks in our case). The concept of ever user is similar to that in family planning but one may argue about its robustness. The denominator may include cases who were not really exposed since diarrhoea may not have occurred in all households. In Bangladesh, however, diarrhoeas are endemic and the chances that someone in household did not experience an episode during the last 1-2 years is very small.

When the number of current users is too small for analysis, data on ever users may provide another way of analysing the data by different characteristics. In our study, information on ever users was collected and each household was asked, "Has anyone in this household ever used the lobon-gur solution?" Results on ever use and on the characteristics of those who ever used and those never used are discussed below.

Extent of Ever Use: Table 9.10 shows the proportion of households where an ever user of the lobon-gur solution was reported during the period between teaching and the survey. It appears that approximately a half of households reported that they had used the solution at least once before. In the First Phase areas, which were taught the method two years before, the proportion of ever use was 41.8 percent. In the second phase areas which were taught one year later, a higher proportion reported the ever use, being 50.5 percent in non-CRP and 52.8 percent in CRP areas.

Table 9.10: Households by ever use of lobon-gur solution

Information	First phase		Non CRP		CRP	
	No.	%	No.	%	No.	%
Ever used	969	41.8	1151	50.5	1207	52.8
Never used	1350	58.2	1131	49.5	1078	47.2
All households	2319	100.0	2282	100.0	2285	100.0

Differentials in Ever Use: The information on ever use was cross-classified with several household characteristics and in some cases a strong association seemed to exist when tested by using the chi-square statistic. These results are taken up below and unless otherwise stated, p values given are individually true for all three study areas (viz., First Phase, non-CRP and CRP).

Ever use and Type of Household: Table 9.11 shows that there were more ever users in 'joint family' type of households and less users in 'other' type, but since 'other' included single-person families perhaps this finding is readily explained. The relationship between ever use and type of household was statistically significant ($p<.001$).

Table 9.11: Ever use and household type

Household type	First phase		Non CRP		CRP	
	%Ever used	n	%Ever used	n	%Ever used	n
Nuclear	39.7	1273	47.5	1362	50.8	1337
Extended	41.0	359	54.7	311	58.0	367
Joint	47.9	637	57.1	557	59.2	514
Others	24.0	50	50.4	52	52.8	67
All households	41.8	2319	50.5	2282	52.8	2285

Ever Use and Land Ownership: Households with larger land holdings tended to be more in the 'ever user' group and the relationship between ever use and amount of land owned was statistically significant ($p<.05$). Results are presented in Table 9.12.

Table 9.12: Ever use and land holding groups

Land owned (decimals)	First phase %Ever Used	n	Non CRP %Ever Used	n	CRP %Ever Used	n
<50	37.7	1193	47.2	1239	49.9	1299
50-249	44.0	571	53.2	662	53.6	664
250+	48.3	555	55.6	376	63.7	309
All households	41.8	2319	50.3	2277	52.9	2272

Note: 100 decimals=1 acre

Ever Use and Possession of a Radio: Table 9.13 shows how possession of a radio was associated with ever use (statistically significant with p<.05) but when controlling for land holding, this relationship existed only in the lower land ownership groups. This suggests that radio ownership, like land ownership, is linked to socio-economic status.

Table 9.13: Ever Use and Household Possession of a Radio

Possess a radio?	First phase %Ever Used	n	Non CRP %Ever Used	n	CRP %Ever Used	n
Yes	47.9	420	57.6	262	62.6	273
No	40.5	1899	49.5	2020	51.5	2012
All households	41.8	2319	50.5	2282	52.8	2285

Ever Use and Whether Taught by ORWs: Information collected shows that more than 90% of households were taught by a BRAC ORW. Households taught by ORWs seemed to do well in respect of 'ever use'. Results are presented in Table 9.14.

Table 9.14: Ever use and whether taught by an ORW

Taught by ORW?	First phase		Non CRP		CRP	
	%Ever used	n	%Ever used	n	%Ever used	n
Yes	44.5	2131	53.5	2087	55.3	2131
No	11.4	185	17.0	194	18.9	154
All households	41.8	2316	50.5	2281	52.8	2285

Ever Use and a Child at School: BRAC has an LGS promotional programme through the local primary and high schools. In order to know whether this programme was having an impact on usage, a question was asked on whether any child from the household attends school. Results presented below indicate that the school programme may have had some effect, since households with school-going children had more ever users and the relationship was statistically significant ($p<.001$).

Table 9.15: Ever use and a child at school

Any school going child?	First phase %Ever used	n	Non CRP %ever used	n	CRP %Ever used	n
Yes	49.1	993	58.9	915	60.3	983
No	36.4	1326	44.8	1366	47.2	1301
All households	41.8	2319	50.5	2281	52.8	2284

Ever Use and Availability of Gur at Home: As stated in a previous chapter, collection of information on the availability of gur in the household was started when the survey was already half way through. Results in Table 9.16 show that gur was a scarce material in rural households at the time of the survey (October-December). The situation may become better when gur is more available during the gur season which would have started after the data collection was over. Availability of gur in households was related to ever use and the relationship was statistically significant, both in First Phase and CRP areas ($p<.001$). In the non-CRP areas, however, where the proportion of households reporting possession of gur was higher (14 per cent against 9 per cent in First phase and 10 per cent in CRP), the difference was not statistically significant.

Table 9.16: Ever use and availability of gur at household

Gur available at household?	First phase %Ever used	n	Non CRP %Ever used	n	CRP %Ever used	n
Yes	53.6	116	55.5	126	71.7	106
No	35.3	1111	48.0	769	53.8	936
All households	37.0	1227	49.1	895	55.7	1042

Effective Use

For those who had tried the lobon-gur solution during the past 2 weeks, a question still remained to be answered: How effective was that use? It is important to know whether: (a) the solution taken was 'safe and effective'; (b) the quantity taken was enough for the fluid loss and; (c) whether the therapy was started from the first watery stool. The answers to these questions are not straight forward.

(a) Safety and effectiveness of solution used: Because of the short length of stay of an interviewing team in one area, it is almost impossible to collect enough samples of lobon-gur solutions actually prepared for use in an actual diarrhoea episode. Thus in this study, proxy solutions were used to conclude whether the solution actually used was 'safe and effective' (with a sodium concentration of 30-99 mmol/L). During the survey, households reporting the use of LGS during the previous two weeks were later revisited and the person preparing the solution during the episode was asked to prepare it again for the interviewer. A sample of this solution was saved and later analysed for sodium. For transportation and logistical reason, only a small number of samples were actually collected. Results are presented in Table A.18. Although the number of samples is small, the proportion in the 'safe and effective' range agree quite closely to what is found in Chapter 10. Seventy eight percent in First Phase, 63% in non-CRP and 50% in CRP were in this range.

(b) Quantity of solution used: As stated in Chapter 5, information on whether the quantity of LGS used was enough for the fluid lost is very difficult to assess through interview surveys. In our survey, we asked of every current user, 'how many times was LGS prepared during the episode?' Results are presented in Table A.19 according to the type of diarrhoea. It appears that in most cases, LGS was prepared 2-3 times, including those for the severe cases ('Diarrhoea'). As the amount of fluid actually lost is not known, it is not possible to conclude whether the solution taken was enough for the fluid lost.

(c) Start of the therapy: Information on the timing of the therapy was collected by asking the question, 'after how many watery stools was LGS started?' Results are presented in Table A.20 according to the type of diarrhoea. It shows that a majority of the patients (57%) started the therapy after 2-3 watery stools in the non-CRP and CRP areas and 42% in First phase area. Only about a quarter started after the first watery stool. There was no apparent difference between the types of diarrhoea with respect to the above.

Opinion about Effectiveness of LGS

Of the households reporting a current use of LGS a question was asked, 'was lobon-gur solution effective in treating the diarrhoea?'. Eighty five percent of them in all study areas replied in the affirmative. However, this response should be interpreted with care because of the leading nature of the question. Results are presented in Table 9.17.

Table 9.17: Opinion of respondents as to whether LGS was effective in treating their diarrhoeas by type of diarrhoea and study areas

Diarrhoea type	Opinion of respondents about LGS					
	First Phase		Non-CRP		CRP	
	Eff.	N.E.	Eff.	N.E.	Eff.	N.E.
Dud haga	2	0	13	6	22	3
Ajirno	16	3	48	7	70	7
Amasha	4	1	9	1	16	7
Diarrhoea	11	2	20	3	32	4
Total	33	6	90	17	140	21
%	85	15	84	16	87	13

Note: Eff.-Effective; N.E.-Not effective.

DISCUSSION

In this chapter, efforts were made to look at usage from different points of view. With respect to treatment, about 50 to 60 percent of all episodes were found to have received only some treatment. This is similar to as has been found in previous surveys (Chowdhury, 1983; BRAC, 1985). This result is, however, not surprising in a society where 35 percent deaths also receive no treatment (Aziz, 1977).

The usage rates presented in this chapter have differed widely depending on definition. Firstly, all diarrhoeal episodes were considered in the denominator in calculating usage rates. Episodes which were given no treatment were then removed and new analyses were carried out. Table 9.18 presents a summary of usage rates arrived at by different definitions.

Table 9.18: Summary of LGS usage rates (% episodes) based on different definitions

Sl. No.	Definition guide	First phase	Non CRP	CRP
1.	Usage rate for all episodes			
	a. Overall	4.1	8.2	9.9
	b. Amongst children less than 5 years of age	3.3	13.0	11.8
	c. Amongst males	5.2	7.9	10.9
	d. Amongst females	3.1	8.5	8.9
	e. Amongst 'Dud haga'	2.0	12.2	12.3
	f. Amongst 'Ajirno'	4.0	7.9	9.8
	g. Amongst 'Amasha'	1.6	2.9	4.0
	h. Amongst 'Diarrhoea'	25.6	31.6	52.2
2.	Usage for those receiving some treatment			
	a. Overall	7.7	13.2	17.0
	b. Amongst children less than 5 years of age	6.8	15.9	18.7
	c. Amongst males	8.9	12.2	17.6
	d. Amongst females	6.4	14.5	16.2
	e. Amongst 'Dudhaga'	4.1	17.4	21.7
	f. Amongst 'Ajirno'	9.0	16.5	21.3
	g. Amongst 'Amasha'	2.6	3.7	5.7
	h. Amongst 'Diarrhoea'	26.0	32.9	55.2
	i. Excluding 'Amasha'	11.0	18.9	25.6
3.	Ever used (% Households)	41.8	50.5	52.8

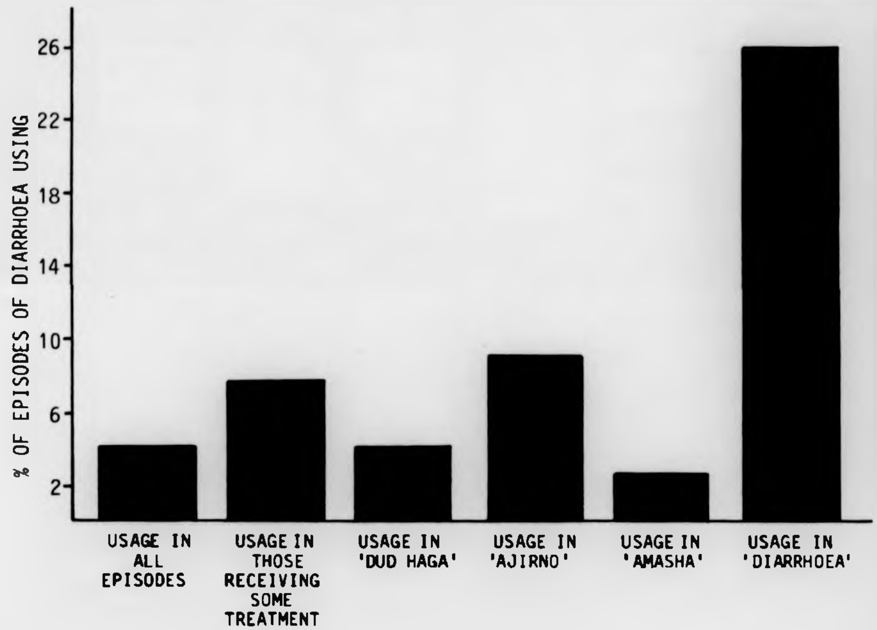


Figure 8

Usage of LGS 24 months after teaching in the first phase areas of the BRAC orogramme according to different definitions.

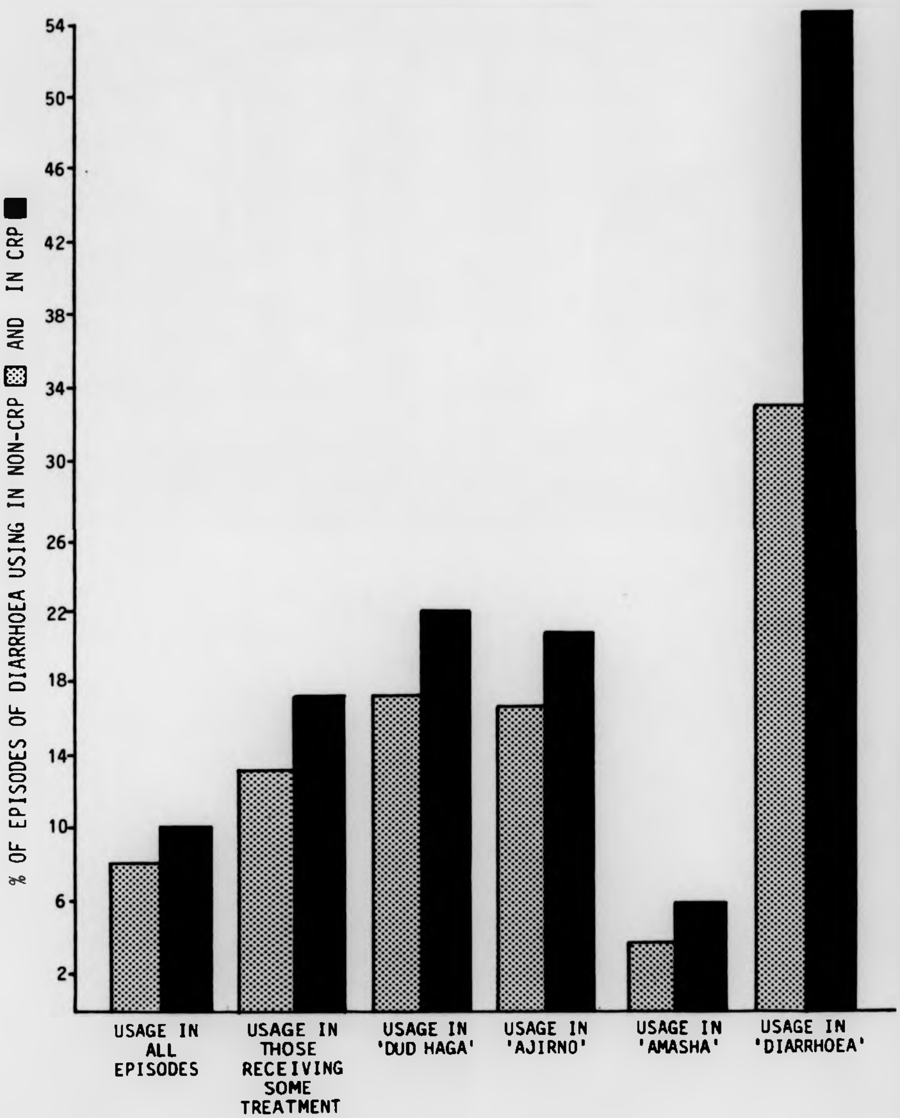


Figure 9

Usage of LGS 12 months after teaching in non-CRP and CRP areas of the BRAC programme according to different definitions.

According to the definition used, it appears that the current usage rate varied from 1.6 percent to 26.0 percent in the first phase areas, from 2.9 to 32.9 percent in the non-CRP areas and from 4.0 to 55.2 percent in the CRP areas. The BRAC definition of usage is given by Row 1a. Previous surveys seem to agree with these results given that there exists a downward drift over time in usage. As discussed in the text, the results of this survey were comparable with those of the mortality study (BRAC, 1985). Another survey conducted by the Research and Evaluation Division of BRAC in 1982 found an usage rate of 16.7 percent (Chowdhury, 1983). That survey was carried out in the First phase areas and was done approximately one month after teaching. There appears to have been a four-fold reduction in usage over the two years following teaching. This is not unexpected since there is no reinforcement of ORT knowledge, except the 30-second long advertisement from Dhaka on Radio Bangladesh and radio listening is, of course, not particularly common for the rural population. In our study, the proportion of households having a radio were: 18% in First phase areas and 12% in non-CRP and CRP areas.

When all episodes of diarrhoea are considered in the denominator, various usage rates emerged as given in Rows 1a to 1h. It varied from a very low of 1.6% in 'Amasha' to a comfortable 55.2% in 'Diarrhoea'. These rates were based irrespective of whether the diarrhoeal episodes are given any treatment or not.

But people go for treatment if they think that their 'watery stool' is a disease and many people in Bangladesh do not consider diarrhoea a disease requiring treatment until it becomes serious. That is why it may be fairer to consider usage amongst those who have already taken a treatment. With this change in the denominator, the new rates emerge as in Rows 2a to 2i. Overall usage rate with this changed denominator varied from 8 percent in First phase to 17 percent in CRP.

Usage amongst children under 5 years of age are given in 2b which were, for non-CRP and CRP areas, a little higher than the average. Rows 2c and 2d give usage rates by sex and except for non-CRP, males had slightly higher rates than females.

Rates were computed separately for the four types of diarrhoea, where considerable variation was found. The lowest usage rates were in 'Amasha', which is the diarrhoea resulting in a mucousy stool (with or without blood). People do not believe that lobon-gur solution can do much to treat such patients and that they probably require antibiotics. The BRAC programme does not specifically instruct mothers whether to give LGS in such cases. It may thus be improper to keep these in the denominator (and in the numerator). Rates excluding 'Amasha' patients are given in 2i and 11% in First phase, 18.9% in non-CRP and 25.6% in CRP were users of LGS.

The overall and treatment only rates for the 'Diarrhoea' type were clearly more encouraging (1h and 2h). These are the severe diarrhoeas. Similarity of these two rates for severe diarrhoeas shows that a very high proportion of these are getting some treatment, including LGS. More than a quarter of 'Diarrhoea' in first phase, a third in non-CRP and more than a half in CRP were using the BRAC LGS method. The reason for this higher usage of LGS may be traced back to the question of definition. The BRAC ORWs during their teaching put an emphasis on the word diarrhoea itself, which the villagers understand as their own term of 'Diarrhoea', meaning severe diarrhoea. Many villagers in the village study told the author that LGS was for severe diarrhoeas and not meant for other types. Because of this communication gap, and because mild to moderate diarrhoeas are not considered a disease, the usage rates in other types were lower. The high usage rate in 'Diarrhoea' type is, however, significant from the point of view of severe dehydration and mortality reduction. The mortality study currently being undertaken by BRAC should be able to throw more light on this.

The last row in the table concerns the ever used concept of LGS. Even with their several limitations, these findings strengthen the conclusion that the Second phase was doing better with respect to usage. Over 50 percent of households in Second phase study areas reported having used the method at least once compared to 40 percent in First phase areas. This result is more interesting as the gap between the survey and the teaching was two years in First phase compared to one year in Second phase. These results are comparable with what has been found elsewhere. In Honduras, 49 percent mothers reported that they used ORS at least once during the past year (Foote, 1983). The information on ever users was analysed for different household characteristics. Those with joint families, higher landholdings, possessing a radio, previously taught by ORWs, a child attending a school and with gur available at home were found to be higher users. However, using a regression analysis these variables could not explain more than 10 percent variations in current and ever use.

Availability of gur at home was investigated. Only a small proportion of households (9 to 14 percents) were found to have gur at the time of the survey. Another survey, which was done during the winter gur season, found up to 50% households having gur (Fakir and Ahmed, 1985).

But do people go out to get gur if it is not available at home? The data suggest that a few people do. In the First phase, 9% households had gur at home and 53.6% of them used LGS at least once (Table 9.15). Assuming that the episodes are evenly distributed among gur and non-gur households, a maximum of 4.9% (i.e., 53.6% of 9%) episodes could expect to use LGS with gur from their own households but in our study only 4.1% actually used the solution implying that none went out to get gur for use. But the situation was a little different in other two study areas. In non-CRP and CRP, a maximum of 7.8% (i.e., 55.5% of

14%) and 7.1% (71.7% of 10%) respectively of episodes could be treated by using own gur available at home but actual usage in these areas were higher (8.2% in non-CRP and 9.9% in CRP) implying that a few people (more in CRP) did go out to get gur from their neighbours or local shops in order to prepare the lobon-gur solution.

Concerning effective use, there is a lack of appropriate data. For ORS to be successful in reducing dehydration, the solution taken should be (a) 'safe and effective', (b) should be taken in sufficient quantity so as to replenish the fluid loss and (c) should be started from the first watery stool. Amongst the users, 78% in First phase, 63% in non-CRP and 50% in CRP took a 'safe and effective' solution which are very close to what have been found by collecting sample LGS from a random sample of mothers (see Chapter 10). Information on quantity of LGS used during an episode could not be collected with enough precision through this survey. About 50% started taking the solution after 2-3 watery stools and a quarter started after the first. There was no apparent difference between the types of diarrhoea. From these inconclusive data, it is hard to say whether the users were 'effective users'. Effective use is very important. Tekce (1982) in analysing the reasons for the failure to reduce mortality in an Egyptian programme at Menoufia found that ORS was not used widely and where used was administered too late and too little (Tekce, 1982). This evaluation did not deal with these questions adequately since they pose methodological problems (see Chapter 5). Adequate and cost-effective methods need to be developed to measure these aspects of ORT programmes.

CONCLUSION

From the results presented in this chapter, the following conclusions can be drawn.

1. Only just over one half of all diarrhoeal episodes identified used some form of treatment method at all.

2. Overall usage rate of LGS was low when all episodes of diarrhoea were considered: 4.1% in First phase, 8.2% in non-CRP and 9.9% in CRP.

3. The usage rates almost doubled when only those episodes that received some form of treatment were included in the denominator.

4. LGS was the third most popular treatment method after allopathy and 'Boneji' (local indigenous herbal system). LGS was used 4 to 13 times more frequently than ORS packets.

5. Considerable differences surfaced when usage rates were separately computed for different diarrhoea types and it varied from 2% in 'Amasha' to 55% in 'Diarrhoea' type. However, a high rate in the later type could not make much change in the overall rate as only 5% of all diarrhoeas were in this type (Chapter 8). The usage rates of LGS for severe diarrhoea were very similar for the overall and for that based only on those episodes receiving some treatment. This shows a very high usage of treatments including LGS in this form of diarrhoea.

6. Only small differences were found when usage rates were analysed by age and sex of patients. Children under 5 years of age had similar rates to the average. Males tended to use LGS more than females in the First phase and CRP areas.

7. Nearly a half of all households interviewed reported that they had used LGS at least once before and this 'ever use' by households were statistically related to a number of household characteristics, particularly the availability of gur at home.

8. Only 9-14% households had gur available at home at the time the survey was carried out. As this was an off-season for gur, this may have lowered the usage rates downwards. It is quite possible that there is a seasonal variation in usage rates.

9. Because of methodological problems, the question of effective use received only partial attention. From the data it could not be concluded whether the users of LGS were 'effective users' or not.

CHAPTER 10: KNOWLEDGE AND SAFETY OF LOBON-GUR SOLUTION

INTRODUCTION

Attempts were made to determine how well knowledge and skills concerning the preparation of a safe and effective lobon-gur solution (LGS) was retained after time had elapsed since the BRAC programme teaching of individual households in the three study areas. As described in Chapter 7, a specimen of LGS was collected from a 5% random sample of households (later raised to 10%). This formed the first group, henceforth called the 'random LGS sample'. The second group consisted of households where the use of the LGS was reported in the previous two-week reference period, henceforth called the 'user LGS sample'.

A small questionnaire was administered in both the sample household groups (see Appendix 9). At the end of the interview session using this questionnaire, the respondent was asked to prepare a lobon-gur solution for the interviewer. The volume of solution prepared was measured and a sample of the prepared solution was taken in a screw-cap vial. These specimen solutions were sent to Dhaka and analysed for electrolyte concentrations at the laboratories of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). Because of the high cost of analysis, only about 10% of the collected samples were analysed for glucose. The distribution of the two groups of LGS samples in the three study areas is given in Table 10.1. Fourteen random LGS samples (one from First Phase, 8 from non-CRP and 5 from CRP) were also coincidentally user samples as well. In the analysis here, however, these were considered with the 'random sample' group. Results from the 'user samples' were analysed in the previous chapter and hence only the 'random LGS samples' are considered here.

Table 10.1: Number of households from which a specimen of LGS was collected by study areas

Type of Sample	First Phase	Non-CRP	CRP	Total
Random sample	187	174	182	543
User sample	31	78	102	211
Total	218	252	284	754

RESULTS

Reported Knowledge

At the beginning of interview, the respondent was asked, 'is there any person in this household who knows how to prepare LGS?' An overwhelming majority of the respondents answered in the affirmative as can be seen from the following table.

Table 10.2: Reported knowledge on how to prepare LGS by study area

Can anybody pre-	First phase		Non CRP		CRP	
pare LGS?	No.	%	No.	%	No.	%
Yes	181	96.6	168	96.5	179	100.0
No	6	3.4	6	3.5	0	0.0
Total	187	100.0	174	100.0	179	100.0

Source of Learning

The respondent at the end of interview was asked to tell the source from which she learned the technique of preparing the solution. More than 85% of the women in every study area reported that they learned it from BRAC Oral Replacement Workers (ORWs). BRAC's other means for disseminating knowledge about LGS, such as radio/TV, schools, posters, etc., seems to have had a very limited effect. However, these other means were not an alternative to the programme but were meant to be supplementary to the teaching by ORWs. It should be mentioned here that many respondents told of multiple sources, but only the first reported source is produced in the following table.

Table 10.3: Sources of learning about LGS by study areas

Source	First phase		Non CRP		CRP	
	No.	%	No.	%	No.	%
ORW	154	85.5	153	91.6	160	89.9
School	0	0.0	0	0.0	0	0.0
Relative and/or Neighbour	5	2.8	0	0.0	3	1.7
Radio/Poster	0	0.0	1	0.6	1	0.5
BRAC male worker	3	1.7	1	0.6	0	0.0
Others	18	10.0	12	7.2	14	7.9
Total	180	100.0	167	100.0	178	100.0

Sodium Concentration in LGS

The distribution of sodium concentrations in the collected solutions is presented in the following table in intervals of 10 mmol/L. Some summary statistics are also presented.

Table 10.4: Distribution of sodium concentrations by study areas

Sodium (in mmol/L)	First phase No.	%	Non CRP No.	%	CRP No.	%
<30	8	4.4	4	2.5	3	1.8
30-39	14	7.8	6	3.8	9	5.4
40-49	23	12.8	11	7.0	8	4.8
50-59	9	5.0	17	10.9	13	7.8
60-69	26	14.5	22	14.1	14	8.4
70-79	21	11.7	13	8.3	11	6.6
80-89	22	12.3	14	9.0	13	7.8
90-99	13	7.3	16	10.2	16	9.6
100-109	10	5.6	12	7.7	21	12.6
110-119	7	3.9	13	8.3	16	9.6
120-129	7	3.9	4	2.5	7	4.2
130+	19	10.8	24	15.7	35	21.4
Total	179	100.0	156	100.0	166	100.0
Missing	8		18		16	
Mean	81.4		93.0		103.3	
Median	73.0		84.5		96.5	
Standard dev.	44.9		49.9		67.6	
Minimum	18.0		20.0		22.0	
Maximum	322.0		322.0		728.0	

Marked differences are seen across different study areas (see also Figure 12) and an analysis of variance shows significant difference between the means of the three studies (p<.005). When tested between the pairs of means with the d-statistic (Armitage, 1971), differences between First phase and Non-CRP are found to be significant (p<.05) but not those between Non-CRP and CRP. It can be suggested from these results that there has been an upward trend in the sodium concentrations between the phases of the programme. Given that the First-phase samples were drawn from areas taught two years before the survey and the second phase (Non-CRP and CRP) samples were from areas taught one year before the same survey, one might wonder: has there been a deterioration in the quality of teaching in the second phase? The observed differences can further be illustrated if the above table is summarised according to 'safety and effectiveness' criterion suggested by Ellerbrock (1981).

Table 10.5: Sodium concentrations according to 'safety and effectiveness' criterion by study areas

Safety and Effectiveness (Na in mmol/L)	First Phase No.	First Phase %	Non CRP No.	Non CRP %	CRP No.	CRP %
Safe but less effective (<30)	8	4.4	4	2.5	3	1.8
Safe and effective (30-99)	128	71.4	99	63.3	84	50.4
Effective but potentially dangerous	17	9.5	25	16.0	37	22.2
Dangerous (120+)	26	14.7	28	18.2	42	25.6
Total	179	100.0	156	100.0	166	100.0

It is disappointing to observe how the high proportion of samples in the 'safe and effective' range has become smaller in the different phases. In the First phase, the households which had been taught two years previously retained a proportion in the safe and effective' range of 71.4 percent (Figure 10). In the

Second phase, although households had been taught one year ago, the proportion in this range was down to 63% in Non-CRP and 50% in CRP. The results which are of most concern are those in the 'dangerous' zone, with 14.7% for the First phase (Figure 11) and 18.2% in Non-CRP and 25.6% in CRP.

Comparison with Monitoring and Other Evaluation Information

Let us now make some intra-phase comparisons. There are sodium concentration results available for the First phase from programme monitoring (conducted one month after teaching) and independent studies conducted by the Research and Evaluation Division of BRAC (conducted 3 and 6 months after teaching). These results may be compared with those from the current study conducted 2 years after teaching. These are presented in Table 10.6 and in Figures 10 and 11.

Table 10.6: Sodium concentrations(%) for the First phase at different time periods after teaching

Na in mmol/L	One month (a)	3 months (b)	6 months (b)	2 years (c)
<30	1.2	2.4	0.8	4.4
30- 99	90.3	89.2	89.6	71.4
100-119	6.5	5.2	6.4	9.5
120+	2.0	2.8	2.8	14.7
Mean	68.0	65.4	71.2	81.4
S.dev.	21.0	21.4	22.0	44.9
n	18,892	250	250	179

Sources: (a) Abed (1983); (b) Chowdhury (1983); (c) present study

It appears from the table that the ability to prepare a 'safe and effective' LGS was retained up to 6 months but that there after

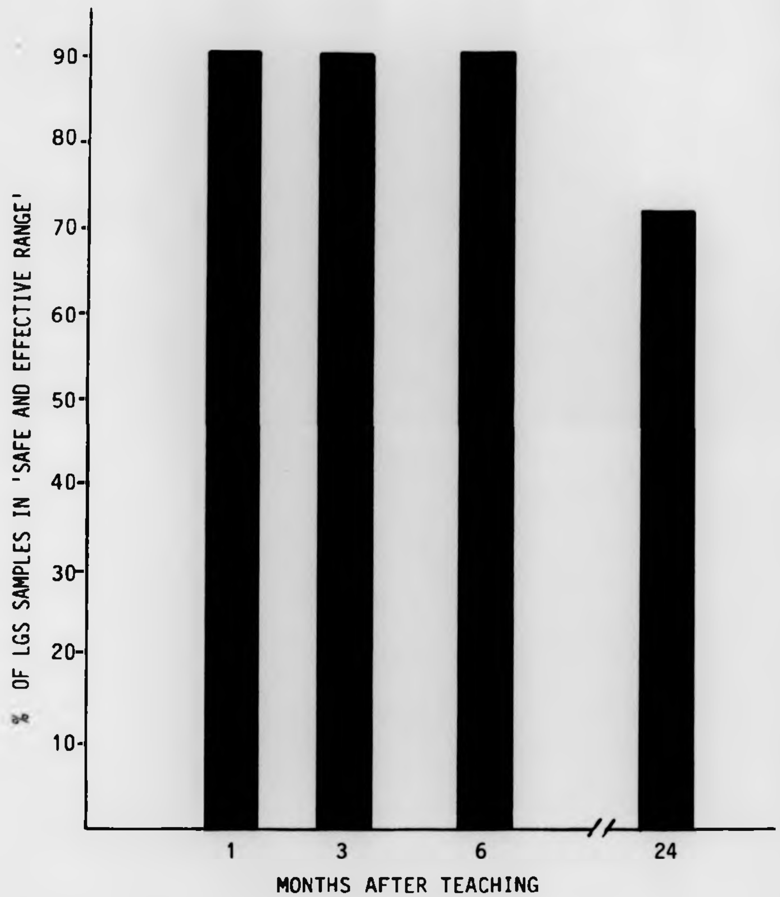


Figure 10

Proportion of LGS samples with sodium concentration of 30-99 mmol/L ('safe and effective') prepared by mothers in different time periods after teaching in the first phase of the BRAC programme.

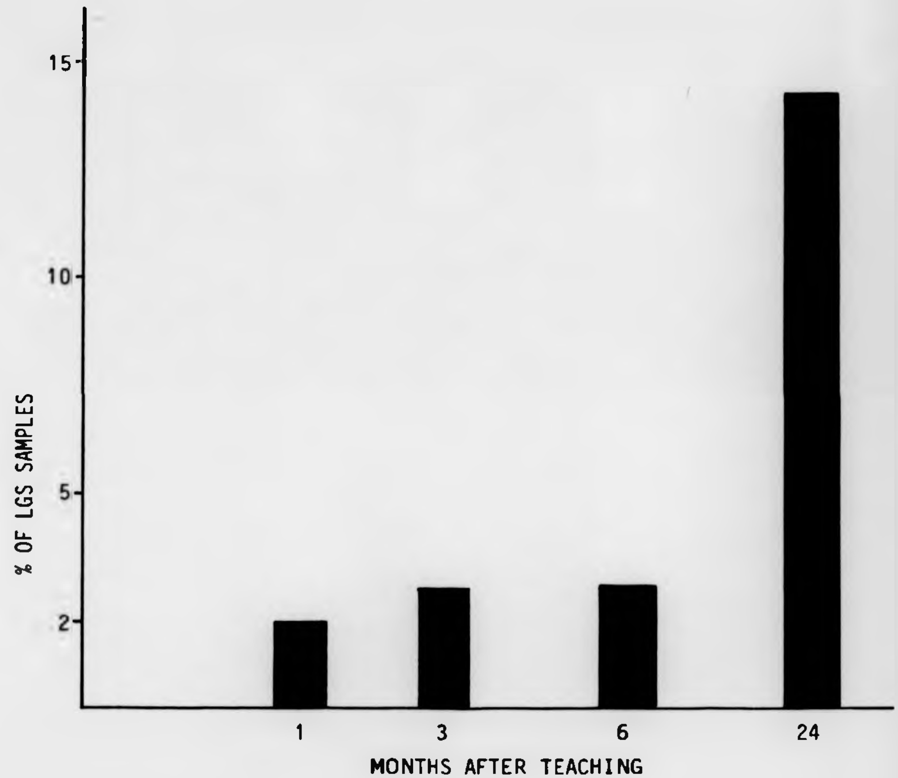


Figure 11

Proportion of LGS samples with sodium concentrations of of 120 mmol/L or more ('dangerous') prepared by mothers in different time periods after teaching in the first phase of the BRAC programme.

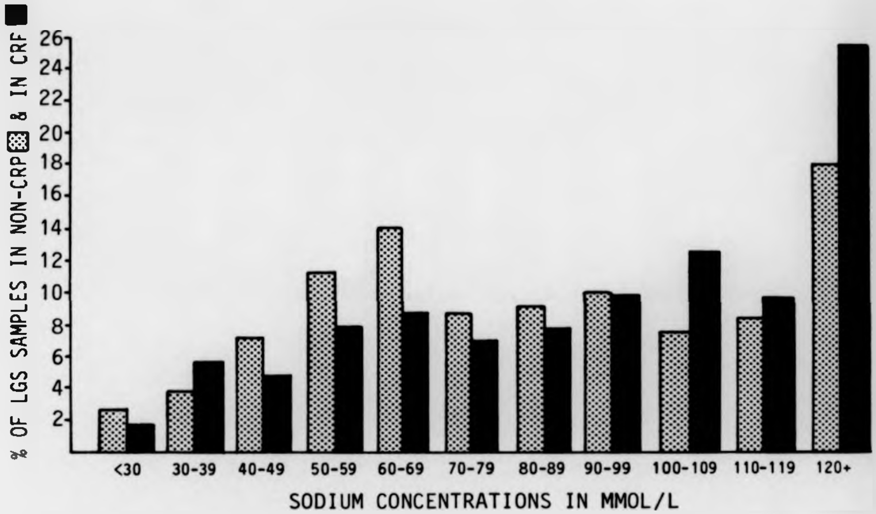


Figure 12

Sodium concentration in LGS samples prepared by mothers 12 months after teaching in non-CRP and CRP areas of the BRAC programme.

there has been a considerable deterioration over time.

For the Second Phase, the ability seems to have worsened much faster in the CRP compared to non-CRP areas. The following table compares the sodium concentrations available one month after teaching (data from programme monitoring) with those after one year of teaching in Non-CRP and CRP areas. The one-month proportions are directly comparable in time with our present samples as the former were compiled from monitoring results of the areas covered by the programme in October-November 1983.

Table 10.7: Sodium concentrations (%) after one month and one year for the Second Phase.

Na in mmol/L	One month	One year	
	Non-CRP & CRP (a)	Non CRP (b)	CRP (b)
<30	.3	2.5	1.8
30- 99	86.7	63.3	50.4
100-119	8.3	16.0	22.2
120+	4.7	18.2	25.6
Mean	73.9	93.0	103.3
S.D.	24.4	49.9	67.6

Sources: (a) S. Zaman (Laboratory Technician at BRAC)
(b) present study

Effects of Salinity

As can be seen in the map of Bangladesh in Figure 1, the districts of Khulna, Barisal and Patuakhali, which are being covered by the BRAC programme, are coastal areas close to the Bay of Bengal. During the analysis of monitored samples, larger concentrations of sodium were found in these districts (Table

A.21). BRAC analysed water samples from different sources in these districts and a higher concentration of sodium was found than in other areas of the country. To examine how far the water salinity of these areas affected these results, an analysis of the sodium data was repeated separately for the sample LGS solutions collected from these districts. Table 10.8 presents the results. There appears to be some difference between the means in coastal and non-coastal areas (statistically not significant at 5% level). However, the exclusion of the coastal samples did not alter the trend found previously between the phases as shown in the following table.

Table 10.8: <u>Distributions of sodium concentrations in coastal and non-coastal areas</u>

Sodium	First Phase				Non-CRP				CRP			
mmol/L	Coastal		Others		Coastal		Others		Coastal		Others	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<30	0		8	5.1	3	5.8	1	1.0	1	2.0	2	1.7
30-99	15	71.4	113	71.5	29	55.8	70	67.3	22	43.1	62	53.9
100-119	1	4.8	16	10.1	9	17.3	16	15.4	13	25.5	24	20.9
120+	52	3.8	21	13.3	11	21.2	17	16.3	15	29.4	27	23.5
Missing	2		6		-		18		-		16	
n	21		158		52		104		51		115	
Mean	98.1		79.1		101.2		89.0		122.0		95.0	
S.D.	61.1		42.1		58.0		45.1		102.2		42.4	
Minimum	39		18		20		28		24		22	
Maximum	314		322		322		275		728		275	

Water Volume

There are two main variables which may affect sodium concentration in the lobon-gur solution, which are the amount of salt and the volume of water actually used. A higher than expected concentration of sodium could arise from anyone of the following combinations:

a) excessive salt and normal water volume

b) normal salt quantity and decreased water volume

c) excess of salt and decreased water volume

From the analysis so far it is not clear which of the above caused the observed high concentrations. Since the amount of

Table 10.9: Distribution of water volumes for LGS by study areas

Water in cc	First phase		Non CRP		CRP	
	No.	%	No.	%	No.	%
<400	12	6.6	9	5.3	14	7.8
400-449	17	9.4	25	14.9	31	17.4
450-499	46	25.5	47	28.0	52	29.2
500-549	48	26.7	39	23.2	46	25.8
550-599	46	25.5	26	15.4	24	13.5
600+	11	6.3	22	13.2	11	6.3
Total	180	100.0	168	100.0	178	100.0
Missing	7		6		4	
Mean	496.2		495.6		480.0	
Median	500		500		475	
S.D.	69.9		76.2		75.1	
Minimum	167		287		250	
Maximum	675		700		725	

N.B. The correct volume is equal to 1/2 seer or 467 cc.

salt actually used in making up the LGS was not measured at the time of mixing, it is not directly possible to determine if an excess in salt was responsible. However, we can examine the role of water volumes as shown in the above table. The distribution appears to be favourable compared to that for sodium concentrations. The means are closer to the ideal volume of 467 cc (1/2 seer) although individually they differ with this value when tested against the t-statistic ($p<.005$). The three means are statistically different ($p<.01$) as were the sodium means. When considered in pairs, there appears to be a significant difference between the means of First phase and Non CRP ($p<.05$) but no difference between Non-CRP and CRP. Statistically, the distributions of both sodium concentration and water volume follow a similar pattern and hence this leads to no meaningful conclusion regarding the role of water.

A sodium concentration of 120 mmol/L or more is considered 'dangerous'. With a volume of 467 cc of water and a pinch of salt, the mean concentration of sodium has been found to be 60 mmol/L in lobon-gur solution during the Pilot phase (Ellerbrock, 1981). With a correct quantity of salt, the amount of water needed to obtain a sodium concentration of 120 mmol/L or more will be 234 cc (i.e., half of 1/2 seer) or less. In fact, only one solution (from the First Phase area) had less than 234 cc. Even those with less than 400 cc of water were between 5 and 8 percents of all solutions (Table 10.9).

Thus very few solutions were found in the 'dangerous' zone when water volume alone is used as a measure. This shows quite convincingly that the contribution of water volume in producing high sodium concentration is a much less important factor than too much salt. We will now make some further analyses of the sodium samples which are in the 'dangerous' zone (120+ mmol/L) and examine their relationship with water volume.

Table 10.10: Mean, deviation from expected means and standard deviation for sodium and water in solutions having a 'dangerous' sodium concentration by study areas

Statistics	First phase		Non CRP		CRP	
	Na (mmol/L)	Water (cc)	Na (mmol/L)	Water (cc)	Na (mmol/L)	Water (cc)
Mean	161.3	484.1	177.5	478.9	173.2	457.5
Deviation from expected mean	+101.3	+17.1	+117.5	+11.9	113.2	-9.5
S.D.	54.6	87.3	48.1	72.6	98.2	80.1
n	26		28		42	

It appears from the above table that only in CRP samples has there been a negative deviation for water from the expected mean of 467 cc. This, therefore, strengthens further the argument that it is the excess of salt rather than the shortage of water which contributed to the observed higher concentration of sodium in the lobon-gur sample solutions.

Selected Characteristics and Sodium Concentrations

Attempts were made to find out any associations between the mothers, as represented by their sodium values, and different individual and household characteristics, which included age and literacy of individual woman, their economic status (measured by landholding and number of cows owned) and household type. No appreciable associations were however obtained when tested by using the chi-square statistic. Similar analyses were also done for water volume . No appreciable associations were found between water volume and selected characteristics.

Glucose

As reported earlier, analysis of the solutions for glucose was done for only a limited number of cases: approximately 10% of the solution sub-samples. The following table gives the distribution of glucose concentration.

Table 10.11: Distribution of glucose concentrations by study areas

Glucose in mmol/L	First phase	Non CRP	CRP
<100	5	2	4
100-124	4	3	2
125-149	2	1	4
150+	4	7	7
Total	15	13	17

The numbers are small but the data are indicative of a high proportion in the higher ranges. Compared to 110 mmol/L of glucose found in the lobon-gur solution during the pilot phase of the programme, the trend seems to be upwards, similar to the one observed for sodium concentrations.

Potassium

The following table shows the distribution of the concentration of potassium. Here also there is an increase in the mean concentration compared to what was observed during the pilot phase of the programme (Ellerbrock, 1981). This is still less than the WHO recommended concentration of 20 mmol/L. Presence of potassium in gur is a natural advantage for lobon-gur solution over other salt-sugar solutions. The increase in the mean potassium compared to the pilot phase need not be considered too seriously, particularly as the potassium content of gur is variable depending upon their sources. For example, when experimenting with gur, the present author found more potassium in gur made from date juice than that made from sugar cane juice.

Table 10.12: Distribution of potassium concentrations

Potassium in mmol/L	First phase No.	First phase %	Non CRP No.	Non CRP %	CRP No.	CRP %
<10	38	21.2	65	41.6	48	28.9
10-19	92	51.4	72	46.1	95	57.2
20-29	39	21.8	17	10.9	20	12.0
30+	10	5.6	2	1.4	3	1.9
Total	179	100.0	156	100.0	166	100.0
Missing	8		18		16	
Mean	15.7		12.1		13.4	
Median	15.0		11.0		12.0	
S.D.	7.3		6.0		6.0	
Minimum	4.0		3.0		3.0	
Maximum	37.0		38.0		37.0	

DISCUSSION

In this chapter, the data on the analysis of lobon-gur solution is presented. It appears that knowledge of LGS was very common and that the technique for preparing it was learnt mainly from BRAC female field workers.

Sodium is the principal component of interest in LGS because of the associated risk involved with too high a sodium concentration. A 'higher' sodium may cause the condition of hypernatraemia which may even lead to death. Analysis of the distribution of sodium revealed two main trends. First, it appears that the knowledge of the women on the correct way to prepare lobon-gur solution fell considerably over time after teaching and this fall was sharper in the Second phase areas (both Non-CRP and CRP). Women in the First Phase areas, even two years after teaching, were doing better than those in the Second phase who were taught one year later. The trend continued to hold even after the samples from the 'high salinity' upazilas were removed from analysis. Secondly, the fall in the knowledge seems to be attributable to a fall in knowledge on how to mix the ingredients (viz., salt and gur) rather than the measurement of water. A 'seer of water' is better remembered than a 'pinch of salt' or a 'fistful of gur', probably for cultural reasons. A 'seer' is the popular unit of measurement in Bangladesh and almost everything is measured through this unit in the villages. There were indications of a higher glucose concentrations in the solutions which could have been caused by an excess of gur.

The receding knowledge is not surprising, particularly in the absence of any significant reinforcement and infrequent household use (see previous chapter). Although the new experiment with CRP has brought some 'good' results as seen in the previous chapter, it seems to be much poorer when the quality of the prepared LGS considered. The differences between the First and Second phases were statistically significant but this is not true between the non-CRP and CRP areas. The initial teaching in non-CRP and CRP was done and supervised by the same workers.

How do these results compare with other evaluations of ORT programmes? There is, unfortunately, a dearth of information on these aspects of ORT programmes and no comparable information is available from any other programme. Evaluations looking at the retention of knowledge over a long period do not appear to be available. An Egyptian study provides some information on the retention of knowledge, but the intensity of training in that programme was much greater with the mothers being taught a total of 9 separate times, once per month. The first survey was carried out after 3 months (and after 3 teachings) and another was done after 9 months (and hence after 9 teachings). While the expected mean of sodium concentrations was 40 mmol/L, the first survey found a mean of 59 mmol/L, 50% higher than expected. The second survey found 48 mmol/L which is 20% higher than the expected value (Mobarak, et al., 1980). The BRAC results were very comparable since after two years during which there was no second visit, the mean was 81 mmol/L, that is 30% more than expected.

CONCLUSION

From the results presented in this chapter, the following conclusions can be drawn.

1. The knowledge about LGS was very common and the technique of preparing it was learnt mainly from BRAC.

2. The ability of mothers to prepare a 'safe and effective' solution fell considerably over time after teaching and this fall was sharper in the Second phase of the BRAC programme. Women in the First phase areas even two years after teaching were doing better than those in the Second phase who were taught one year later.

3. Samples of LGS from the areas close to the Bay of Bengal had a little higher sodium concentrations than those from other parts. But even when these 'high salinity' samples were removed from analysis, the inter-phase trend seemed to remain.

4. The fall in the ability to prepare a 'safe and effective' solution was caused more by an incorrect mixing of ingredients than that by water volume.

5. Similarly higher trends in the concentrations of glucose and potassium were encountered.

CHAPTER 11: DISCUSSION AND CONCLUSION

That diarrhoea is a major health and nutritional problem is beyond question. The technical barrier to preventing diarrhoeal deaths from dehydration is now largely solved, with oral rehydration therapy (ORT) well established as the treatment of choice for most cases of diarrhoea. The last few years have seen the application and development of ORT programmes in different countries of the world and the oral therapy extension programme (OTEP) of the Bangladesh Rural Advancement Committee (BRAC) is such a programme. During the last five years, mothers in approximately 5 of Bangladesh's 16 million households have been taught a 'home treatment' method of ORT and this thesis has provided evaluation results from this programme.

ORT programmes are very recent and only a few have seriously been evaluated so far (Chapter 5). Most Evaluations have attempted to measure the impact of the ORT on mortality, the ultimate aim of such programmes, but few have looked at intermediate process indicators, such as safety of the prepared solutions. Many evaluations have examined usage but they have used different definitions thus making comparability very difficult. The current evaluation, however, looked at some of these intermediate indicators.

EVALUATION RESEARCH METHODS

Experts agree about the merit of a combination of data collection methods in evaluating programmes (World Health Organization, 1984) and the present evaluation used both quantitative and qualitative methods of research. In the village case study, which was carried out first, qualitative methods of research were used and these helped in the understanding of a number of processes, such as the four types of diarrhoea. Observational studies are also very useful in the design of questionnaires and in testing research methods used in interview surveys (Ross and

Vaughan, 1984). The village case study proved invaluable in this way for the community sample survey. On the other hand, the survey substantiated on a wider sample many of the conclusions arrived at from the village case study. The village case study and the community survey were complementary to each other and assisted in better understanding of the results.

The problem of asking appropriate questions on severity of illness has long been faced by researchers (Ross and Vaughan, 1984). Different types of questions have been used, such as whether the illness led to confinement to bed or failure to do normal work. Such an attempt, for example, was made in a previous BRAC survey to distinguish severe diarrhoeas from non-severe ones. The question asked was, 'did the patient do his/her normal work?' but the result was of doubtful use as it reported 35% diarrhoeas in the severe category (Chowdhury, 1983). Fortunately, the recent discovery that the term 'Diarrhoea' meant severe diarrhoea in rural Bangladesh was particularly useful in differentiating severe diarrhoeas from others.

The Village Case Study

The purpose of the village case study was to develop the understanding of certain features concerning the BRAC programme. Although the villages were not representative of Bangladesh, subsequent checks, however, validated some of the information found in the village as being relevant for other areas of the country as well. Within the village study, a combination of many methods of data collection using 'convergent evidence' method of research turned out to be especially useful.

The Community Survey

A multi-stage, random, sampling technique was adopted for the survey. Out of a total of 7,500 households, 6,910 or 92% were finally interviewed in the survey. The non-response of 8% is comparable to the 5% found in the Bangladesh Fertility Survey (Bangladesh, Government of, 1978). Ross and Vaughan (1984) reviewed 10 studies from different parts of the world and found the non-response in the range of under 1 percent to over 17 percent. Five of them, however, did not mention their non-response rates.

Most respondents were female (85%) and were either the head of households or his wife (83%) and thus much of the information sought on household assets and individual characteristics was likely to be known to them. In Bangladesh, a person's age often has to be estimated because most people do not know their date of birth or actual age. However, use of a calendar of important events to remind the respondents was particularly useful (see Appendix 12). Data on a number of items of information were collected through the community survey. The survey population was largely representative of the Bangladesh population. Aproximately 45 percent of the population were under 15 years of age which is comparable to that found by the Bangladesh Fertility Survey (BFS).

There are problems in identifying the diarrhoeal episodes which occurred during the past 2 weeks. Recall information is obviously subject to different biases. However, the use of the people's own terms for different forms of diarrhoea reduced some of these biases.

As part of quality control, a sample of interviews were subjected to repeatability interviews. However, logistical problems, such as an unforeseen shortage of repeatability questionnaires or difficulties in revisiting due to distance and travelling times and the non-availability of respondents in the second visit, meant that between 50-80% of the episodes were reinterviewed (Chapter 7). Out of those reinterviewed an overwhelming number (91 % in First phase and non-CRP and 84% in CRP) agreed with each other (Chapter 8). However, when a comparison for possible biases was made between those who were interviewed twice with those interviewed only once, no appreciable differences were found on a range of variables.

The survey collected retrospective information on diarrhoeal episodes through a 2-week recall. There was little difference between three study areas- First phase, non-CRP and CRP- with regard to the age/sex distribution of diarrhoea patients. Approximately 30 percent occurred in children under 5 years of age, which compares with the 39% found by Chen (1978) in Matlab, Bangladesh. The present author, in another retrospective survey carried out in the First phase areas, found 37% episodes occurring in children under 5 years of age (Chowdhury, 1983).

In this study males were found to experience a slightly higher diarrhoeal episodes than females except in 15-44 age group where females consistently had higher number of episodes across all study areas. Most of the females in this age group are mothers and it has been postulated that they have a higher attack rates of diarrhoea because of higher risk due to contact with children (Chen, Huq and D'Souza, 1981; Merson, Black and Khan, 1978). Chen et al. (1981) found a 10% higher incidence amongst male children under 5 years of age in Matlab, Bangladesh. The present author, however, found a 50% higher attack rate in males in a previous study when male interviewers were used (Chowdhury, 1983). The present survey probably represents a better picture with respect to sex differences in reporting of diarrhoea because of the use of female interviewers.

Extrapolating the results of the 2-week recall, incidence rates were calculated for a year. On an average, an incidence of 1.8 to 3.8 per person per year was found each of which is higher than that found by Chen (1978) in Matlab. Incidence rates were separately calculated for different diarrhoea types. The highest incidence occurred in 'Ajirno' type which varied from 0.9 in First phase areas to 1.8 in CRP areas and the lowest occurred in 'Diarrhoea' type which varied from 0.09 to 0.15. In almost all types and study areas, children under 5 years of age had the highest incidence.

Differences were found with respect to the reporting of the episodes of diarrhoea between First Phase, non-CRP and CRP areas. Were these differences real or were they due to other factors, such as differences between the teams of interviewers? Due to logistical reasons the sample areas in the coastal districts of Barisal and Patuakhali were covered by a single interviewing team (Team 1) and it was this team which found a higher incidence of diarrhoeas. Analyses revealed that the number of episodes found per household interviewed were more in upazilas closer to the Bay of Bengal than in others which were relatively further away. Differences between the teams were looked for in the reporting of other population characteristics but no differences were found. This suggests that some degree of the higher rates was due to real differences in incidence of diarrhoea episodes between the study areas. However, one coastal upazila in the district of Khulna which was covered by another team did not find as high an incidence, which suggests that inter-team differences may also be an explanation. Thus it appears that a high incidence and inter-team survey differences probably explains the variations in reported incidence.

It should be remembered that the data presented here are retrospective for a particular period (October-December 1984). As mentioned before, this period in Bangladesh is immediately before the peak winter diarrhoea season and hence may represent an average incidence. There was no report of any large epidemic of watery diarrhoea at that time although dysentery was being reported (Rahaman, 1984). Whether an epidemic situation would change the existing picture on usage is hard to say. However, availability of gur may be important. The survey was conducted immediately before the winter season when gur is more readily available and the household availability was low at the time of the survey. The usage rate may increase when the winter gur season sets in. This should be studied further.

In summary, the survey methods were thorough, the non-response was low, the population studied was largely representative of Bangladesh, and the agreement on the repeatability checks all suggest that the information was reliable. There may be questions about the absolute incidence rates of diarrhoea found in this study because of the differences found between the three study areas. The difference in incidence can probably be attributed to both real differences and those due to team performance. Will these uncertainties invalidate the analyses? When conclusions are being based on proportional changes these uncertainties should not invalidate the conclusions, but care is definitely needed in the interpretation of absolute values, such as the incidence of diarrhoea episodes .

EVALUATION RESULTS

Village Case Study

The study unfolded the existence of four types of illnesses with diarrhoeal symptoms which were: Dud Haga, Ajirno, Amasha and Diarrhoea. They were found to be clearly perceived and understood by villagers, who had good ideas about their aetiology and severity. This finding in Bangladesh may not be unique. We know of 'empacho' or 'caida de mollera', etc. in Honduras (Kendall, et al., 1984), the five types of folk illnesses in north-east Brazil (Nations, 1982), 'Behdi' or 'Dosham' in south India (Lozoff, et al., 1975) or those found by Zoysa et al. (1984) in Zimbabwe. All these are labelled diarrhoea or related conditions but villagers perceive them as different. This aspect of the people's perception concerning diarrhoea has not been studied before in Bangladesh. Although these indigenous concepts were checked in other areas of the country and found to be valid, further research for their validation is still needed and demarcation between the types needs further study. Under what condition, for example, does a 'Ajirno' become 'Diarrhoea'? There are great implications of these results for programmes and if more recognition is made of these perceptions and beliefs programme staff will be able to communicate better with the people. Kendall et al. (1984) has described how such an understanding helped develop a 'successful' ORT programme in Honduras but very few other programmes have taken this perspective seriously (see Table 5.1).

The village study also looked at the reasons why some people do not use the lobon-gur solution. There was no attempt, however, to classify the findings according to which is more important because time and sample size constraints did not allow for this. Problems with the people's definition of diarrhoea was found to be a major reason. Many did not use the LGS as they thought that the illness was not 'Diarrhoea' but was something else such as Dud Haga, Ajirno or Amasha. The ORWs of BRAC put an emphasis on the word diarrhoea, which is mistaken by villagers as 'Diarrhoea' (i.e., severe diarrhoea) and it has been found in the survey that the highest proportion of users were in the 'Diarrhoea' group.

Another reason for the non-use of LGS was the absence of 'gur' in many households. This finding from the village study necessitated the inclusion of a related question in the subsequent community survey. Surprisingly, only 10 to 14 percent households from the survey were found to have 'gur' at home. The author also noted from personal experience the scarcity of 'gur' in one area in Khulna (Chapter 6). As this survey was done before the winter gur season, these results may have some seasonal dimension. Availability of more refined sugar has less seasonal problems and its promotion as a substitute along with 'gur' may provide an alternative in the event of 'gur' scarcity. Moreover, the price of gur is now similar to that for refined sugar (Ittefaq, 1985).

Another reason for non-use was the antagonistic attitudes of the village health practitioners and as they have the confidence of the people, their role in LGS promotion could be critical. There is a clear need for further research to know more about the reasons of non-use and to know the relative weight of these identified and other reasons.

Usage

The study revealed that 40 to 50 percents of diarrhoeas were not treated with any treatment method at all. Similar results were also found in previous BRAC surveys (Chowdhury, 1983; BRAC, 1985). However, this is not surprising in a society where 35% of people dying also received no treatment prior to death (Aziz, 1977). Shepard et al. (1985a) reported that only 29.5% of diarrhoeal episodes in the Gambia were being treated at home by any method at the start of the ORT campaign, but this later increased to 81.2% when the campaign was over. However, they did not mention whether the remaining episodes (70.5% at the beginning and 18.8% later) were untreated or received treatment elsewhere.

Information on 'current' and 'ever' use of the lobon-gur solution was collected and indices prepared for each. Based on altering definitions, several rates on current use were computed. For the First phase, the rates varied from 2 percent in 'Amasha' to 26 percent in 'Diarrhoea' cases. For non-CRP, the picture was better and the rates varied from 3% in 'Amasha' to 33 percent in 'Diarrhoea'. In CRP, the rates varied from 3% for 'Amasha' to 55% for 'Diarrhoea'. Apart from the rates for 'Amasha' and 'Diarrhoea', several other current rates were also computed depending on altering definitions. An intervention designed to lower diarrhoea mortality requires a high usage in 'Diarrhoea' which in reality is severe diarrhoea, because these are the diarrhoeas which are likely to lead to dehydration and death. On the other hand, rates for 'Amasha' may be of little interest because there is little fluid loss and oral rehydration is of little use for this form of diarrhoea (Feachem, Hogan and Merson, 1983).

The inter-study difference in usage rates is an important finding. The differences were statistically significant ($p<.05$) between the First phase and both studies of the Second phase (i.e., non-CRP and CRP) but not between the non-CRP and CRP. Although CRP was designed to increase usage, it did not produce a significant improvement over non-CRP, when measured 12 months after teaching.

LGS occupied third position amongst the treatment methods, after allopathy and 'Boneji' (local herbal system). The fact that allopathy was the treatment of choice and that an overwhelming proportion of village practitioners belong to the allopathic school of medicine (Sardar et al., 1981), means that there is a great need to influence these practitioners and gain their support for increasing the popularity of LGS.

The current overall usage in the BRAC programme is low compared to other programmes such as that found in The Gambia. In the Gambian programme usage continued to rise until the programme was stopped after 27 months when 62% of diarrhoeal episodes were treated at home with salt-sugar solution (Shepard, et al., 1985a). This is very high compared to the 4 percent or so of BRAC. One important difference between the two programmes should be pointed out at this stage. The Gambian programme is basically a mass communication programme heavily dependent on the radio time available to the programme which has continued from the beginning through to the end. There was constant reinforcement, which was absent with the BRAC programme. The BRAC workers taught the method just once and there was no significant reinforcement or second visit.

There is a need for caution in comparing usage between different programmes because of the wide differences in definitions used. For example, usage was found to be more than 40 percent in the Guatemalan programme (Lechtig, et al., 1983), but the definition used there was, 'what did you do last time when your child had diarrhoea?', which is different to that used by the BRAC programme. Also, the BRAC definition of diarrhoea includes all these people with one or more watery stools per day. This makes the denominator very large and tends to lower the usage rate for the BRAC programme compared to another using a definition for diarrhoea based on more watery stools per day.

Usage of LGS was analysed by age and sex and a similar trend was seen as for the episodes themselves. Twenty three percent of LGS users in the First phase, 41 in non-CRP and 35 percent in CRP were under 5 years of age, while approximately 30 percent of all episodes were in this age group. These may be compared with the results of two other studies in Bangladesh. Stanton et al. (1985) provided results from a 'volunteer' programme in Dhaka which showed that 21 percent of ORS packets were distributed to children under 5 years. Chen, Black, et al. (1980) in a study in rural Bangladesh found that 23 percent of the packets were distributed to children under 5 years of age and that 23 percent of patients were in this age group.

The concept of 'ever used' has its own merits and demerits. Proportion of households reported to have used the method at least once since teaching were 42, 50 and 53 percents respectively for First phase, non-CRP and CRP areas. These results seem to indicate that the Second phase (non-CRP and CRP) was doing better with respect to usage as the gap between the survey and teaching was 2 years in First phase and one year in Second phase. This conclusion assumed that the extent of mothers' recall about ever use was the same in both phase areas. The results on 'ever use' are comparable to what has been found elsewhere. In Honduras and in the Gambia, 49 percent mothers reported that they used ORS (packets) at least once during the previous year (Foote, 1983).

Safety of Lobon-gur Solutions

From the analyses of the sample LGS prepared at home by mothers, two trends surfaced concerning the safety of the solutions. It was found that the ability of women to prepare the correct solution appeared to fall considerably over time and that this fall was sharper in the Second phase (non-CRP and CRP). This trend continued to hold even after samples from high salinity areas (most of which come from the Second phase) were removed from the analysis. Secondly, this fall seemed to be attributable to a fall in the ability to correctly mix the ingredients (pinch of salt and fistful of gur) rather than in the measurement of the volume of water (half a 'seer'). This fall in ability shows the programme in the Second phase to be at fault when compared to the safety record of the First phase. However, that the ability should fall is not surprising, particularly in the absence of any reinforcement and the infrequent household need to prepare LGS. Similar to the results on usage, the difference between the First and Second phases were statistically significant ($p<.05$) but not that between non-CRP and CRP. There is a dearth of information on this aspect of safety from other ORT programmes. Evaluations looking at the retention of ability over a long period do not appear to be available. The Egyptian programme (Mobarak, et al., 1980), as discussed in Chapter 5, provided some information. The BRAC results were comparable to those found in the Egyptian programme.

The results show a large proportion of mothers particularly in the CRP areas who prepared a 'dangerous' solution. Drinking of such solutions may cause hypernatraemia but during the field work, no such case was reported nor any death following the drinking of LGS.

But why did the ability to correctly prepare LGS decline more rapidly in the Second phase? During the later part of the First phase, feedback on programme information suggested poor usage (Chowdhury, 1983) and the new experimental programme, called CRP or concentrated reinforcement programme, was then started as part of the Second phase. The field staff probably gave more attention to increasing usage and did not give as much attention to the details of how well the ORWs taught the mothers. Moreover, the overall programme expanded faster in the Second phase compared to early in the First phase, and the staff were not as well trained and supervised. The area managers were originally chosen from experienced BRAC staff, but as the programme expanded, there were problems in appropriately manning the area offices. Eventually less experienced and junior persons were put in charge of the area offices. Moreover, the change from 10 points (Ellerbrock, 1981) of the message to 7 points (Appendix 2) may have had some effect as the dangers of LGS was more clearly specified in the 10 points than it is now in the 7 points.

Given the above evaluation results and the absence of any strong evidence that the programme reduced mortality, one question is forthcoming: Has the whole effort been a failure? The overall usage is low and the safety of the solution made by mothers is questionable. Others may, however, put a counter question: Is the usage really low? The diarrhoeas which may lead to dehydration and death are the severe diarrhoeas (or 'Diarrhoea' in the language of the people) and usage in that category was good ranging from 26 to 55%. This is no small achievement given that the mothers were instructed only once and that occurred up to one to two years previously. However, some of the results on the safety of the home LGS were quite alarming. How do these results compare with those from other similar programmes? Unfortunately, such a comparison is difficult because there is a dearth of such information. The Egyptian programme, in which a salt-sugar mixture was used, gave results on safety which were not very different (Chapter 5).

What then about the BRAC approach of teaching a mother by using a once only face-to-face technique? It seems now to be the right time to reconsider the efficiency of such a one-shot teaching programme. Such a method of programme delivery gives immediate results but, as this evaluation has shown, the ability to prepare a safe LGS and the level of usage over the long term may not be so acceptable. This raises the questions about the need for more effective reinforcement particularly after relatively short period of time.

Cost-effectiveness and Cost efficiency

The cost of the BRAC programme has been presented in Chapter 4. As the Second phase is still continuing, the costs of the First phase will only be considered here.

The impact of the programme on mortality is not known yet nor the case fatality rate amongst diarrhoeas as identified through the present study. Hence computation of the cost-effectiveness of OTEP using cost per death averted is not attempted here. However, cost per household visited, per person covered and per user of LGS can be computed.

<u>Cost per household visited</u>: During the 39 months of the programme (July 1980 to September 1983), 2,488,582 households were visited (BRAC, 1984) which means an average cost of Taka 14.42 or 72 US cents per household visited during this period. If this is extrapolated, the cost per person is estimated to be Taka 2.40 or 12 US cents. This may be compared with that of the new Egyptian ORT programme which started in 1983. A budget of US$ 50 million was made available to cover the country's 44.5 million people (Grant, 1985), at a cost of US$1.12 per person. This proposed budget is nearly 10 times higher than the actual BRAC programme cost per person.

If the children under 5 years of age are considered the real target (inspite of the fact that a large proportion in other ages do get diarrhoea), the cost per child covered then becomes Taka 13.89 or 69 US cents.

Table 11.1: Costs per household visited, per person and child taught and per user of LGS for the First phase of the BRAC ORT programme

Information	Taka	US$
Cost per household visited	14.42	0.72
Cost per person covered	2.40	0.12
Cost per child* covered	13.89	0.69
Cost per user of LGS	31.02	1.55

* Aged 0-4 years

Cost per user of LGS: Let us consider the first 12 months of the First phase programme. Assuming that the costs and households visited during the First phase's 39 months were evenly distributed, an amount of Taka 11,042,769 were spent to visit 767,717 households in the first 12 months. Now with a household size of 6.3 and estimated incidence of 1.8 episodes per person per year (Chapter 8), a total of 8,683,231 episodes could be expected amongst the households visited in the first year of the First phase. With an overall usage rate of 4.1% for all episodes, there would be an estimated 356,012 users of LGS during this first 12 months which means an average cost of Taka 31.02 or US$ 1.55 per episode treated. This average cost, however, is valid for the first year of the programme and in subsequent years there will be additional users for marginal additional expenditures by BRAC. If these additional users are also included the average cost would be lower. However, since the usage of LGS was higher in the Second phase (non-CRP and particularly CRP), the average cost per user may be even lower in the Second phase.

CONCLUSIONS

1. The research methods employed in this evaluation were sound and the results were representative and comparable between study areas. However, the thoroughness on the reporting of episodes of diarrhoea appeared to vary between study teams. Some methodological problems in the measurement of 'effective use' still remain to be solved. The findings from the village study were useful in distinguishing severe diarrhoeas from other forms of diarrhoea.

2. There are four types of illnesses in rural Bangladesh with the symptoms of diarrhoea, which are perceived by the villagers as different in aetiology and in the treatment required. Programmes should study the perceptions by the people in designing ORT interventions. Unfortunately this was not done thoroughly by BRAC before the start of the ORT programme.

3. There are several reasons why many people do not use LGS and these need further study, particularly the perception of the people about diarrhoea. Non-availability of 'gur' in households may be a major reason for the infrequent use of LGS. A greater positive involvement of the village practitioners would seem to be very advantageous to the programme and how to do this needs further operational research.

4. Usage rates were computed by using different definitions. Rates varied from 2 to 55 percents of episodes reported, and there was a decline in usage over time after teaching. LGS occupied the third position amongst diarrhoea treatment methods, after allopathy and 'Boneji' (local herbal system). Given that the teaching was done only once and that it had been carried out at one or two years previously, the usage achieved was considered encouraging. The proportion of households which reported as having ever used the method was computed and it indicated that

the programme in the Second phase was probably better in this regard. Households with joint families, higher land holding, possessing radio, previously taught by ORWs, a child attending school and with 'gur' available at home were found higher ever users. However, these variables could only explain less than 10 percent of the variation. The differentials need further study.

5. A knowledge of lobon-gur solution was almost universal and it was shown that in the greater majority of households this originated from the BRAC OTEP programme. There appeared to be no confusion between the LGS promoted by BRAC and the ORS packets which are promoted by the Bangladesh government.

6. The safety of the solution prepared by mothers was assessed by measuring the concentration of sodium in the solution. There appeared to be a decline over time in the ability to prepare a 'safe and effective' solution and the decline was more pronounced in the Second phase areas, where upto nearly a quarter of solutions were in the 'dangerous' range. Analysis of water volumes indicated that it was the mixing of ingredients rather than the measurement of water volume which resulted in the high sodium concentrations. A rapid expansion of the programme in the Second phase and the lack of experienced staff were suggested as reasons for the inter-phase variations.

7. Some results on usage and safety were not encouraging and left a great deal of room for improvements. The new CRP experiment (viz., the concentrated reinforcement programme) did not show statistically better results than the normal programme (non-CRP) either in usage or in the retention of appropriate knowledge or ability. Other elements of the CRP such as health education were, however, not studied through this evaluation.

8. Cost information of the First phase of OTEP was analysed and this showed that 72 US cents were spent in visiting and teaching about the use of LGS per household, or expressed in another form, 12 cents were spent in covering a person or 69 cents per child covered under 5 years of age. The cost per user of LGS for the first year of the First phase was estimated to be US$ 1.55, which would probably be lower in the Second phase areas and in the future years due to the small additional marginal costs incurred once the programme was established.

THE FUTURE

The Second phase of the BRAC programme will be over in June 1986. Should BRAC step into the third phase and if so how? Should the present programme (vertical non-CRP) continue given the results on the CRP or should they include other elements into the programme? These are the questions to which BRAC must now decide for the future.

Oral rehydration programmes are gaining momentum and by now they have been implemented in over 100 countries (McPherson, 1985). The value of ORT in reducing diarrhoea related mortality is well documented (Chapter 3) but the impact of ORT programmes is not. There is also documentation to show how a poorly organised programme can have no impact on mortality (Tekce, 1982). The effect of the BRAC programme on diarrhoeal mortality is still unknown. However, a good proportion of severe or potentially dehydrating diarrhoeas used the ORT solution but how effectively that was used is not clearly known.

Oral rehydration is ,however, only a facet in the overall control of diarrhoeal diseases. As Feachem et al. (1983a) mentioned, there are reasons why ORT only cannot be considered a panacea for diarrhoeal diseases. The reasons are: operational constraints in the extensive promotion and use of ORT at the community level, limited usefulness of it in chronic or dysenteric diarrhoeas and little or no effectiveness in reducing the incidence of diarrhoeas. The Diarrhoea Disease Control Programme of the World Health Organization has advocated several strategies for diarrhoea control and only one of them was ORT (Merson, 1983). Oral rehydration is also only one amongst the measures promoted through the Child Survival and Development Revolution of UNICEF (Grant, 1985). If the objective of a programme is to save the lives of children from diarrhoea, it should include other elements also which are known or proved effective for the purpose. Recently Feachem and colleagues have published a list of potential interventions for diarrhoeal disease control (Feachem et al., 1983a). Four types of such interventions have been considered:

1. <u>By case management</u> through oral rehydration, non-oral rehydration, appropriate feeding and chemotherapy.
2. <u>By increasing host resistance</u> maternal nutrition, child nutrition, immunization and chemoprophylaxis.
3. <u>By reducing transmission</u> through water supply and excreta disposal, personal and domestic hygiene, food hygiene, control of zoonotic reservoirs and fly control.
4. <u>By controlling and preventing epidemics</u> through surveillance, investigation and control.

They also have listed these interventions according to whether they are (a) effective, feasible and affordable; (b) potentially effective with unknown knowledge about feasibility or cost; and (c) ineffective or unfeasible or too costly.

The BRAC 7 points (Appendix 2) also talks about child nutrition and personal and domestic hygiene. As considerable efforts and resources are being channelled to this programme, it may be worthwhile to consider some other elements of these potential interventions which would be within the organizational capabilities of BRAC. This will in turn could mean that with some additional effort infant and child mortality might be further reduced. BRAC is already thinking in these directions and proposing a broader and more elaborate child survival programme for the third phase (BRAC, 1986).

CHAPTER 12: RECOMMENDATIONS

The previous chapter discussed the findings and the conclusions arising from this evaluation study of the BRAC ORT programme. In summary, there are four major conclusions that need to be considered before recommendations can be made. The first two concern fundamental assumptions built into the design and implementation of the programme itself, which are:

1. BRAC assumed that the term diarrhoea covered all diarrhoea episodes. However, there appear to be four well recognised types of illness found in rural Bangladesh which have the symptoms of diarrhoea. The village people interpreted the BRAC message on diarrhoea using their own perceptions and illness classifications, which has largely led them to assume that LGS was for what they call 'Diarrhoea', a term used to denote severe watery or cholera-like diarrhoea.

2. BRAC assumed in planning OTEP that gur or unrefined sugar was readily available to most households, but this has now been shown not to be the case. Gur is not available to a large majority of households and its availability also appears to be extremely seasonal.

The second two conclusions concern the usage and safety of LGS.

3. The overall usage of LGS per episode was low, even though it occupied third place as a treatment, after allopathic medicines and Boneji. However, usage was clearly much higher for episodes of 'Diarrhoea' or severe diarrhoea. In addition, the usage rate for LGS was clearly higher following the Second Phase teaching, although there was no difference between usage in the experimental Community Reinforcement Programme (CRP) areas and the non CRP areas.

4. There was a clear deterioration over time in the mothers'

ability to prepare 'safe and effective' lobon-gur solutions (LGS). However, for the First Phase this deterioration took place between 6 and 24 months after the original teaching, whereas for the Second Phase this deterioration was clearly seen within the 12 months followup period. There was no basic difference between CRP and non CRP areas in this regard. The lack of ability to prepare a 'safe and effective' LGS solution was due to faulty pinches of salt and not in the volume of water used.

Recommendations to BRAC

BRAC has implemented a massive vertical programme in which an ORW taught one woman per household for an average of 30 minutes in 5 million households by December 1985. The more widespread knowledge of ORT in Bangladesh is in large part due to BRAC's activities. However, the following recommendations concern possible improvements that could be made to the ORT programme.

1. BRAC needs to explore in much greater depth the significance and meaning of the four types of diarrhoea, with a view to focussing attention more clearly on the use of LGS for these types. ORWs may mention clearly to the mother about each of these (by using local terms for each) and draw her attention to the need for rehydration in each type.

2. Since gur is not a readily available household item, the use of alternative substrates, such as refined sugar and/or rice powder, should be experimented with.

3. The apparently much higher usage rates of LGS in the Second Phase, compared to the First Phase, needs to be explained. The reasons may indicate the best ways in which the face to face teaching can be improved.

4. The details of how the mothers are being actually taught the 'pinch and scoop' need to be explored and an explanation obtained as to why in the Second Phase there was a surprisingly high

proportion of solutions with dangerous levels of sodium. In this respect, the 7 points may be revised to focus more on the dangers of LGS.

5. The monitoring procedures need to be thoroughly reviewed, since it is surprising that the high proportion of dangerous LGS was not detected before this evaluation.

6. The assumption that certain additional programme inputs into the CRP areas would improve the usage of LGS was not born out in practice and therefore the effectiveness of these additional interventions needs to be thoroughly reviewed. There is no information from this evaluation to support the continuation of the Concentrated Reinforcement Programme (CRP) and in view of its cost and the time involved per union, this programme should be discontinued.

7. In implementing the ongoing evaluation of OTEP greater attention needs to be given to the value of the basic definition of a diarrhoea episode of 'one or more watery stools per day'. Using this definition as the denominator leads to an apparently low usage of LGS and this rate is likely to be widely misinterpreted. BRAC should institute a better range of usage indicators, such as usage for each type of diarrhoea.

8. This evaluation did not investigate the management aspects of the OTEP programme itself, and since some of the variation in results may be due to changes in how well the programme functioned, a thorough review is recommended of the ORW training, supervision, monitoring and incentive payment system. It appears that this has not been done since the inception of the Second Phase in October 1983.

Recommendations for further research

1. In depth social anthropological studies should be initiated into the four types of diarrhoea, their definition, aetiology and treatment, to determine how clearly and widely these are

understood by the people of Bangladesh.

2. Action research should be instituted as to how the perception of the people about diarrhoea and its treatment be fruitfully used in better implementation of ORT programmes.

3. More experimental research should be conducted into the effectiveness, feasibility and acceptability of gur substitutes, such as refined sugar and rice powder.

4. The programme should now experiment with the collection of monitoring information that would enable a more useful range of usage indicators to be calculated.

5. The monitoring of prepared LGS for dangerous solutions, using the silver nitrate method in field laboratories, needs to be fully validated and an improved reporting system experimented with to detect when the proportion of dangerous solutions reaches an unacceptable level.

6. Given the scale and ambitious targets of the OTEP programme, it is now extremely important, both to BRAC and the international community, that the impact study of OTEP on mortality be completed as soon as possible.

7. As BRAC has got good cost information, it is strongly recommended that a more elaborate cost-effectiveness study be carried out as soon as possible.

8. Since local practitioners appear to be a powerful influence against the greater use of LGS, further studies need to be carried out on this group of health care providers to determine how they could be more positively involved.

9. The OTEP programme also included in the 'Seven Points to Remember' knowledge on the control of diarrhoea, based on cleanliness, sanitation and child nutrition. In addition, the CRP trained traditional birth attendants and village volunteer

health workers. This evaluation did not cover any of these parts of the programme and certainly these aspects also need to be evaluated.

General recommendations on ORT programmes

The ORT programme of BRAC has had to overcome and work within several constraints. The teaching by BRAC to mothers was done only once and there was no reinforcement of this new knowledge and skill. Other ORT programmes which have shown better results with respect to usage have all had continuous reinforcement, either through repeated visits (e.g. in Egypt) or extensively through mass media (e.g. Honduras or The Gambia). In addition, gur was not available in many homes and local village health practitioners were found not to be supporting the programme. The BRAC programme also expanded very fast and it then suffered from a lack of experienced staff and leadership. Moreover, there was a wide misunderstanding between the message given by the oral rehydration fieldworkers and the people themselves.

However, if BRAC decides to go ahead with the programme and sweep the remaining parts of the country, how many of these constraints can be effectively overcome? A positive step could be to increase and intensify the mass media campaign, since a lot has been achieved in Honduras and The Gambia through such a campaign. Reinforcement could be strengthened provided enough resources are available. Problems with the availability of gur might be met by the simultaneous promotion of sugar or rice powder and more experienced staff could result from better management training. But can BRAC do anything to win the support of the health practitioners?

Governments or NGOs planning new ORT programmes may have a number of things to learn from the BRAC programme experience. Two vital things BRAC seemed to have ignored, or did not consider at the beginning, were the perceptions of the people about diarrhoea and its treatment and the availability of gur or molasses. The evaluation findings may have been very different had these been considered earlier.

Other innovations that the BRAC programme introduced may also be relevant for others. These include measures to control the quality of the programme through the system of monitoring and the use of incentive salaries for its frontline workers. Also, the simple system of chloride analysis, as a proxy for sodium, has been established in the field laboratories. But maybe most important, BRAC has also shown how a non-government organization can be a leader in promoting a nation-wide health intervention programme based on a home produced oral rehydration solution. This alone is no mean achievement.

Additional Tables

Table A.1: Respondents by broad age groups and by study areas

Age group (in years)	First Phase No.	First Phase %	Non-CRP No.	Non-CRP %	CRP No.	CRP %
Under 25	585	25.3	497	21.7	511	22.4
25-34	730	31.5	768	33.7	753	33.0
35-44	474	20.5	469	20.6	450	19.7
45+	528	22.7	546	24.0	568	24.9
All respondents	2317	100.0	2280	100.0	2282	100.0

Table A.2: Respondents by sex and by study areas

Sex	First Phase No.	First Phase %	Non-CRP No.	Non-CRP %	CRP No.	CRP %
Male	281	12.1	379	16.6	328	14.4
Female	2035	87.9	1903	83.4	1956	85.6
All respondents	2316	100.0	2282	100.0	2284	100.0

Table A.3: Respondents by relationship to head of household and by study areas

Relationship	First Phase No.	First Phase %	Non-CRP No.	Non-CRP %	CRP No.	CRP %
Head	451	19.5	544	23.8	528	23.1
Wife of head	1455	62.8	1407	61.7	1375	60.2
Others	411	17.7	331	14.5	381	16.7
All respondents	2317	100.0	2282	100.0	2284	100.0

Table A.4: Respondents by whether knows how to read or write a letter and by study areas

Literacy	First Phase No.	First Phase %	Non-CRP No.	Non-CRP %	CRP No.	CRP %
Knows how to read or write a letter	432	18.8	531	23.4	588	25.8
Does not know	1873	81.2	1744	76.6	1693	74.2
All respondents	2305	100.0	2275	100.0	2281	100.0

Table A.5: Number of diarrhoeal episodes identified by different interviewers in each team

Name of interviewer	No. of episodes identified
Team 1	
Anwara Begum	332
Shyamali	210
Honufa Begum	220
Shahana	276
Swaraste	298
Rafeza Khanam	412
Mira Rani	301
Total	2049
Mean	293

Name of interviewer	No. of episodes identified
Team 2	
Aleya Begum	110
Shibani Basu	72
Mahmuda Begum	91
Sneha Lata	119
Chitra Raha	79
Halima Begum	113
Total	584
Mean	97

Table A.5 (Contd.)

Team 3	
Jebunnessa	131
Halima Begum	106
Asha Lata	42
Shahin Akhtar	111
Arati Bhattacharya	91
Mariam Begum	59
Total	540
Mean	90

Team 4	
Lovely Roy	178
Nurjahan Begum	279
Sahera Begum	248
Sulekha	140
Shamima Nasrin	177
Promila	202
Total	1224
Mean	204

Table A.6: Age distribution of populations by broad age groups as reported by different teams of interviewers

Team No.	% of Population		
	Under 15 years	15 + years	Total
1	46.1	53.9	100.0
2	45.5	54.5	100.0
3	43.1	56.9	100.0
4	43.9	56.1	100.0
n	18,899	23,405	42,304

Table A.7: Sex distribution of population as reported by different teams

Team No.	% Population		
	Male	Female	Total
1	50.7	49.3	100.0
2	50.2	49.8	100.0
3	51.8	48.2	100.0
4	49.0	51.0	100.0
n	21,335	21,007	42,342

Table A.8: Number of diarrhoea episodes per 2 weeks and estimated annual incidence per person, by type of diarrhoea, age group and study areas

Age group (years)	First Phase Epis.	First Phase Incid.	Non-CRP Epis.	Non-CRP Incid.	CRP Epis.	CRP Incid.
(a) Diarrhoea type: 'Dud Haga'						
0- 4	118	1.27	191	2.20	250	3.10
5-14	0		0		0	
15-44	0		0		0	
45+	0		0		0	
Total 'Dud Haga'	118	0.21	191	0.35	250	0.48
(b) Diarrhoea type: 'Ajirno'						
0- 4	112	1.20	188	2.17	158	1.96
5-14	156	0.94	272	1.77	342	2.30
15-44	177	0.77	242	1.11	289	1.35
45+	71	0.90	101	1.29	141	1.73
Total 'Ajirno'	516	0.91	803	1.50	930	1.77
(c) Diarrhoea type: 'Amasha'						
0- 4	63	0.68	119	1.37	153	1.90
5-14	61	0.37	104	0.68	160	1.08
15-44	149	0.64	160	0.74	238	1.11
45+	65	0.82	78	0.99	128	1.57
Total 'Amasha'	338	0.59	461	0.86	679	1.29
(d) Diarrhoea type: 'Diarrhoea'						
0- 4	12	0.13	15	0.17	18	0.22
5-14	13	0.08	28	0.18	25	0.17
15-44	21	0.09	22	0.10	29	0.13
45+	5	0.06	13	0.16	8	0.10
Total 'Diarrhoea'	51	0.09	78	0.14	80	0.15

Table A.9: Age distribution (%) of diarrhoea patients in the 'matched' and 'single interview' groups by study areas

Age groups (years)	First Phase Matched	First Phase Single	Non-CRP Matched	Non-CRP Single	CRP Matched	CRP Single
Under 5	31.0	21.9	36.4	30.4	31.5	27.5
5-14	22.2	24.3	24.6	28.2	25.6	28.1
15-24	16.0	11.4	12.2	9.6	10.6	13.1
25-34	11.2	17.1	8.6	11.2	11.5	11.2
35-44	6.6	8.1	5.5	8.0	7.0	5.8
45+	13.0	17.2	12.7	12.6	13.8	14.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
n	739	210	615	783	781	846

Table A.10: Sex distribution (%) of patients in the 'matched'and 'single interview' groups by study areas

Sex	First Phase Matched	First Phase Single	Non-CRP Matched	Non-CRP Single	CRP Matched	CRP Single
Male	49.7	46.7	50.6	45.5	48.3	47.4
Female	50.3	53.3	49.4	54.5	51.7	52.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
n	739	210	615	784	782	846

Table A.11: Literacy (%) of diarrhoea patients (aged 5+ years) in the 'matched' and 'single interview' groups by study areas

Literacy	First Phase Matched	First Phase Single	Non-CRP Matched	Non-CRP Single	CRP Matched	CRP Single
Can read or write a letter	23.8	18.9	27.1	19.5	26.3	27.0
Cannot read or write a letter	76.2	81.1	72.9	80.5	73.7	73.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
n	508	154	391	535	533	592

Table A.12: Religion (%) of diarrhoea patients in the 'matched' and 'single interview' groups by study areas

Religion	First Phase Matched	First Phase Single	Non-CRP Matched	Non-CRP Single	CRP Matched	CRP Single
Islam	90.4	85.7	95.2	98.3	94.2	92.3
Hinduism	9.6	14.3	4.8	1.7	5.8	7.7
Total	100.0	100.0	100.0	100.0	100.0	100.0
n	741	210	625	787	796	849

Table A.13: Usage rates by upazilas

Upazila	No. of episodes	No. used	% used
(a) First Phase			
Rajoir	96	6	6.2
Bhanga	20	2	10.2
Gangni	69	14	20.3
Moheshpur	43	5	11.6
Shyamnagar	45	1	2.2
Terokheda	42	1	2.4
Jagannatpur	188	10	5.3
First phase Total	503	39	7.7
(b) Non-CRP			
Gopalpur	26	10	38.5
Galachipa	164	17	10.3
Bhaluka	61	9	14.7
Chandina	97	26	26.8
Tarail	47	12	25.5
Ujirpur	90	9	10.0
Shibpur	81	4	4.9
Char Fassion	294	27	9.2
Non-CRP Total	860	114	13.2

Table A.13 (contd.)

(c) CRP			
Bhuapur	19	1	5.2
Mirzaganj	148	17	11.5
Gaffargaon	36	18	50.0
Homna	81	29	35.8
Karimganj	48	19	39.6
Kotwali	155	18	11.6
Monohardi	120	20	16.7
Lalmohan	338	39	11.5
CRP Total	945	161	17.0

Table 14: Usage rates by interviewing teams

Teams	Total episodes	% using LGS
1	1097	10.7
2	300	9.0
3	236	29.2
4	674	12.5

Table 15: Usage (%) of LGS amongst all diarrhoeal episodes by and sex of patients and study areas

Age group (years)	First phase M	F	T	Non-CRP M	F	T	CRP M	F	T
0- 4	5.7	1.0	3.3	9.5	11.0	10.9	13.0	10.8	11.8
n	139	135	274	242	217	459	253	223	476
5-14	3.9	6.2	5.1	7.8	6.8	7.3	13.6	10.6	12.1
n	102	113	215	193	177	370	221	216	437
15-44	7.1	3.4	5.2	7.6	8.2	8.0	8.3	6.9	7.5
n	140	185	325	157	231	388	192	290	482
45+	2.4	0	1.5	4.7	5.7	5.1	6.4	6.8	6.6
n	82	50	132	106	70	176	110	117	227
All	5.2	3.1	4.1	7.9	8.5	8.2	10.9	8.9	9.9
n	463	483	946	698	695	1393	776	846	1622

Note: M- Male; F- Female; T- Total; n- No. of episode in cell

Table A.16: Usage (%) of LGS amongst diarrhoeal episodes using at least one treatment method, by age and sex of patients and study areas

Age group (years)	First Phase M	F	T	Non-CRP M	F	T	CRP M	F	T
0- 4	13.1	1.4	6.8	14.9	17.0	15.9	20.4	16.8	18.7
n	61	71	132	154	141	295	157	143	300
5-14	7.3	14.0	10.4	14.4	13.0	13.8	24.2	21.1	22.7
n	55	50	105	104	92	196	124	109	233
15-44	10.4	8.4	9.5	10.2	14.6	12.5	11.8	13.9	12.9
n	96	83	179	118	130	248	135	144	279
45+	3.4	0	2.3	6.6	9.1	7.5	10.6	12.1	11.4
n	58	29	87	76	44	120	66	66	132
All	8.9	6.4	7.7	12.2	14.5	13.3	17.6	16.2	16.9
n	270	233	503	452	407	859	482	462	944

Note: M- Male, F- Female, T- Total, n- no. of episodes in cell

Table A.17: Usage of LGS amongst diarrhoea episodes using at least one treatment method, by diarrhoea type, age group and study areas

Age group (years)	First phase Total Episodes	First phase % Using LGS	Non-CRP Total Episodes	Non-CRP % Using LGS	CRP Total Episodes	CRP % Using LGS
(a) Diarrhoea type: Dud haga						
<1	21	4.8	49	10.2	36	19.4
1	22	0	44	25.0	36	25.0
2	5	20.0	18	16.7	31	12.9
3	2	0	3	33.3	10	40.0
4	0	-	1	0	2	50.0
0- 4	50	4.0	115	17.4	115	21.7
5-14	0	-	0	-	0	-
15-44	0	-	0	-	0	-
45+	0	-	0	-	0	-
All 'Dud haga'	50	4.0	115	17.4	115	21.7
(b) Diarrhoea type: Ajirno						
0- 4	40	7.5	82	20.7	72	25.0
5-14	57	12.3	108	15.7	114	27.3
15-44	77	9.1	111	15.3	118	14.4
45+	36	5.5	49	14.3	53	18.9
All 'Ajirno'	210	9.0	350	16.5	357	21.3

Contd.

Table A.17 (contd.)

(c) Diarrhoea type: Amasha						
0- 4	30	3.3	84	7.1	99	5.0
5-14	36	2.8	62	0	98	11.2
15-44	81	3.7	116	5.2	137	5.1
45+	46	0	59	0	72	0
All 'Amasha'	193	2.6	321	3.7	406	5.7
(d) Diarrhoea type: Diarrhoea						
0- 4	12	25.0	14	28.6	14	57.1
5-14	12	25.0	26	38.5	21	52.4
15-44	21	33.3	21	38.1	24	50.0
45+	5	0	12	16.7	7	71.4
All 'Diarrhoea'	50	26.0	73	32.9	66	54.5

Table A.18: Sodium concentrations in lobon-gur solutions prepared in households where recent use was reported

Na (in mmol/L)	First phase No.	First phase %	Non-CRP No.	Non-CRP %	CRP No.	CRP %
<30	0		0		1	
30- 99	7	77.7	19	63.3	12	50.0
100-119	1		4		3	
120+	1		7		8	
Total	9	100.0	30	100.0	24	100.0
Mean (mmol/L)	70.4		92.8		106.6	

Note: Percentages for cells with small numbers are not computed.

Table A.19: Number of times LGS prepared during the recent episode by type of diarrhoea and study areas

Diarrhoea type	No. of times LGS prepared								
	First phase			Non-CRP			CRP		
	1	2-3	4+	1	2-3	4+	1	2-3	4+
Dud haga	1	1	0	9	10	0	6	15	4
Ajirno	12	4	3	32	23	0	27	46	4
Amasha	2	3	0	4	6	0	5	13	5
Diarrhoea	3	9	1	4	15	3	12	15	9
Total	18	17	4	49	54	3	50	89	22

Table A.20: Number of watery stools after which LGS was started by type of diarrhoea and study areas

Diarrhoea type	No. of watery stools: First phase 1	2-3	4+	Non-CRP 1	2-3	4+	CRP 1	2-3	4+
Dud haga	2	0	0	3	11	5	7	14	3
Ajirno	2	5	12	13	32	9	25	42	10
Amasha	3	2	0	2	5	3	2	16	4
Diarrhoea	1	7	4	2	12	8	9	18	9
Total	8	14	16	20	60	25	43	90	26
%	21	37	42	19	57	24	27	57	16

Table A.21: Mean chloride concentrations in LGS samples collected by monitors during October 1983 to December 1983 by programme areas

Programme Area	Mean Chlorode Concentrations (mmol/L)	n
Comilla	66.5	1391
Narsingdi (Dhaka)	62.3	903
Mymensingh	75.6	128
Barisal	89.2	713
Bhola (Barisal)	81.6	692
Patuakhali	79.5	711
Total	73.9	4538

REFERENCES

Abed,FH. Household teaching of oral therapy in rural Bangladesh. Assignment Children, 1983; 61/62: 250-265.

Ali, A. and Wahed, MA. Preparation and quality control of hand packaged oral rehydration salt sachets. Journal of Diarrhoeal Disease Research, 1984; 2: 162-167.

Anonymous. A positive effect on the nutrition of Philippine children of an oral glucose electrolyte solution given at home for the treatment of diarrhoea.Report of a field trial by an international study group. Bulletin of the World Health Organization, 1977; 55: 87-94.

Anonymous. (editorial). Weekly Epidemiological Record (WHO), 1979; 16: 121-123.

Anonymous. Beneficial effects of oral electrolyte-sugar solutions in the treatment of children's diarrhea. Bulletin of the World Health Organization, 1981; 27: 62-67.

Anonymous. Egypt:mothers cut diarrheal deaths in half with homemade treatment. Salubritas, 1982; 6: 1-2.

Anonymous. ORS: new formula gives longer shelf life. Diarrhoea Dialogue, 1984; 19: 2.

Anonymous. Oral Rehydration: A Manual for Physicians. Dhaka. 1985;Program for the Introduction and Adaptation of Contraceptive Technology (PIACT): 70p.

Armitage, P. Statistical Methods of Medical Research. Oxford, Blackwell Scientific Publications, 1971.

Ashworth, A and Feachem, RG. Intervention for the control of diarrhoeal disease: prevention of low birth weight. Bulletin of the World Health Organization, 1985; 63: 165-184.

Aziz, KMA. Present trends in medical consultation prior to death in rural Bangladesh. Bangladesh Medical Journal, 1977; 6:53-58.

Bangladesh Rural Advancement Committee. Sulla Project. Dhaka. 1975; 35p.

Bangladesh Rural Advancement Committee. Oral Therapy Extension Programme Phase I. Dhaka. 1980;57p.

Bangladesh Rural Advancement Committee. Interviewer's Manual. Dhaka, 1981a; 26p.

Bangladesh Rural Advancement Committee. Supervisor's Manual. Dhaka, 1981b; 23p.

Bangladesh Rural Advancement Committee. Oral Therapy Extension Programme Phase II. Dhaka. 1983(a); 59p.

Bangladesh Rural Advancement Committee. (general description). Dhaka. 1983; 16p.

Bangladesh Rural Advancement Committee. Report of Phase I of Oral Therapy Extension Programme. Dhaka. 1984;35p.

Bangladesh Rural Advancement Committee. An evaluation of BRAC's ORT programme: A study of two upazilas. Dhaka, 1985: 143p.

Bangladesh Rural Advancement Committee. Child Survival Program. Dhaka. 1986; 45p.

Barzgan, MA, Ourshano. The evaluation of the effectiveness of oral rehydration in acute diarrhea of children under three years of age in West Azerbaijan,Iran. Journal of Tropical Pediatrics, 1980; 26: 217-222.

Bart, KJ and Finberg, L. Single solution for oral therapy of diarrhoea. Lancet, 1976; 1: 633-634.

Baumslag, N, Mason, LG. Diarrheal Disease and Oral Rehydration:An Annotated Bibliography. 1979;US Department of Health,Education and Welfare.

Behar, M, Ascoli, W and Scrimshaw, NS. An investigation into the causes of death in children in four rural communities in Guatemala. Bulletin of the World Health Organization, 1958; 19: 1093-1102.

Bhatia, S., Cash, RA. and Cornaz, I. Evaluation of the Oral Therapy Extension Programme of Bangladesh Rural Advancement Committee. Berne. 1983; Swiss Development Cooperation:3 volumes.

Bhatia, S and Cutting, W. Teaching millions individually. Diarrhoea Dialogue, 1984; 19: 3.

Bhatia, S., Mosley, WH., et al. The Matlab family planning-health services project. Studies in Family Planning, 1980;11(6):202-212.

Blum, D. and Feachem, RG. Measuring the impact of water supply and sanitation investments on diarrhoeal diseases: problems of methodology. International Journal of Epidemiology, 1983; 12: 357-365.

Black, RE, Brown, KE, Becker, S and Yunus, M. Longitudinal studies of infectious diseases and physical growth of children in rural Bangladesh. I. Patterns of morbidity. American Journal of Epidemiology, 1982a; 115: 305-314.

Black, RE, Brown, KE, Becker, S, Alim, ARMI and Huq, I. Longitudinal studies of infectious diseases and physical growth of children in rural Bangladesh. II. Incidence of diarrhea and association with known pathogens. American Journal of Epidemiology, 1982b; 115: 315-324.

Booth, IW and Harries, JT. Oral rehydration therapy:an issue of growing controversy. Journal of Tropical Pediatrics, 1982; 28: 116-123.

Cash, RA. Oral therapy for diarrhoea. Tropical Doctor, 1979; 9: 25-30.

Cash, RA. Oral rehydration in the treatment of diarrhea. Issues in the implementation of diarrhea treatment programs. In: Chen, LC et al.(eds.). Diarrhea and Malnutrition: Interaction, Mechanism and Intervention. London. Plenum Press. 1983: pp 203-221.

Cash, RA and McLaughlin, J. (eds.). Proceedings of the International Conference on Oral Rehydration Therapy. Washington D.C. Agency for International Development. 1983: 210p.

Cash, RA, Nalin, DR, Forrest, JN and Abrutyn, E. Rapid correction of acidosis and dehydration of cholera with oral glucose and electrolyte solution. Lancet, 1970; 2: 549-550.

Cash, RA, Nalin, DR, Rochat, R, Reller, LB, Haque, ZA and Rahman, ASMM. A clinical trial of oral therapy in a rural cholera treatment centre. American Journal of Tropical Medicine and Hygiene, 1970; 19: 653-656.

Chatterjee, HN. Control of vomiting in cholera and oral replacement fluid. Lancet, 1953; 2: 1063.

Chatterjee, A, Mahalanabis, D, et al. Oral rehydration in infantile diarrhea: controlled trial of a low sodium glucose electrolyte solution. Archives of Disease in Childhood, 1978; 53: 284-289.

Chaudhuri, A, De, S, Dutta, P, Dutta, P, Sircar, BK, De, SP, Nath, J and Pal, SC. Oral fluid therapy for cholera and non-choleraic diarrhoeas in children. Journal of Communicable Diseases, 1975; 7: 124-128.

Chen, LC. The control of diarrheal diseases morbidity and mortality;some strategic issues. American Journal of Clinical Nutrition, 1978; 31: 2284-2291.

Chen, LC. Interactions of diarrhea and malnutrition. In Chen, LC and Scrimshaw, NS (editors), Diarrhea and Malnutrition: Interactions, Mechanism and Interventions. London; Plenum Press, 1983.

Chen LC, Black, RE and Sardar, AM, Merson, MH, Bhatia, S, Yunus, M and Chakraborti, J. Village based distribution of oral rehydration therapy packets in Bangladesh. American Journal of Tropical Medicine and Hygiene, 1980; 29: 285-290.

Chen, LC, Huq, E and D'Souza, S. Sex bias in the family allocation of food and health care in rural Bangladesh. Population and Development Review, 1981; 7: 55-70.

Chen, LC, Rahman, M and Sardar, AM. Epidemiology and causes of death among children in a rural area of Bangladesh. International Journal of Epidemiology, 1980; 9: 25-33.

Chowdhury, AMR. Impressions of a visit to OTP. (mimeo). Dhaka. BRAC. 1980:5p.

Chowdhury, AMR. Some results from OTEP: the implications and future directions. Dhaka. BRAC. 1982: 8p.

Chowdhury, AMR. The retention of knowledge about homemade oral rehydration solution:a survey in rural Bangladesh. Sylhet Medical Journal, 1982; 6: 11-15. and Bangladesh Paediatrics, 1983: 11-13.

Chowdhury, AMR. Diarrhoeal morbidity and treatment in BRAC programme areas.(mimeo). Dhaka. BRAC. 1983 (unpublished): 15p.

Chowdhury, AMR. and Ahmed, J. A design and field methods for measuring the impact of an oral therapy programme on mortality (follow-up surveys). Dhaka. 1983; BRAC:20p.

Chowdhury, AMR. and D'Souza, S. A design and field methods for monitoring impact of an oral therapy programme. Dhaka. 1982; International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) Working paper no. 27:23p.

Chowdhury, FI. and Chowdhury, AMR. Use pattern of oral contraceptive in rural Bangladesh. Bangladesh Development Studies. 1978:Monsoon.

Chowdhury, FI., Chowdhury, AMR and Ahmed, A. Use-effectiveness and safety of oral contraceptive in rural Bangladesh. Bangladesh Development Studies. 1980; Summer.

Church, MA. Fluids for the sick child,a method for teaching mothers. Tropical Doctor, 1972; 2: 119-121.

Claquin, P. Private health care providers in rural Bangladesh. Social Science and Medicine, 1981; 15B: 153-157.

Cohen, N, Mitra, M, Regt, EL and Davidson, J. Treating the whole child. Dialogue on Diarrhoea, 1985;21:4-5.

Collyns, W. Malignant cholera: bleeding cold salt and water in gallons. Lancet, 1832; 1: 113

Corrales, GA., Melara, A., and Bonnano, MR. The control of diarrhoeal diseases experiment with a national program in Honduras. In: Cash, RA., et al. (eds.). Proceedings of the International Conference on Oral Rehydration Therapy. Washington D.C. 1983; USAID Bureau of Science and Technology:210p.

Curran, PF. Sodium,chloride and water transport by rat ileum in vitro. Journal of General Physiology, 1960; 43: 1137-1148.

Cutting, WAM. Rehydration solution and domestic measurements. Lancet, 1977; 2: 663-664.

Cutting, WAM and Ellerbrock, TV. Homemade oral solutions for diarrhoea. Lancet, 1981; 1: 998.

Cutting, WAM, Harpin, VA, Lock, BA and Sedgwick, JR. Can village mothers prepare oral rehydration solution? Tropical Doctor, 1979; 9: 195-199.

Cutting, WAM and Langmuir, AD. Oral rehydration in diarrhoea: applied pathophysiology. Transactions of the Royal Society of Tropical Medicine and Hygiene, 1980; 74: 30-35.

Cutting, WAM, Omer, RI and McLean, SJ. A worldwide survey on the treatment of diarrhoeal disease by oral rehydration in 1979. Annals of Tropical Paediatrics, 1981; 1: 199-208.

Darrow, DC, Pratt, EL, Fleet, J, Gamble, AH and Wiese, HF. Disturbances of water and electrolytes in infantile diarrhea. Pediatrics, 1949; 3: 129-156.

De, SN. Cholera:Its Pathology and Pathogenesis. London. Oliver and Boyd. 1961: 141p.

Ellerbrock, TV. Oral replacement therapy in rural Bangladesh with home ingredients. Tropical Doctor, 1981; 11: 179-183.

El-Sherbini, AF, Fahmy, SI, EID, EE, Goda, MY, Eltantawy, AS and El-Sayyed, L. The use of oral rehydration in infantile diarrhoea. Journal of Egyptian Public Health Association, 1978; 53: 82-104.

Esrey, SA., Feachem, RG. and Hughes, JM. Intervention for the control of diarrhoeal disease among young children: improving water supplies and excreta disposal facilities. Bulletin of the World Health Organization, 1985; 63: 757-772.

Fakir, GS and Ahmed, J. A note on the availability of gur in rural Bangladesh. Dhaka, BRAC, 1985:7p.

Feachem, RG. Oral rehydration with dirty water? Diarrhoea Dialogue, 1981; 4: 7.

Feachem, RG., Hogan, RC, Merson, MH. Diarrhoeal disease control: reviews of potential interventions. Bulletin of the World Health Organization, 1983a; 61: 637-640.

Feachem, RG and Koblinsky, MA. Interventions for the control of diarrhoeal diseases among young children: measles immunization. Bulletin of the World Health Organization, 1983b; 61: 641-652.

Feachem, RG. and Koblinsky, MA. Intervention for the control of diarrhoeal disease among young children: promotion of breast feeding. Bulletin of the World Health Organization, 1984; 62: 271-291.

Feldman, S. The use of private health care providers in rural Bangladesh: a response to Claquin. Social Science and Medicine, 1983; 17: 1887-1896.

Finberg, L. The role of oral electrolyte-glucose solutions in hydration for children - international and domestic aspects (editorial). Journal of Pediatrics, 1980; 96: 51-54.

Finberg, L,Harper, PA, Harrison, H and Sack, RB. Oral rehydration for diarrhea (editorial). Journal of Pediatrics, 1982; 101: 497-499.

Finberg, L, Mahalanabis, D,et al. Oral therapy for dehydration in acute diarrhoeal diseases with special reference to the global diarrhoeal diseases control programme. Geneva. World Health Organization. WHO/BAC/DDC. 1979; 79: 1.

Folch-Lyon, E, Macorra, L and Shearer, SB. Focus group and survey research on family planning in Mexico. Studies in Family Planning, 1981; 12: 409-433.

Folch-Lyon, E and Trost, JF. Conducting focus group sessions. Studies in Family Planning, 1981; 12: 443-449.

Foote, D. Health education and mass media. AID Resources Report, 1983; 26: 28.

Fox, JP, Hall, CE, Cooney, MK, Luce, RE and Kronmal, RA. The Seattle virus watch. II. Objective, study population and its observation, data processing and summary of illnesses. American Journal of Epidemiology, 1972; 96:270-285.

Gopalan, C. Health problems in pre-school children. III. World-wide exoerience: special problems and preventive programmes. Indian Journal of Tropical Paediatrics, 1968; 14: 228-237.

Gordon, JE, Guzman, MA, Ascoli, W and Scrimshaw, NS. Acute diarrhoeal disease in less developed countries. 2. Patterns of epidemiological behaviour in rural Guatemalan villages. Bulletin of the World Health Organization, 1964; 31: 9-20.

Government of Bangladesh. Bangladesh Fertility Survey. Dhaka, Ministry of Health and Population Control; 1978.

Government of Bangladesh. Bangladesh Population Census: National volume. Dhaka, Bangladesh Bureau of Statistics; 1977.

Grant, JP. The state of the world's children 1986. Oxford; Oxford University Press, 1985.

Greenough III, WB. The role of ICDDR,B in research,training and extension of oral rehydration therapy. Glimpse, 1980; 2: 1-2.

Greenough III, WB. Directions for future research in ORT. In: Cash, RA, et al. (eds.). Proceedings of the International Conference on Oral Rehydration Therapy.Washington D.C.Agency for International Development. 1983: pp199-201.

Greenough III, WB. The international centre for diarrhoeal disease research, Bangladesh. Assignment Children, 1983; 61/62: 295-299.

Griffith, LSC, Fresh, JW, Watten, RH, and Villaroman, MP. Electrolyte replacement in paediatric cholera. Lancet, 1967; 1: 1197.

Guerrant, RL and Cash, RA. Infectious disease: treatment of cholera and other dehydrating diarrheas. In: Chen, LC (editor), Disaster in Bangladesh. Oxford, Oxford University Press, 1973.

Harrison, HE. The treatment of diarrhea in infancy. Pediatric Clinic of North America, 1954; 1: 335-348.

Hendrata, L. Spoons for making glucose-salt solution. Lancet, 1978; 1: 612.

Hielscher, S. and Sommerfeld, J. Concepts of illness and the utilization of health-care services in a rural Malian village. Social Science and Medicine, 1985; 21: 469-481.

Higgins, AR, Floyd, TM and Kader, MA. Studies in shigellosis. II. Observations on incidence and etiology of diarrheal in Egyptian children. American Journal of Tropical Medicine and Hygiene, 1955; 4: 271-280.

Hirschhorn, N. The treatment of acute diarrhea in children:an historical and physiological perspective. American Journal of Clinical Nutrition, 1980; 33: 637-663.

Hirschhorn, N. Oral rehydration therapy for diarrhea in children - a basic primer. Nutrition Reviews, 1982; 40: 97-104.

Hirschhorn, N and Denny, KM. Oral glucose-electrolyte therapy for diarrhea:a means to maintain or improve nutrition? American Journal of Clinical Nutrition, 1975; 28: 189-192.

Hirschhorn, N, Kinzie, JL, Sachar, DB, Northrup, RS, Taylor, JO, Ahmad, SZ and Phillips, RA. Decrease in net stool output in cholera during intestinal perfusion with glucose-containing solutions. New England Journal of Medicine, 1968; 279: 176-180.

Hirschhorn, N, McCarthy, BJ, Ranney, B, Hirschhorn, MA, Woodward, ST, Lacapa, A, Cash, RA and Woodward, WE. Ad libitum oral glucose-electrolyte therapy for acute diarrhea in Apache children. Journal of Pediatrics, 1973; 83: 562-571.

Hoyle, B, Yunus, M and Chen, LC. Breast-feeding and food intake among children with acute diarrheal disease. American Journal of Clinical Nutrition, 1980; 33: 2365-2371.

Islam, MR, Greenough III, WB, Rahaman, MM, Azad, AK and Sack, DA. Lobon-gur (common salt and brown sugar) oral rehydration solution in the treatment of diarrhoea of adults. Journal of Tropical Medicine and Hygiene, 1980; 83: 41-45.

Ittefaq (Dhaka). Gur-chini ek daam (editorial). 1985; 2 January: 2.

Joe, LK, Rukomo, B, Oemijati, S, Sahab, K, Newell, KW, Hway, ST and Talogo, RW. Diarrhoea among infants in a crowded area of Djakarta, Indonesia: a longitudinal study from birth to two years. Bulletin of the World Health Organization, 1966; 34: 197-210.

Kamal, M. A pinch of salt, a handful of molasses... UNICEF News, 1983; 118: 26-27.

Kendall, C., Foote, D. and Martorell, RA. Anthropology, communication and health: the mass media and health practices program in Honduras. Human Organization, 1980; 42: 353-360.

Kendall, C., Foote, D. and Martorell, R. Ethnomedicine and oral rehydration therapy: a case study of ethnomedical investigation and program planning. Social Science and Medicine, 1984; 19: 253-260.

Kielmann, AA and McCord, C. Home treatment of childhood diarrhea in Punjab villages. Environmental Child Health, 1977; 23: 197-201.

Kielmann, AA, Taylor, CE, Desweemer, C, Uberoi, IS, Takulia, HS, Masih, N and Vohra, S. The Narangwal experiment on interaction of nutrition and infection.2.Morbidity and mortality effects. Indian Journal of Medical Research, 1978; 68(supplement): 21-41.

Kleevens, JWL. Rice water for infant gastroenteritis. Lancet, 1981; 2: 306.

Kleinman, A., Eisenberg, L. Culture, illness and care: clinical lessons from anthropological and cross-cultural research. Annals of Internal Medicine, 1978; 88: 251-258.

Kuberski, T, Roberts, A,et al. Coconut water as a rehydration fluid. New Zealand Medical Journal, 1979; 90: 98-100.

Lancet (editorial). The cases of cholera successfully treated by large aqueous injections. 1832; 2: 284-286.

Lancet (editorial). Water with sugar and salt. 1978; 2: 300-301.

Lancet (editorial). Oral therapy for acute diarrhoea. 1981; 2: 615-617.

Lancet (editorial). Management of acute diarrhoea. 1983; 1: 623.

Latta, T. Malignant cholera:documents communicated by the Central Board of Health, London, relative to the treatment of cholera by the copious injection of aqueous and saline fluids into the veins. Lancet, 1831-32; 2: 274-277.

Lechtig, A. and Townsend, JW. SINAPS evaluation: results of community distribution of oral rehydration salts in Guatemala. In: Cash, RA., et al. (eds.). Preceedings of the International Conference on Oral Rehydration Therapy. Washington D.C. 1983; USAID Bureau of Science and Technology:210p.

Leeuwenburg, J, Genest, W, Muller, AS and Patel, C. Agents affecting health of mother and child in a rural area of Kenya. VII. The incidence of diarrheal disease in the under-five population. Tropical Geographic Medicine, 1978; 30:383-391.

Lerman, SJ, Shepard, DS and Cash, RA. Treatment of diarrhoea in Indonesian children: what it costs and who pays for it. Lancet, 1985; 2:651-654.

Levine, MM, Hughes, TP, Robut, BS, Black, RE, Clements, ML, Mathers, RN, Siegel, A and Smith, W.et al. Variability of sodium and sucrose levels of simple sugar/salt oral rehydration solutions prepared under optimal and field condition. Journal of Pediatrics, 1980; 97: 324-327.

Lozoff, B., Kamath, KR and Feldman, RA. Infection and disease in South Indian families: beliefs about childhood diarrhoea. Human Organization, 1975;34:353-358.

Mahalanabis, D, Choudhury, AB, Bagchi, NG, Bhattacharya, AK and Simpson, TW. Oral fluid therapy of cholera among Bangladesh refugees. Johns Hopkins Medical Journal, 1973; 132: 197-205.

Mahalanabis, D, Jalan,P. Present and future of oral rehydration therapy for diarrhoeal diseases with special reference to health care delivery. Indian Journal of Preventive and Social Medicine, 1975; 6: 286-290.

Mahalanabis, D, Sack, RB, Jacobs, B, Mondal, A and Thomas, J. Use of an oral glucose-electrolyte solution in the treatment of paediatric cholera:a controlled study. Journal of Tropical Pediatrics and Environmental Child Health, 1974; 20: 82-87.

Martorell, R, Habicht, JP, Yarbrough, C, Lechtig, A, Klein, RE and Western, KA. Acute morbidity and physical growth in rural Guatemalan children. American Journal of Diseases of Children, 1975; 129: 1296-1301.

Mata, L. The children of Santa Maria Cauque: a prospective field study of health and growth. Cambridge, Massachusetts; MIT Press, 1978.

Mata, L. Diarrhoeal disease - how Costa Rica won? World Health Forum, 1981; 2: 141-145.

Mata, L, Urrutia, JJ and Gordon, JE. Diarrheal disease in a cohort of Guatemalan village children observed from birth to age two years. Tropical Geographic Medicine, 1967; 19:247-257.

McCord, C. and Kielmann, AA. A successful programme for medical auxiliaries training childhood diarrhoea and pneumonia. Tropical Doctor, 1978;8:220-225.

McDaniel, C. Focus groups- their role in marketing research process. Akron Business and Economic Review, 1979; 10: 14-19.

McPherson, P. Address at the concluding session of the second international conference on oral rehydration therapy (ICORT II). Washington D.C. December 10-13, 1985.

Melamed, A and Segall, M. Spoons for making glucose-salt solution. Lancet, 1978; 1: 1317-1318.

Merson, MH. The WHO diarrhoeal disease control programme: the practical application of ORT. In: Cash, RA, et al. (eds.), Proceedings of the International Conference on Oral Rehydration Therapy, Washington D.C. USAID Bureau of Science and Technology; 1983: 23-28.

Merson, MH, Black, RE and Khan, MU. Epidemiology of cholera and enterotoxigenic E. Coli diarrhea. Stockholm, Proceedings of the Nobel Symposium, 1978.

Meyer, AJ, Block, CH, et al. Teaching mothers oral rehydration. Horizons, 1983; April: 14-20.

Miller, CJ, Drasar, BS and Feachem, RG. Response of toxigenic V. Cholerae 01 to physico-chemical stresses in aquatic invironments. Journal of Hygiene Cambridge, 1984; 93:475-495.

Mobarak, AB., Hammamy, MT., Gomaa, AI, Abou-El-Saad, S, Lotfi, RK, Mazen, I and Kielmann, AA. Diarrhoea disease control study May through October 1980. Cairo. 1980; Egypt, Ministry of Rural Health Department of Strengthening Rural Health Delivery Project: 51p.

Molla, AM., Ahmed, SM and Greenough III, WB. Rice-based oral rehydration solution decreases the stool volume in acute diarrhoea. Bulletin of the World Health Organization, 1985; 63: 751-756.

Molla, A, Molla, AM, Sarkar, SA, Khatun, M and Rahaman, MM. Effects of acute diarrhea on absorption of macro-nutrients during disease and after recovery. In: Chen, LC, et al. (eds.), Diarrhea and Malnutrition. London; Plenum Press, 1983.

Molla, AM, Rahman, M, Sarkar, SA, Sack, DA and Molla, A. Stool electrolyte content and purging rates in diarrhea caused by rotavirus, enterotoxigenic E Coli and V. Cholerae in children. Journal of Pediatrics, 1981; 98: 835-838.

Molla, AM, Sarkar, SA, Hossain, M, Molla, A and Greenough, WB. Rice-powder electrolyte solution as oral therapy in diarrhoea due to V.cholera and E.Coli. Lancet, 1982; 1: 1317-1319.

Moore, HA, Cruz, E and Vargas-Mendez, O. Diarrheal disease studies in Costa Rica. III. Morbidity and mortility from diarrhea. American Journal of Epidemiology, 1965;82: 143-161.

Moore, HA, Cruz, E and Vargas-Mendez, O. Diarrheal disease study in Costa Rica. I. Plan and methods of investigation. American Journal of Public Health, 1966; 56: 276-286.

Moran, N. Oralrehydration therapy in home and hospitals: experience in rural Nigeria. Pediatric Nursing, 1976; 2: 32-33.

Morley, D. Paediatric Priorities in the Developing World. London. Butterworth. 1970: 470p.

Morley, D and King, M. Spoons for making glucose-salt solution. Lancet, 1978; 1: 53-54.

Nalin, DR. A spoonful of sugar...Lancet, 1978; 2: 264.

Nalin, DR and Cash, RA, Islam, R, Molla, M and Phillips, RA. Oral maintenance therapy for cholera in adults. Lancet, 1968; 2: 370-373.

Nalin, DR, Cash, RA, Rahman, M and Yunus, M. Effect of glycine and glucose on sodium and water absorption in patients with cholera. Gut, 1970; 11: 768-772.

Nalin, DR and Cash, RA. Oral therapy for cholera. Annals of Internal Medicine, 1970; 72: 288-289.

Nalin, DR and Cash, RA. Oral or nasogastric maintenance therapy for diarrhoea of unknown aetiology resembling cholera. Transactions of the Royal Society of Tropical Medicine and Hygiene, 1970; 64: 769-771.

Nalin, DR and Cash, RA. Oral or nasogastric maintenance therapy in pediatric cholera patients. Journal of Pediatrics, 1971; 78: 355-358.

Nalin, DR and Cash, RA. Oral therapy for cholera. In: Barua, D. et al.(eds.). Cholera. London. W.B. Sanders Company. 1974: pp253-261.

Nalin, DR,Levine, MM, Mata, L, Lespedas, C, Vargas, W, Lizano, C, Loria, AR, Simhon, A and Mohs, E. Comparison of sucrose with glucose in oral therapy of infant diarrhoea. Lancet, 1978; 2: 277-279.

Nalin, DR, Levine, MM, Mata, L, Cespedas, C, Vargas, W, Loria, AR, Simhon, A and Mohs, E. Oral rehydration and maintenance of children with rotavirus and bacterial diarrhoeas. Bulletin of the World Health Organization, 1979; 57: 453-459.

Nalin, DR, Hartland, E, Ramlal, A, Swaby, D, McDonald, J, Gangarosa, R, Levine, M and Johnson, B. Comparison of low and high sodium and potassium content in oral rehydration solutions. Journal of Pediatrics, 1980; 97: 848-853.

Nations, MK. Illness of the child: the cultural context of childhood diarrhea in north-east Brazil. PhD dissertation. 1982. Berkeley, California: Department of Anthropology.

Nichols, BL and Soriano, HA. A critique of oral therapy of dehydration due to diarrheal syndrome. American Journal of Clinical Nutrition, 1977; 30: 1457-1472.

Oldfield, FSJ. Diarrhea disease control: a Gambian experience. In: Cash, RA., et al. (eds.). Proceedings of the International Conference on Oral Rehydration Therapy. Washington D.C. 1983; USAID Bureau of Science and Technology:210p.

O'Shaughnessy, WB. Experiments on the blood in cholera. Lancet, 1831-32; 1: 490.

Patra, FC, Mahalanabis, D, Jalan, KN, Sen, A and Banerjee, P. Is oral rice electrolyte solution superior to glucose electrolyte solution in infantile diarrhea? Archives of Disease in Childhood, 1982; 57: 910-912.

Phillips, RA. Water and electrolyte losses in cholera. Federation Proceedings, 1964; 23: 705-712.

Phillips, RA. Cholera in perspective of 1966. Annals of Internal Medicine, 1966; 65: 922-930.

Pierce, NF,Banwell, JG, Mitra, RC, Caranasos, GJ, Keimowitz, RI, Mondal, A and Manji, PM. Oral maintenance of water-electrolyte and acid-base balance in cholera:a preliminary report. Indian Journal Of Medical Research, 1968(a); 56: 640-645.

Pierce, NF, Banwell, JG, Mitra, RC, Caranasos, GJ, Keimowitz, RI, Mondal, A and Manji, PM. Effect of intragastric glucose-electrolyte infusion upon water and electrolyte balance in Asiatic cholera. Gastroenterology, 1968(b); 55: 333-343.

Pizarro, D, Posada, G, Mata, L, Nalin, D and Mohs, E. Oral rehydration of neonates with dehydrating diarrhoeas. Lancet, 1979; 2: 1209-1210.

Pollack, H. Disease as a factor in world food problems. American Journal of Clinical Nutrition, 1968; 21: 868-874.

Population Reports. Oral rehydration therapy for childhood diarrhea. Baltimore. Johns Hopkins University. 8(6): L41-L75.

Puffer, RR and Serrano, CV. Patterns of mortality in childhood. Pan American Health Organization. Washington D.C.; PAHO Scientific Publication No. 262, 1973.

Rabbani, GH, Greenough III, WB, Holmgren, J and Lonnroth, I. Chlorpromazine reduces fluid-loss in cholera. Lancet, 1979; 1: 410-412.

Rahaman, MM. Talk at the International Congress of Tropical Medicine and Malaria, 1983. Calgary, Canada.

Rahaman, MM. Direct nutrient loss and diarrhea. In: Chen, LC, et al. (eds.), Diarrhea and Malnutrition. London; Plenum Press, 1983.

Rahaman, MM, Aziz, KMS and Patwary, Y. Diarrhoeal mortality in two Bangladeshi villages with and without community-based oral rehydration therapy. Lancet, 1979; 2: 809-812.

Rance, TF. Treatment of the malignant cholera in the parish of St. Luke,Middlesex. Lancet, 1832; 2: 110-112.

Rogers, L. The treatment of cholera by injections of hypertonic saline solutions with a simple and rapid method of intraabdominal administration. Philippine Journal of Science, 1909; 4: 99-105.

Rohde, JE. Preparing for the next round: convalescent care after acute infection. American Journal of Clinical Nutrition, 1978; 31: 2258-2268.

Rohde, JE. Therapy begins at home. In: Cash, RA, et al.(eds.). Proceedings of the International Conference on Oral Rehydration Therapy. Washington D.C. Agency for International Development. 1983: pp30-35.

Rohde, JE. Personal communication with the author. 1984.

Rohde, JE, Cash, RA, Guerrant, RL, Mahalanabis, D, Molla, M and Valyasevi, A. Therapeutic intervention in diarrhea. In: Chen, LC, et al.(eds.). Diarrhea and Malnutrition: Interaction, Mechanism and Intervention. London. Plenum Press. 1983: pp287-295.

Rohde, JE and Hendrata, L. Oral rehydration:technology and implementation. In: Jelliffe, DB, et al. (eds.). Advances in International Maternal and Child health. Vol.1. New York. Oxford University Press. 1981: pp82-97.

Rohde, JE and Northrup, RS. Taking science where the diarrhoea is. In: Ciba Foundation. Acute Diarrhoea in Childhood. Amsterdam. Elsevier/ Excerpta Medica/ North Holland. 1976 (CIBA Foundation Symposium No.42): pp339-366.

Rosenberg, IH, Solomans, HW and Schneider, RD. Malabsorption associated with diarrhea and intestinal infections. American Journal of Clinical Nutrition, 1977; 30: 1248-1253.

Ross, DA and Vaughan, JP. Health interview surveys in developing countries. London, 1984; Evaluation and Planning Centre, London School of Hygiene and Tropical Medicine: 42p.

Rossi, PH. and Freeman, HE. Evaluation: A Systematic Approach. Beverly Hills. 1982;Sage:p175.

Rowland, MGM and Cole, TJ. The effect of early glucose-electrolyte therapy on diarrhea and growth in rural Gambian village children. Journal of Tropical Pediatrics, 1980; 26: 54-57.

Rowland, MGM, Cole, TJ and Whitehead, RG. A quantitative study into the role of infection in determining nutritional status in Gambian village children. British Journal of Nutrition, 1977; 37: 441-450.

Ruzicka, LT and Chowdhury, AKMA. Demographic surveillance system (volume 2). Dhaka, 1978, Cholera Research Laboratory.

Sack, DA, Islam, S, Brown, KH, Islam, A, Kabir, AKMI, Chowdhury, MAK and Ali, A. Oral therapy in children with cholera:a comparison of sucrose and glucose electrolyte solutions. Journal of Pediatrics, 1980; 96: 20-25.

Sack, RB, Pierce, NF and Hirschhorn, N. The current status of oral therapy in the treatment of acute diarrheal illness. American Journal of Clinical Nutrition, 1978; 31: 2251-2257.

Samadi, AR, Islam, R and Huq, MI. Replacement of intrvenous therapy by oral rehydration solutions in a large treatment centre for diarrhoea with dehydration. Bulletin of the World Health Organization, 1983; 61: 471-476.

Santosham, M, Daum, RS, Daum, M, Dillman, L, Rodriguez, J, Luque, S, Russell, R, Kouramy, M, Ryder, R, Bartlett, A and Sack, RB. Oral rehydration therapy of infantile diarrhea:a controlled study of well nourished children hospitalised in the United States and Panama. New England Journal of Medicine, 1982; 306: 1070-1076.

Sarder, AM. and Chen, LC. Distribution and characteristics of non-government health care practitioners in a rural area of Bangladesh. Social Science and Medicine, 1981;15A:543-550.

Sarker, SK.(Regional manager of OTEP, BRAC). Personal communication, 1985.

Scrimshaw, NS. Interactions of malnutrition and infection: advances in understanding. In: Olson, RE (ed.), Protein-calorie Malnutrition. San Francisco; Academic Press, 1975.

Scrimshaw, NS, Ascoli, W, Kevani, JJ, Flores, M and Iscaza, SJ. Nutrition and infection field study in Guatemalan villages 1959-1964. III. Field procedures, collection of data and methods of measurements. Archive of Environmental Health, 1967; 16: 6-15.

Scrimshaw, NS, Taylor, CE and Gordon, JE. Interactions of nutrition and infection. Geneva; WHO monograph no. 57, 1968.

Sebrell, WM, Smith, SC and Severinghouse, LL. Appraisal of nutrition in Haiti. American Journal of Clinical Nutrition, 1959; 7: 538-584.

Sellards, AW. Tolerance for alkalis in Asiatic cholera. Philippine Journal of Science, 1910; 5: 363-390.

Shepard, DS. Procedures for assessing the cost-effectiveness of a diarrhea disease control program based on ORT. In: Cash, RA., et al.(eds.). Proceedins of the International Conference on Oral Rehydration Therapy. Washington D.C. 1983; USAID Bureau of Science and Technology: 210p.

Shepard, DS and Brenzel, LE. Cost-effectiveness of the mass media and health practices projects. Mimeographed report from Stanford University to the Agency for International Development, 1985a: 62p.

Shepard, DS, Brenzel, LE and Nemeth, KT. Cost-effectiveness of oral rehydration therapy for diarrheal disease. Boston, 1985b; Institute for Health Research, Harvard School of Public Health: 122p.

Snow, J. On the mode of communication of cholera (2nd edition). London. John Churchill. 1854.

Snyder, JD. From pedialyte to popsicles: a look at oral rehydration therapy used in the United States and Canada. American Journal of Clinical Nutrition, 1982; 35: 157-161.

Snyder, JD and Merson, MH. The magnitude of the global problem of acute diarrhoeal disease: a review of active surveillance data. Bulletin of the World Health Organization, 1982; 60: 605-613.

Soeprapto, Soenarto, Y, et al. Feeding children with diarrhea. Tropical Pediatrics and Environmental Child Health, 1979; 24: 97-100.

Stanton, B., Clemens, J., Koblinsky, M, Khair, T. The urban volunteer program in Dhaka: a community based PHC and research initiative. Tropical Geographic Medicine, 1985; 37: 183-187.

Suresh, EG. Doctors still need convincing. Dialogue on Diarrhoea, 1985; 23:8.

Suyono, H. and Piet, N, Stirling, F and Ross, J. Family planning attitudes in urban Indonesia: findings from focus group research. Studies in Family Planning, 1981; 12: 433-442.

Taylor, JO, Hare, RS, et al. Measurement of Na+ fluxes in human small intestine. Federation Proceedings, 1968; 27: 386.

Taylor, PR, Merson, MH, Black, RE, Rahman, ASMM, Yunus, M, Alim, ARMA and Yolken, RH. Oral rehydration therapy for treatment of rotavirus diarrhoea in a rural treatment centre in Bangladesh. Archives of Disease in Childhood, 1980; 55: 376-379.

Tekce, B. Oral rehydration therapy:an assessment of mortality effects in rural Egypt. Studies in Family Planning, 1982; 13: 315-327.

Tomkins, A. Nutritional status and severity of diarrhoea among preschool children in rural Nigeria. Lancet, 1981; 2: 860-862.

Uhlig, A. Salt and sugar against disease and corruption. Swiss Review of World Affairs, 1982; January: 13-18.

UNICEF. Resource Guide: Oral Rehydration Therapy. Washington D.C. American Public Health Association. 1983: 24p.

Victora, C, Smith, P and Vaughan, JP. Social and environmental influences on child mortality in Brazil: logistic regression analysis of data from census files. Journal of Biosocial Science (in press).

Walsh, JA and Warren, KS. Selective primary health care: an interim strategy for disease control in developing countries. New England Journal of Medicine, 1979; 301: 967-974.

Watkinson, M, Lloyd-Evans, N,et al. The use of oral glucose electrolyte solution prepared with untreated well water in acute non-specific childhood diarrhea. 18p. (unpublished).

Watten, RH, Morgan, FM, Songkhla, YN, Vanikiati, B and Phillips, RA. Water and electrolyte studies in cholera. Journal of Clinical Investigation, 1959; 38: 1879-1889.

Wharton, BA. Gastro-enteritis in Britain: management at home. British Medical Journal, 1981; 283: 1277-1278.

Winardi, B, Soedarto, Sosroamidjojo and Koiman, I. Diarrheal disease control program (oral rehydration activities) in Indonesia. In: Cash, RA, et al. (eds.), Proceedings of the International Conference on Oral Rehydration Therapy. Washington D.C. Agency for International Development, 1983: 95-100.

Wray, JD. Malnutrition and diarrhea: the evidence from Candelaria. Thesis. Chapel Hill; University of North Carolina School of Public Health, 1967.

Wong, HB. Rice water in treatment of infantile gastroenteritis. Lancet, 1981; 2: 102-103.

World Bank. Bangladesh: Recent economic trends and medium term development issues. Washington D.C. 1983; South Asia Programs Department: 243p.

World Education. BRAC comes to town. World Education Reports, 1975; 6:1-7.

World Health Organization. Manual for the Treatment and Prevention of Diarrhoeal Disease for Health Workers. Geneva. 1975: 46p.

World Health Organization. Diarrhoeal Diseases Control Programme. Report of the WHO/UNICEF Consultation on the National Production, Packaging and Distribution of Oral Rehydration Salts (ORS). Bangkok. 1979: 33p.

World Health Organization. Clinical Management of Acute Diarrhoea. New Delhi. 1979: 21p.

World Health Organization. Data collection methods and related consideration. In: Evaluation of Primary Health Care in South East Asia. New Delhi. SEARO; 1983:40-46.

World Health Organization. Oral Rehydration Therapy: An Annotated Bibliography (Second edition). Washington D.C. Pan American Health Organization. 1983: 172p.

Yankaur, A. Oral rehydration and social change: the control of diarrheal disease in the third world (editorial). American Journal of Public Health, 1982; 72: 1105-1106.

Zijl, WJ. Studies on diarrhoeal disease in seven countries by the WHO diarrhoeal disease advisory team. Bulletin of the World Health Organization, 1966; 35: 249-261.

Zimicki, S., Yunus, M, Wahed, MA and D'Souza, S. A field trial of home-prepared oral rehydration solution in rural Bangladesh. Cambridge. 1984; Harvard University Center for Population Studies Discussion paper 84-4: 38p.

Zoysa, I, Carson, D, Feachem, RG, Kirkwood, B. Lindsay-Smith, E and Loewenson, R. Home-based oral rehydration therapy in rural Zimbabwe. Transaction of the Royal Society of Tropical Medicine and Hygiene, 1984a; 78: 102-105.

Zoysa, I., Carson, D., Feachem, RG., Kirkwood, B., Lindsay-Smith, E. and Loewenson, R. Perception of childhood diarrhoea and its treatment in rural Zimbabwe. Social Science and Medicine, 1984b; 19: 727-734.

Zoysa, I. and Feachem, RG. Intervention for the control of diarrhoeal disease among young children: rotavirus and cholera immunization. Bulletin of the World Health Organization, 1985; 63: 569-584.

APPENDICES

APPENDIX 1

Persons who served on the BRAC Technical Advisory Committee

* Dr Richard Cash, M.D., M.P.H.
Director, International Health Programs
Harvard School of Public Health
Boston, MA, USA.

Dr Lincoln Chen, M.D., M.P.H.
Formerly Scientific Director
Cholera Research Laboratory
Dhaka, Bangladesh.

* Dr Stan D'Souza, M.Sc., Ph.D.
Formerly Scientific Programme Head
International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B)
Dhaka, Bangladesh.

* Dr Roger Eeckles, M.D.
Director, International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B)
Dhaka, Bangladesh.

Ms Adrienne Germain, M.S.
Formerly Representative,
The Ford Foundation
Dhaka, Bangladesh.

Dr William Greenough III, M.D.
Formerly Director, International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B)
Dhaka, Bangladesh.

Dr Monowar Hossain, M.Sc., Ph.D.
Formerly Chairman, Bangladesh Institute of Development Studies
Dhaka, Bangladesh.

Dr Anthony Measham, M.D., Dr.P.H.
Formerly Program Officer,
The Ford Foundation
Dhaka, Bangladesh.

* Dr Qudrat-e-Khuda Talukder, M.B.B.S., Ph.D.
Professor of Paeditrics,
Institute of Post Graduate Medicine and Research
Dhaka, Bangladesh.

* Present members.

APPENDIX 2: The Seven Points to Remember

1. Loose motions and increased frequency of motions 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 spasm of hands and legs may set in. Loose motions then run 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 tubewell and 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 taken. All foodstuff 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 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 substances such as saline that are not easily available in the villages. Since these injections are intravenous, the services of a doctor is essential but it is 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. But the advantage is that it can be prepared right in the house and it requires only a little bit of salt, molasses and water.

4. Oral rehydration saline is prepared by mixing a pinch of salt

with the tips of three fingers and a fistful of molasses in half a seer 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 patient's system, and he/she may become weak. If dehydration takes place, saline injection become essential.

6. Adult patients should be given half a seer of oral saline as prepared at a time 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 foodstuff like rice and curry along with oral saline. In the case of children, breast-feeding 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 the patient's weakness and minimize the possibility of his/her falling victim of the disease again.

Reproduced from: Abed, FH. Household teaching of ORT in rural Bangladesh. Assignment Children,1983; 61/62:249-265.

APPENDIX 3: Recommendations of the External Evaluation Team

Reproduced from: Bhatia, S, Cash, RA and Cornaz, I. Evaluation of the Oral Therapy Extension Program (OTEP) of the Bangladesh Rural Advancement Committee (BRAC), Vol. 1:Report. Berne; Swiss Development Cooperation and Humanitarian Aid: 63p.

BEST COPY AVAILABLE

CONCLUSIONS AND RECOMMENDATIONS

We have expressed our opinions about various components of the program in the discussion. The approach taken in this section is to emphasize those aspects and implications that are of particular importance to us and in some cases to make specific recommendations.

This evaluation took place after only 30 months of activities of OTEP. The introduction of the use of the lobon and gur solution (LGS) implies important behavioral changes which generally take time to occur, particularly in the early stages. The findings of this evaluation therefore have a somewhat provisional character. The results of the 2nd phase will most probably give clearer indications as to the future developments.

The Objectives of OTEP

The External Evaluation Team (EET) was impressed by the results achieved by OTEP during the first 30 months of activities. More than 1.6 million households have been taught oral rehydration therapy using the homemade lobon and gur solution (LGS) and the objective of covering 2,5 million households will most likely be met by the end of Phase I in September 1983. A remarkably high number of women - 95 % of all households taught - remember the message one month after the teaching and 98 % know how to prepare the solution. OTEP has thus shown that it is able to achieve its goal of teaching one woman in each rural household the why and how of LGS.

The approach of OTEP

The OTEP approach is unique as it is based on the work done by mobile teams of young women staying together independently from their respective families, teaching individually, at their home, one woman in each household, usually the mother. This approach

- which is remarkable in a fairly traditional predominantly men orientated society such as rural Bangladesh - is most likely one of the factors of the results achieved so far by OTEP.

The Teaching of the ORWs

EET was impressed by the work of the ORWs (the female Oral Rehydration Workers). Their way of teaching, their attitude towards the women they teach, their patience, and the interest they show in their work are important assets to OTEP.

The Training of the Male Field Workers

In addition to the ORWs, OTEP had to recruit a great number of new male field workers as team coordinators and for the reinforcement teams. Some of the field staff of OTEP have worked in other BRAC projects. Thus the experiences and the abilities of the field workers in their job training and preparation varied greatly. EET feels that for those male field workers lacking experience, additional training in communication skills, in monitoring, and supportive supervision would enhance the effectiveness of the ORW teams.

Additional Training of the Staff in Matters Concerning Diarrhoea

All field staff - male and female - in order to be comfortable with their work should have sufficient knowledge about diarrhoea and dysentery, and their management. Additional training in the technical aspects of these illnesses would, therefore, be valuable for those working at the community level.

Reinforcement Teams

As of September 1982 the reinforcement teams took on the additional activity of conducting the user surveys. Monitoring and reinforcement are the other two activities for which they are responsible. Most field based groups in OTEP have fewer discrete functions. EET feels that it will be important for the supervisors (the area managers, the regional manager and the program manager) to closely monitor the efforts of these workers in order to determine whether all the activities are equally emphasized and whether further training is needed in any one area.

Complementary Integrated Approach

The effectiveness of the teaching is most likely to increase if it is followed up by new contacts, if it is expanded to other members of the households, and if it is integrated with other health activities. BRAC therefore has the intention, as a complement to its teaching in all villages and increasing the use of the newly initiated reinforcement teams, to focus on 150 unions (i.e. 1 union in 150 Thanas) and initiate there a set of activities mainly related to health. BRAC assumes that this integrated approach would increase the use of ORS in those unions and have a spread effect in others. EET was much in favor of this new complementary action.

Prevention

The messages that are now being given by OTEP on the prevention of diarrhoea may reduce its incidence in many situations. Messages include water boiling, greater use of tube wells, hand washing, and protection of food. Many of these activities, however, cannot be carried out by villagers mainly because of a lack of facilities and/or economic resources. It is hoped that research organizations such as ICDDR,B will be exploring other simplified means of preventing diarrhoea.

It is recommended that OTEP, based on its own field experience and by keeping up-to-date on the findings of other groups, continually look for ways to prevent diarrhoea that rural families can afford and practice.

Personnel Policy and Management

EET was very favorably impressed by OTEP/BRAC's personnel policy and its managerial style and capabilities. We are convinced that the successful implementation of OTEP is largely due to these two factors.

User Survey

Who, why, and how LGS is used is information that is critical to OTEP. These data will determine whether OTEP should change any component of the program, redirect its activities to certain groups, or give a different direction to the reinforcement activities. OTEP has done a remarkable job in recognizing the importance of these data and in designing and implementing imaginative studies in this area.

It is recommended that the user data already collected be given priority in the study and the possible effect on user rates of factors such as education, income, distance from the nearest health centre be analyzed. Actual use of LGS will also have to be determined by indirect procedures and more adequate definitions to distinguish "seven cases" from milder illness will have to be found.

Impact Survey

a. OTEP's impact survey is a well designed study that attempts to determine the effect of ORT on childhood diarrhoeal mortality as a measure of the effectiveness of the OTEP program. However, caution should be exercised in interpreting the findings. It will be tempting to over or underestimate the results of the study. Many factors will have a bearing on outcome; use rates, for example, most probably will have to be taken into account.

b. Data from the impact survey is now being analyzed and results should be forthcoming. Data analysis has been somewhat delayed because BRAC is dependent on other computer systems which understandably may not always give BRAC priority. Arrangements have been made between BRAC and other institutions and BRAC has been exploring its computer needs considering future purchase of a computer. EET hopes an adequate solution will be found soon, taking into account also cost effectiveness.

Work with Other Health Personnel

OTEP contacts thana health personnel wherever they are working to inform them of their activities and the LGS messages. A much more concerted effort is now being made to contact local traditional practioners, either individually or in forums, to inform them of ORS in general and LGS in particular. It has been decided by OTEP that more effort should be made to have team coordinators and reinforcement teams contact pharmacists to have their cooperation. All these groups are assured that the packet is always recommended for use if available and that LGS should be given if the packet is unavailable. EET supports OTEP in these efforts and suggests that they continue to increase their activity to reach local practioners as well as pharmacists.

Other Organizations with ORT Programs

Bangladesh is fortunate in having a number of organizations, both government and non-government, interested and involved in developing programs in ORT. Organization such as NORP, UNICEF, and ICDDR,B are particularly prominent in this area.

There are increasing efforts to have all groups communicate with each other and share information whenever possible. We encourage BRAC to continue this process, making others in the field aware of any new development, cooperating with them whenever possible, and benefiting from the experience of the other groups. This also concerns the message utilized* and it is important that others continually be updated on BRAC's observations and findings.

Relationship with ICDDR,B

The relationship that OTEP has with the ICDDR,B has been a very productive one. Advice on study design and training of computer programmers has been given, computer facilities have been used, and laboratory analysis of LGS conducted. A technique for chloride analysis in the field has been developed for use by OTEP. It is clear that OTEP should continue to collaborate with ICDDR,B whenever possible.

---

* OTEP uses a half seer (467 cc) of water as its volume as it is adaptated to local conditions. Most other ORS programs use a liter measure and design their packets accordingly. OTEP has amended and improved its directions for the preparation of LGS by shifting from the initial "1-2-1" message (one pinch of lobon, two small scoops of gur and a half seer of water) to the simpler "1-1-1" message (one pinch of lobon, 1 full scoop of gur, and a half seer of water).

Expansion of OTEP

EET feels that OTEP is in a position to expand the program, that is, to increase the number of areas it works in at one time. However, such an expansion, since it requires additional field staff, can only be successfully implemented if the necessary attention is given to the training and supervision of the new workers. BRAC's training methods and capabilities should enable the organization to meet this condition.

Recommendation for Continued Funding

EET feels that OTEP should be supported in its second phase and urges present and potential funders to commit themselves to this effort.

APPENDIX 4: List of surveyed villages

LIST OF SELECTED VILLAGES

STUDY: FIRST PHASE (1)

Area	Upazila	Union	Village (code)	Sample Size
Madaripur (11)	Rajoir	Badarpasha	Gopalganj (111)	83
			Patta Boket (112)	115
			Dara Dia	
			Gandha Bordi (113)	135
			Char Mostafajur (114)	70
			Shankardi (115)	32
				435
Faridpur (12)	Bhanga	Nasirabad	Duair (121)	83
			Gazaria (122)	57
			Khakandi	
			Dop Fosha (123)	52
			Kusha Danga (124)	97
			Ali Khan Kanda (125)	56
				345
Meherpur (13)	Gangni	Kathuli	Ramkrishnapur (131)	53
			Noapara (132)	122
			Khash Mahal (133)	74
			Mile Mais (134)	95
			Radha Gobindapur (135)	74
				430
Jhenidah (14)	Moheshpur	Swaruppur	Kusumpur (141)	92
			Toiltori	
			Shankarpur (142)	44
			Irshal Danga (143)	42
			Karincha (144)	37
			Kusha Daga (145)	73
				288
Satkhira (15)	Shyamnagar	Bhurulia	Kultukri (151)	51
			Ichakur (152)	90
			Togharia (153)	23
			Sona Mugri (154)	56
			Bellabpur	
			Dewldia (155)	37
				257
Khulna (16)	Torokhada	Chagladaha	Nebodia (161)	96
			Kodal (162)	111
			Patil Danga (163)	39
			Arkandi (164)	47
			Nacduba	
			Rajnagar (165)	30
				323
Sunamganj (17)	Jagannatpur	Kalkelia	Jogodishpur (171)	104
			Gurorgaon	
			Goneshpur (172)	50
			Mulargaon (173)	53
			Sadipur (174)	113
			Farargaon (175)	52
				372
			Total First Phase Households	2,500

STUDY : SECOND PHASE (NON CRP) (2)

Area	Upazila	Union	Village (code)	Sample Size
Tangail (21)	Gopalpur	Nandasinla	Lerchatila (211)	39
			South Bil Doga (212)	35
			Naiz Bari (213)	46
			Kothori	
			North Bil Doga (214)	57
			Sonar Makulla (215)	51
				[illegible]
Patuakhali (22)	Galachipa	Galachipa	Fikkia (A) (221)	65
			Fokkia (B) (222)	65
			South Ratandi (223)	79
			Lalikapur (224)	45
			South Charkhali (225)	54
				309
Mymensingh (23)	Bhaluka	Dhitpur	Randia (231)	22
			Bhuhula (A) (232)	57
			Dhitpur (B) (233)	91
			Dhitpur (C) (234)	21
			Dhitpur (A) (235)	21
				[illegible]
Comilla (24)	Chandina	Suhilpur East	Tirchar (241)	55
			Nazirpur	
			Kohorkhola (242)	50
			Satgaon (243)	48
			Krishnapur North (244)	59
			Falruri (245)	18
				[illegible]
Kishoreganj (25)	Tarail	Tarail Sachail	Tarail Sachail (B)(251)	97
			Kalna (252)	33
			Slamukjan (253)	52
			Dashad Pur (254)	32
			Chail Pati (255)	[illegible]
				[illegible]
Barisal (26)	Ujirpur	Bamrail	Kajira (261)	53
			Uttar Korokati (262)	82
			Kalihata (263)	84
			East Ramsar (264)	69
			Shanuhar (265)	76
				369
Narsingdi (27)	Shibpur	Ayubpur	Koadia (A) (271)	66
			Hizulia (272)	49
			Ghasirdia (273)	95
			Ayubpur (274)	24
			Chandandia (275)	38
				272
Bhola (28)	Char Fession	Char Kalmy	Nangla Fara (A)(281)	78
			Majer Char (A)(282)	67
			Nangla Fata (B)(283)	78
			Dakhin Mongaj (284)	87
			Char Kalmy (235)	59
				369

Total Second Phase (non CRP) Households 2,500

STUDY : SECOND PHASE (CRP) (3)

Area	Upazila	Union	Village (code)	Sample Size
Tangail (31)	Bhuapur	Falda	Agtorilla (B) (311)	48
			Gora Bari (312)	21
			Dhopa Kandi (313)	30
			Mominpur (314)	69
			Bahadipur (315)	34
				202
Patuakhali (32)	Mirzaganj	Amragachi	Dakhin Amragachi (A)(321)	76
			Uttar Amragachi (B)(322)	51
			Saila Bumia (323)	85
			Dakhin Amragachi(C)(324)	77
			Uttar Sailabunia (325)	32
				321
Mymensingh (33)	Gafargaon	Usthi	Kandipara (331)	89
			Haripur (B) (332)	61
			Haripur (A) (333)	61
			Shanjib (334)	53
			Terosree (335)	13
				[illegible]
Comilla (34)	Homna	Homna South	Jagannat Kandi (341)	83
			Saykulla Kandi (342)	92
			Mohismari (343)	53
			Dumuria (344)	47
			Haripur Uttar	
			Munshikandi (345)	43
				318
Kishoreganj(35)	Karimganj	Noabad	Molamkhanchar (351)	50
			Kumaria (352)	55
			Ulukhola (B) (353)	57
			Jhantola (354)	73
			Ulukhola (A) (355)	57
				292
Barisal (36)	Kotwali	Kashipur	Keladema (361)	93
			Bhagia (362)	49
			Bihangal (363)	35
			Gonapara (364)	94
			Bilbobari (365)	84
				355
Narsingdi (37)	Monohordi	Sukundi	Dashdona (371)	25
			Harurdia (372)	66
			Sukundi (A) (373)	75
			Gondardia	
			Fari Gondardia (374)	59
			Dighakandi (375)	72
				297
Bhola (38)	Lalmohan	Char Bhuta	Hariganj (C) (381)	94
			Char Bhuta (A) (382)	88
			Taraganj (B) (383)	74
			Char Bhuta (B) (384)	88
			Char Bhuta (D) (385)	89
				433
	Total Second Phase (CRP) Households			2,500

BRAC

Household Listing Form

C.T 3.30
00-04
01-1

Study Type

Thana/Upazila [illegible]

Union [illegible]

Village [illegible]

Lister [illegible]

Date [illegible]

Sl. No.	(Office use)	Name of Head of Household (HHH)	Father's/Husband's Name of HHH	Location of House
1	2	3	4	5
[illegible]	01	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	02	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	"
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	" "	"
[illegible]	[illegible]	[illegible]	[illegible]	"
[illegible]		[illegible]	[illegible]	"
[illegible]		[illegible]	" "	"
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	" "	"
[illegible]	07	[illegible]	[illegible]	"
[illegible]		[illegible]	[illegible]	"
[illegible]		[illegible]	[illegible]	"
[illegible]		[illegible]	[illegible]	"
[illegible]	[illegible]	[illegible]	[illegible]	"
[illegible]		[illegible]	" "	[illegible]

APPENDIX 5: Specimen Household Listing Schedule

APPENDIX 6: Specimen sketch of a Union showing selected villages

APPENDIX 7: Specimen Household Sample List

Thana/Upazila মহেশপুর

Union স্বরূপপুর   Lister মো: মো: রশিদ

Village কুশাডাঙ্গা   Date ৬/১০/৮৪

Village HH No.	Sample HH No.	Name of Head of Household (HHH)	Father's/Husband's name of HHH	Location of house
1	2	3	4	5
২২৯	৭০	মজুবারী মন্ডল	মৃত: আব্দুল গফুর	২২৬নং বাড়ীর উত্তরে
২৩২	৭১	মো: সত্তার	মৃত: আব্দুল কাদের	"
২৩৫	৭২	মকসেদ বিশ্বাস	মৃত: কালু বিশ্বাস	২২৩নং বাড়ীর পূর্বে
২৩৮	৭৩	মানিক বিশ্বাস	মৃত: জব্বার বিশ্বাস	"
২৪১	৭৪	মো: মোস্তাক চাঁদ	মৃত: ফকির চাঁদ	৫৩নং বাড়ীর
২৪৪	৭৫	মো: আব্দুল জব্বার	মৃত অহমদ আলী বিশ্বাস	২৩৬নং বাড়ীর দক্ষিণে
২৪৭	৭৬	মোকেসার আলী	মৃত: জুবেদ আলী	৭৫ বাড়ীর সামনে
২৫০	৭৭	আবু তাহের মন্ডল	আব্দুল কাদের	১৩০নং বাড়ীর সামনে বাড়ী
২৫৩	৭৮	বকাউল্লাহ রহমান	মৃত: লুৎফর রহমান	৫০নং বাড়ী দক্ষিণ পূর্ব কোণে
২৫৬	৭৯	আব্দুল জলিল	মজিদ মন্ডল	"
২৫৯	৮০	আক্কাস আলী হোসেন	মৃত: রহমান মন্ডল	২২৬নং বাড়ীর পশ্চিমে
২৬২	৮১	খলিলুর রহমান	মৃত: আব্দুল সাত্তার	২৬০নং বাড়ীর পূর্বে
২৬৫	৮২	নূর মোহাম্মদ	মৃত: মোহাম্মদ আলী	৫০নং বাড়ীর উত্তরে
২৬৮	৮৩	সাইদ হোসেন	লিয়াকত হোসেন	২৩০নং বাড়ীর লাগা পশ্চিম পূর্ব কোণে

APPENDIX 8: Specimen Interviewer's Daily Record Sheet

(To be filled up daily by the interviewer and returned to the supervisor on completion of work in each village)

Name of Interviewer [illegible] Village [illegible]

Union [illegible] Upazila [illegible]

Date	Household number	Successfully interviewed (write ✓)	Not successfully interviewed (specify reason)	Diarrhoeal case	LGS use	Vial collection (v)
25.11.84	037	✓	–	–	–	
"	040	✓	–	–	–	
"	043	–	[illegible]	–	–	
"	046	✓	–	3	–	
"	049	✓	–	–	–	
"	052	✓	–	–	–	
"	058	✓	–	1	–	(v)
"	061	✓	–	–	–	
"	064	✓	–	1	–	(v)
"	070	✓	–	–	–	
"	073	✓	–	2	–	(v)

APPENDIX 9
Specimen Questionnaires and English version

Evaluation of BRAC's Oral Therapy Extension Programme

STRICTLY CONFIDENTIAL FOR RESEARCH ONLY.

IDENTIFICATION

Stratum. ....1...........

Thana/Upa-zila .... [illegible] 4

Union .... [illegible] ....

Village .... [illegible] 05

Sample Household No... 073..............

Converted HH No...........1357...........

Name of Head of Household........ [illegible] ....

[illegible] – [illegible]

Scrutinized	☑ [illegible]	**Spot-Checked**	☐
Re-interviewed	☑ [illegible]	**Edited**	☑ [illegible]
Matched	☑ [illegible]	**Coded**	☑

C.T-1 – Fate [illegible]
C.T 2 – [illegible]
C.T 3 – Humayun
C.T-4 – 5 Kafisa

Interviewer's Name........ [illegible] -1

Date.....25.11.84........ Supervisor-2

Research and Evaluation Division,
Bangladesh Rural Advancement Committee
and
Evaluation and Planning Centre
London School of Hygiene and Tropical Medicine.

Line No. O. Respondent- 02
Type Of Household- 4
Total Regular Members- 12
Total Members - 16

Part A: Household

লাইন নং	গৃহ সদস্য/সদস্যা ও অন্যান্যদের নাম	আত্মীয়তা	বাসস্থান		লিঙ্গ	বয়স	
	প্রথমে আপনাদের সংসারে সচরাচর যারা থাকেন তাদের সকলের নাম বলুন. তারপর গতরাতে অতিথি/মেহমান যারা আপনাদের এখানে ছিলেন তাদের নাম বলুন। (এরা যে নামে বেশী পরিচিত এ নামও লিখুন)	সম্পর্ক	ইনি কি সচরাচর আপনাদের এখানে থাকেন ? হাঁ-1 না-2 জানিনা-9	গতরাতে ইনি কি আপনাদের এখানে ঘুমিয়েছেন ? হাঁ-1 না-2 জানিনা-9	ইনি কি পুরুষ না মহিলা ? পুঃ-1 মঃ-2	ইনার জন্ম তারিখ কবে ? জন্মের মাস ও সাল বলুন। মাস	সাল
১	২	৩	৪	৫	৬	৭	৮
01	হানিফ বিশ্বাস	খানাপ্রধান	1	1	1 ✓		
02	সফিয়া খাতুন	স্ত্রী-01	1	1	2 ✓		
03	সাবিনা খাতুন	মে: 01.02	1	1	2 ✓		
04	ফারিনা খাতুন	স্ত্রী 01	1	2	2 ✓		
05	রাহিমা খাতুন	ভাইঝি-02	1	1	2 ✓		
06	কোমোলি খাতুন	মে: 01x.	1	1	2 ✓		
07	ফাতেমা বেগম	মে: 01.04	1	2	2 ✓		
08	নবিদুর রহমান	ভাই-01	1	1	1 ✓		
09	উম্মে কুলসুম	মা-01	2	1	2 ✓		
10	ফিরোজা বেগম	[illegible] 02	2	1	2 ✓		
11	ঝিনি	নাতনি-01	1	1	2 ✓		
12	আব্দুল মান্নান [illegible]	পিতা-04	2	1	1 ✓		
13	জহুরুল আমীন	ছে: 01.02	1	1	1 ✓	[illegible]	[illegible]
14	সুরাইয়া বেগম	কাজের লোক	1	1	2 ✓		

এবার দেখা যাক আপনাদের সকলের নাম আমি লিখেছি কি না।

১। আপনাদের সংসারে এমন কেউ আছে কি যেমন ধরুন বাচ্চা বা শিশু যাদের নাম লিখি নাই ?

২। এছাড়া কেউ আছেন কি যারা এখানে থাকেন অথচ আপনাদের সংসারের লোক নহেন, যেমন ধরুন বন্ধু-বান্ধব, আত্মীয় বা কাজের লোক ?

৩। গত রাতে আপনাদের সঙ্গে কোন অতিথি/মেহমান/অন্য কেউ ছিলেন কি যাদের নাম আমি লিখি নাই ?

Composition

	শিক্ষা			বৈবাহিক অবস্থা	
	বয়স ৫ বছর বা তার বেশী হলে			বয়স ৮ বছর বা তার বেশী হলে	
জন্ম তারিখ বলতে না পারলে বয়স কয় বছর তা অনুমান করে লিখুন।	ইনি কি চিঠি লিখতে বা পড়তে জানেন ? হাঁ-1 না-2 জানিনা-9	হাঁ হলে সর্বোচ্চ কোন শ্রেণী পাশ করেছেন ?	পেশা	ইনার কি বিয়ে হয়েছে ? হাঁ-1 না-2 আক্ত-3 জানিনা-9	হাঁ হলে বর্তমানে কি বিবাহিত / বিবাহিতা-1 বিধবা-2 বিপত্নীক-3 তালাক-4 বিচ্ছিন্ন-5
৯	১০	১১	১২	১৩	১৪
35	2	N.A			
32	2	N. A			
15	2	N. A			
28	2	N.A			
12	1	11			
17	2	N.A			
08	2	N.A			
27	2	N.A			
53	2	N. A			
31	2	N.A.			
06	2	11 N.A.			
60	2	N.A.			
05 month.	N.A.				
15	2	N.A			

হাঁ ☐ (প্রত্যেকের নাম তালিকায় লিখুন) না ☑

হাঁ ☐ (প্রত্যেকের নাম তালিকায় লিখুন) না ☑

হাঁ ☐ (প্রত্যেকের নাম তালিকায় লিখুন) না ☑

Part B : Assets

আপনাদের নিজস্ব কোন .... আছে কি ?

সম্পত্তি		সংখ্যা
(ক) রেডিও	0	=0
(খ) নৌকা/সাইকেল	0+0	=0
(গ) ঘড়ি	0	=0
(ঘ) গরু-বাছুর-মহিষ	0+0+0	=0
(ঙ) ছাগল-ভেড়া	0+0	=0
(চ) ঘর	3	=3
(ছ) চাষযোগ্য জমি (পরিমাণ)	49 শতাংশ	

Part C : Attitude ; Practice and Some Programme Related Matters.

১। খাবার জন্য সাধারণতঃ আপনারা কিসের পানি পান করেন ?

কলের পানি ☑ পুকুর/নদীর পানি ফুটিয়ে ☐ পুকুর/নদীর পানি ☐

২। (ক) আপনি কি মনে করেন সব শিশুদেরকেই মায়ের বুকের দুধ দেয়া উচিৎ ?

হাঁ ☑ না ☐

(খ) জন্মের কত দিন পর শিশুদের মায়ের বুকের দুধ দেয়া উচিৎ ?

..................3.................. দিন

(গ) জন্মের কত মাস পর শিশুদের অন্যান্য খাবার যেমন ভাত, তরিতরকারী ইত্যাদি দেয়া উচিৎ ?

..................6.................. মাস।

৩। আপনাদের খানায় কি কোন স্কুল ছাত্র আছে ?

হাঁ ☑ না ☐

৪। আপনাদের পরিবারের কি কোন সদস্য গ্রামের বাহিরে চাকুরী, ব্যবসা বা অন্য কোন প্রয়োজনে থাকেন ?

হাঁ ☐ না ☑

৫। (ক) আপনাদের খানায় কি কেউ এখন অসুস্থ আছেন?

হাঁ ☑ ↓　　　　না ☐ ↓ (৬নংতে যান)

(খ) কি কি অসুখ হয়েছে?

ডায়রিয়া, বাত জ্বর

৬। (ক) আপনাদের খানায় কোন বাচ্চা বা শিশুর যদি মুখহাগা, বুনিহাগা, বাতাসীহাগা পাতলা পায়খানা হয় তাহলে কি ব্যবস্থা গ্রহণ করবেন?

ডাক্তার দেখাবো ☐　(কোন ধরনের ডাক্তার ……………………)

লবণ-গুড় খাওয়াবো ☑

কিছুই করবোনা ☐

অন্যান্য (নির্দিষ্ট করুন) ……………………।

(খ) অজীর্ণ, বদহজম পেট ফোলা কারণে আপনাদের খানায় যদি কারও পাতলা পায়খানা হয় তাহলে কি ব্যবস্থা গ্রহণ করবেন?

ডাক্তার দেখাবো ☑　(কোন ধরনের ডাক্তার হোমিওপ্যাথি)

লবণ-গুড় খাওয়াবো ☐

কিছুই করবোনা ☐

অন্যান্য (নির্দিষ্ট করুন) ……………………।

(গ) আমাশয় [illegible] কারণে যদি আপনাদের খানায় কারও পাতলা পায়খানা হয় তাহলে কি ব্যবস্থা গ্রহণ করবেন?

ডাক্তার দেখাবো ☐　(কোন ধরনের ডাক্তার ……………………)

লবণ-গুড় খাওয়াবো ☐

কিছুই করবোনা ☐

অন্যান্য (নির্দিষ্ট করুন) [illegible] ……………………।

(ঘ) আপনাদের খানায় যদি কারও ডায়রিয়া কলেরা হয় তাহলে কি ব্যবস্থা গ্রহণ করবেন?

ডাক্তার দেখাবো ☐　(কোন ধরনের ডাক্তার ……………………)

লবণ-গুড় খাওয়াবো ☑

কিছুই করবোনা ☒

অন্যান্য (নির্দিষ্ট করুন) ……………………।

৭। (ক১) মুখ ফোলা, মুনি ফোলা, বাতাসী ফোলা, ... হলে কি শিশুদের মায়ের দুধ দেয়া উচিত ?

হাঁ ☑ না ☐

(ক২) মুখ ফোলা, মুনি ফোলা, বাতাসী ফোলা, ... হলে শিশুদের কি কি খাবার দেবেন ?

বার্লি, ভাত খিচুড়ী, বুকের দুধ, সাগু, চিড়া, লেবুর সরবত

(খ১) অজীর্ণ, বদহজম .... হলে কি কি খাবার দেয়া ক্ষতিকর ?

মাছ, মাংস, [illegible], চুকা, ঝাল তরকারী, বাসি খাবার [illegible]

(খ২) অজীর্ণ, বদহজম .... হলে কি কি খাবার দেবেন ?

ভাত, নিরামিষ তরকারী, কাঁচা কলা, পেঁপে ভর্তা, থানকুনি পাতা [illegible] দিয়ে বড়া

(গ১) আমাশয় .... কারণে পাতলা পায়খানা হলে কি কি খাবার দেয়া ক্ষতিকর ?

মাছ, মাংস, দুধ, চিংড়ি, ঝাল তরকারী, চুকা

(গ২) আমাশয় .... কারণে পাতলা পায়খানা হলে কি কি খাবার দেবেন ?

ভাত, নিরামিষ তরকারী, [illegible] মাংস, চিড়ার পানি, ভাত, [illegible] স্যালাইন পানি।

(ঘ১) ডায়রিয়া ..... কলেরা ..... হলে কি কি খাবার দেয়া ক্ষতিকর ?

মাছ, গোশত, চিংড়ি, দুধ, বাসি খাবার

(ঘ২) ডায়রিয়া হলে কি কি খাবার দেবেন ?

[illegible], বার্লি, খিচুড়ী, লেবুর রস, [illegible], ভাতের পানি

৮। প্রায় এক/দুই বছর আগে একজন মহিলা আপনাদের গ্রামে এসে লবণ গুড় স্যালাইন বানানো শিখিয়ে দিয়েছিলেন। আপনাদের খানার কাউকে কি উনি বানানো শিখানো হয়েছিল ?

হাঁ ☑ না ☐

৯। (ক) তারা যে স্যালাইনের কথা আপনাদের বলেছিলেন উহা কি আপনারা কখনও ব্যবহার করেছেন?

হাঁ ☐ না ☐

(ঘ তে যান)

(খ) এ পর্যন্ত আনুমানিক কতবার ব্যবহার করেছেন? .... 3/4 ....

(গ) আপনারা কিসের জন্য এ স্যালাইন ব্যবহার করেছিলেন?

দুধ হাগা সারাতে ☐
অজীর্ণ সারাতে ☐
আমাশয় সারাতে ☐
ডায়রিয়া সারাতে ☐
লবণ-পানি পূরণ করতে ☐
গরু-মহিষের পাতলা পায়খানা সারাতে ☐
অন্যান্য (নির্দিষ্ট করুন)

(ঘ) আপনার জানামতে কি কেউ উহা ব্যবহার করেছেন?

হাঁ ☐ না ☐

১০। (ক) গত .... বুধ .... বারের আগের .... রবিবার .... থেকে আজ পর্যন্ত অর্থাৎ গত পনেরো দিনে এই খানায় কোন শিশুর দুধ হাগা, বুনি হাগা, আমাশী হাগা, ... হয়েছিল?

হাঁ ☐ না ☐

(১১ নং প্রশ্ন পূরণ করুন)

(খ) গত .... বুধ .... বারের আগের .... রবিবার .... থেকে আজ পর্যন্ত অর্থাৎ গত পনেরো দিনে এই খানায় কারও অজীর্ণ, বদহজম, পেটে অসুখ হয়েছিল?

হাঁ ☐ না ☐

(১১ নং প্রশ্ন পূরণ করুন)

(গ) গত .... বুধ .... বারের আগের .... রবিবার .... থেকে আজ পর্যন্ত অর্থাৎ গত পনেরো দিনে এই খানায় কারও আমাশয় .... হয়েছিল?

হাঁ ☐ না ☐

(১১ নং প্রশ্ন পূরণ করুন)

(ঘ) গত .... বুধ .... বারের আগের .... রবিবার .... থেকে আজ পর্যন্ত অর্থাৎ গত পনেরো দিনে এই খানায় কারও ডায়রিয়া .... [illegible] .... হয়েছিল?

হাঁ ☐ না ☐

(১১ নং প্রশ্ন পূরণ করুন)

২১। ৯৮৪ অসুখ সংক্রান্ত প্রশ্নাবলী

প্রশ্ন নং	লাইন নং	অসুস্থ সদস্য / সদস্যদের নাম	বয়স	লিঙ্গ	খানা প্রধানের সাথে সম্পর্ক	অসুখ শুরু হওয়ার তারিখ	সুস্থ হওয়ার তারিখ	কি ধরনের চিকিৎসা করানো হয়েছে ? (ক্রমানুসারে সংকেত ব্যবহার করুন)	যদি লবণ-গুড় স্যালাইন ব্যবহার করা হয়: অসুখ চলাকালীন কতবার লবণ-গুড় স্যালাইন বানানো হয়েছিল ?	কতবার পাতলা পায়খানার পর এস.জি.এস. খাওয়ানো হয়েছে ?	এটা খাওয়ার ফলে কি কোন উপকার হয়েছে ? হাঁ-1, না-2 জানিনা-9
২০(খ)	09	উম্মে কুলসুম	53	2	মা	11.11.84	15.11.84	1.6.4			
২০(গ)	13	নুরুল আমীন	[illegible] 1391 (00)	1	ছেলে	20.11.84	বর্তমানেও অসুস্থ	3.6.4			

([illegible] 02)

সংকেত

কবিরাজ—1 হোমিও প্যাথি—2
এ্যালোপ্যাথি—3 প্যাকেট স্যালাইন—4
লবণ-গুড়—5 বনজী—6
রসের স্যালাইন—7 অন্যান্য—8
কোন চিকিৎসা করা হয় নাই—0

073

(কেবল মাত্র নির্দিষ্ট খানার জন্য)

১২ । ক) এই খানার কেউ কি লবন - গুড় স্যালাইন বানাতে পারেন ?

হ্যাঁ ✓ না ☐

সাক্ষাৎগ্রহণকারী: যদি উত্তর 'হ্যাঁ' হয় , তবে তাকে লবন - গুড় স্যালাইন বানাতে বলুন । বানানোর পরে স্যালাইনের পরিমান মেপে লিখুন ।

পরিমান - 680 c.c.

পরিমান মাপার পর স্যালাইনের নমুনা আপনার " ভায়েলে " দিন । এবং উহাতে পূর্ণ লেবেল লাগিয়ে দিন ।

যিনি বানালেন তার লাইন নম্বর লিখুন ।

লাইন নম্বর - 02

খ) আপনি কার কাছ থেকে এই স্যালাইন বানানো শিখেছেন ?

[illegible]

১০। (ক) গত ......রবি...... বারের আগের ......রবিবার...... থেকে আজ পর্যন্ত অর্থাৎ গত পনেরো দিনে এই খানায় কোন শিশুর দুধ হাগা, বুনি হাগা, বাতাসী হাগা, ... হয়েছিল ?

হাঁ ☐ না ☑

↓

(১১ নং প্রশ্ন পূরণ করুন)

(খ) গত ......রবি...... বারের আগের ......রবিবার...... থেকে আজ পর্যন্ত অর্থাৎ গত পনেরো দিনে এই খানায় কারও অজীর্ণ, বদহজম, পেটে অসুখ হয়েছিল ?

হাঁ ☑ না ☐

↓

(১১ নং প্রশ্ন পূরণ করুন)

(গ) গত ......রবি...... বারের আগের ......রবিবার...... থেকে আজ পর্যন্ত অর্থাৎ গত পনেরো দিনে এই খানায় কারও আমাশয় .... হয়েছিল ?

হাঁ ☑ না ☐

↓

(১১ নং প্রশ্ন পূরণ করুন)

(ঘ) গত ......রবি...... বারের আগের ......রবিবার...... থেকে আজ পর্যন্ত অর্থাৎ গত পনেরো দিনে এই খানায় কারও ডায়রিয়া .... হয়েছিল ?

হাঁ ☐ না ☑

↓

(১১ নং প্রশ্ন পূরণ করুন)

১১। অসুখ সংক্রান্ত প্রশ্নাবলী

প্রশ্ন নং	লাইন নং	অসুস্থ সদস্য / সদস্যাদের নাম	বয়স	লিঙ্গ	খানা প্রধানের সাথে সম্পর্ক	অসুখ শুরু হওয়ার তারিখ	সুস্থ হওয়ার তারিখ	কি ধরনের চিকিৎসা করানো হয়েছে ? (ক্রমানুসারে সংকেত ব্যবহার করুন)	যদি লবণ-গুড় স্যালাইন ব্যবহার করা হয়: অসুখ চলাকালীন করবার লবণ-গুড় স্যালাইন বানানো হয়েছিল ?	করবার পাতলা পায়খানার পর এস.জি.এস. খাওয়ানো হয়েছে ?	এটা খাওয়ার ফলে কি কোন উপকার হয়েছে ? হাঁ-1, না-2 জানিনা-9
১০(খ)	09	উম্মে কুলসুম	53	2	মা	11.11.84	15.11.84	1.6.			
১০(গ)	13	জহুরুল আমীন	Nov 84 কার্তিক 1391 (চ)	1	ছেলে	15.11.84	19.11.84	3.6.			

সংকেত

কবিরাজ—1 ✓ হোমিওপ্যাথি—2 লবণ-গুড়—5 বনজী—6 ✓

এ্যালোপ্যাথি—3 ✓ প্যাকেট স্যালাইন—4 রগের স্যালাইন—7 অন্যান্য—8

কোন চিকিৎসা করা হয় নাই—0

১০। (ক) গত ......রবি...... বারের আগের ......রবিবার...... থেকে আজ পর্যন্ত অর্থাৎ গত পনেরো দিনে এই খানায় কোন শিশুর মুখ হাসা, বুনি হাসা, বাতাসী হাসা, ... হয়েছিল ? হাঁ ☐ না ☑

↓

(১১ নং প্রশ্ন পূরণ করুন)

(খ) গত ......রবি...... বারের আগের ......রবিবার...... থেকে আজ পর্যন্ত অর্থাৎ গত পনেরো দিনে এই খানায় কারও অজীর্ণ, বদহজম, পেটের অসুখ হয়েছিল ? হাঁ ☑ না ☐

↓

(১১ নং প্রশ্ন পূরণ করুন)

(গ) গত ......রবি...... বারের আগের ......রবিবার...... থেকে আজ পর্যন্ত অর্থাৎ গত পনেরো দিনে এই খানায় কারও আমাশয় .... হয়েছিল ? হাঁ ☑ না ☐

↓

(১১ নং প্রশ্ন পূরণ করুন)

(ঘ) গত ......রবি...... বারের আগের ......রবিবার...... থেকে আজ পর্যন্ত অর্থাৎ গত পনেরো দিনে এই খানায় কারও ডায়রিয়া .... হয়েছিল ? হাঁ ☐ না ☑

↓

(১১ নং প্রশ্ন পূরণ করুন)

১১। অসুখ সংক্রান্ত প্রশ্নাবলী

প্রশ্ন নং	লাইন নং	অসুস্থ সদস্য / সদস্যাদের নাম	বয়স	লিঙ্গ	খানা প্রধানের সাথে সম্পর্ক	অসুখ শুরু হওয়ার তারিখ	সুস্থ হওয়ার তারিখ	কি ধরনের চিকিৎসা করানো হয়েছে ? (ক্রমানুসারে সংকেত ব্যবহার করুন)	যদি লবণ-গুড় স্যালাইন ব্যবহার করা হয়: অসুখ চলাকালীন কয়বার লবণ-গুড় স্যালাইন বানানো হয়েছিল ?	কয়বার পাতলা পায়-খানার পর এল.জি.এস. খাওয়ানো হয়েছে ?	এটা খাওয়ার ফলে কি কোন উপকার হয়েছে ? হাঁ-1, না-2 জানিনা-9
১০(খ)	09	উম্মে কুলসুম	53	2	মা	11.11.84	15.11.84	1.6.			
১০(গ)	13	জহুরুল আমীন	Nov 84 কার্তিক 1391 (চ)	1	ছেলে	15.11.84	19.11.84	3.6.			

সংকেত

কবিরাজ—1 ✓ হোমিওপ্যাথি—2 লবণ-গুড়—5 বনজী—6 ✓

এ্যালোপ্যাথি—3 ✓ প্যাকেট স্যালাইন—4 রসের স্যালাইন—7 অন্যান্য—8

কোন চিকিৎসা করা হয় নাই—0

PART A : HOUSEHOLD COMPOSITION

খানা নং -

ব্যক্তির নং	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]			[illegible]	
	[illegible]	সম্পর্ক	[illegible] হ্যাঁ - 1 না - 2 জানিনা - 9	[illegible] হ্যাঁ - 1 না - 2 জানিনা - 9	[illegible] পু : 1 ম : 2	[illegible] মাস	সাল	[illegible]	[illegible] হ্যাঁ - 1 না - 2 জানিনা - 9	[illegible]
১	২	৩	৪ ৪	৫	৬	৭	৮	৯	১০	১১
15	রফিক বক্স	খানাপ্রধান	1	1	1 ✓			27	1	S.S.C.
16	ওমর আলী	কাজের লোক	2	1	1 ✓			41	2	

(English version of the Questionnaire)

Evaluation of BRAC's Oral Therapy Extension Programme

STRICTLY CONFIDENTIAL
FOR RESEARCH ONLY

IDENTIFICATION

Stratum..........
Thana/Upazila..........
Union.............
Village.............
Sample Household No.............
Converted Household No............
Name of Head of Household.......................
Profession of Head of Household.....................

Scrutinized......... Spot checked.............
Reinterviewed............ Edited...........
Matched......... Coded Card type 1......
Card type 2......
Card type 3......
Card type 4......

Interviewer's Name.............
Date.............

Research and Evaluation Division
Bangladesh Rural Advancement Committee
and
Evaluation and Planning Centre
London School of Hygiene and Tropical Medicine

Part A: Household Composition

Line No.	Name of Household Members and Others	Relation ship	Residence		Sex
	First tell me about those who usually live here. Then tell me about guests who stayed with you last night. (Tell me their other names also)		Does he/ she usu- ally live here? Yes- 1 No- 2 D.K.- 9	Did he/ she sle- ep here last night? Yes- 1 No-2 D.K.- 9	M- 1 F- 2
1	2	3	4	5	6

Let us check if I have noted the names of all of you.

Part A contd.

Age			Education (if age>4)	
When was he born?		If date of birth not known, estimate age in completed years	Can he/she read or write a letter? Yes- 1 No- 2 D.K.- 9	If yes, what class did he/she pass?
Month	Year			

1. Is there any child or baby whose name I have not written? Yes (include in above list) No
2. Is there anyone else who is not a member of your family but live with you such as a lodger, servant, etc.? Yes (include in above list) No
3. Was there any other person whose name I have not written down? Yes (include in above list) No

Part B: Assets

Have you got........

Asset	No.
(a).Radio	
(b).Boat/Bicycle	
(c).Watch/Clock	
(d).Cow/Buffalo	
(e).Goat/Sheep	
(f).Room in house	
(g).Arable land (amount)	

Part C: Attitude, Practice and Some Programme Related Matters

1. What is the usual source of your drinking water?
   Tubewell   River/pond (after boiling)   River/pond

2.(a). Do you think that all babies should be breast-fed?
   Yes   No

(b). How many days after birth should babies be given breast milk?   ....days

(c). How many months after birth should children be given other foods such as rice, vegetables, etc.?   ....months

3. Is there any school-going child in your household?
   Yes   No

4. Does any of your family members lives outside the village for work or study?
   Yes   No

5.(a). Is anybody in your household ill now?
   Yes   No
   (skip to 6a)

(b). What are the illnesses?   ....
....

6.(a). If any child in your household has Dud haga, Buni haga....
what measure will you undertake?
Consult doctor (Type of doctor.............)
Give LGS
Do nothing
Others (specify).........

(b). If anybody in your household has Ajirno, Bod hajam.......,
what measure will you undertake?
Consult doctor (Type of doctor.............)
Give LGS
Do nothing
Others (specify).........

(c). If anybody in your household has Amasha, Kamri,.......,
what measure will you undertake?
Consult doctor (Type of doctor.............)
Give LGS
Do nothing
Others (specify).........

(d). If anybody in your household has Diarrhoea, cholera,.....,
what measure will you undertake?
Consult doctor (Type of doctor.............)
Give LGS
Do nothing
Others (specify).........

7.(a1).Do you think that babies should be breast-fed even if they
have Dud haga,........?
Yes No

(a2).If a child has Dud haga,........, what food will you give?

(b1).Which foods are harmful for Ajirno,......?

(b2).Which foods do you recommend for Ajirno,.......?

(c1).Which foods are harmful for Amasha,.......?

(c2).Which foods do you recommend for Amasha,.......?

(d1).Which foods are harmful for Diarrhoea.........?

(d2).Which foods do you recommend for Diarrhoea........?

8. About one/two years ago, a group of women visited your village to teach the preparation of lobon-gur saline. Was it taught to anyone in your household?

Yes No

9.(a). Has anybody in this household ever take the lobon-gur saline?

Yes No
(skip to 9d)

(b). Approximately how many times was it used?

(c). For what purpose did you take that solution?
For treating Dud haga
For treating Ajirno
For treating Amasha
For treating Diarrhoea
For replacing salt and water
For treating cattle diarrhoea
Others (specify)...........

(d). Do you know of anyone else who used it?

Yes No DK

10.(a).Since ....day before last, that is during the last 15 days, has anyone in this household had Dud haga, Buni haga,......?

Yes No

(complete Q.11)

(b).Since ....day before last, that is during the last 15 days, has anyone in this household had Ajirno,....?

Yes No

(complete Q.11)

(c).Since ......day before last, that is during the last 15 days, has anyone in this household had Diarrhoea,.....?

Yes No

(complete Q.11)

PAGES MISSING
NOT AVAILABLE

293

(For selected households only)

12.(a). Is there anyone in this household who knows how to prepare lobon-gur saline?

Yes No

Interviewer: If yes, ask her to prepare a LGS for you. After the preparation, measure the volume, take a sample of the solution in a vial and label it properly. Note the line no. of the woman who prepared the solution.

Volume:

Line no.:

(b). From whom did you learn the preparation?

APPENDIX 10: Composition of teams

TEAMS OF INTERVIEWERS

Team 1: Barisal, Patuakhali

Supervisor: Jahangir Alam (33)

Interviewers

Anwara Begum (05)
Shyamali Biswas (07)
Honufa Khanam (17)
Shahana Sultana (14)
Swareste Biswas (23)
Rafeza Khanam (15)
Mira Rani Dey (24)

Cook

Team 2: Jessore, Kushtia, Faridpur, Khulna

Supervisor: M. Mostafa Kamal (31)

Interviewers

Aleya Khatun (06)
Shibani Basu (08)
Mahmuda Khatun (16)
Sneha Lata Biswas (22)
Chitra Saha (19)
Halima Khatun (20)

Cook

Team 3: Tangail, Mymensingh

Supervisor: Aminul Haque (32)

Interviewers

Jebunnessa (02)
Halima Begum (03)
Asha Lata Das (18)
Shahen Akhtar (09)
Arati Chakravorty (25)
Mariam Khatun (13)

Cook

Team 4: Dhaka, Comilla, Sylhet

Supervisor: Delwar Hossain (30)

Interviewers

Lovely Roy (01)
Nurjahan Begum (04)
Sahera Begum (10)
Sultana Yasmin (11)
Shamima Siddiqua (12)
Promila Biswas (21)

Cook

Reserved Team: Mira Rani Dey (24)

APPENDIX 11: Schedule of data collection

FIELD OPERATION SCHEDULE

Team 1

Area	Upazila	Sample size	Listing date	Data collection date
Patuakhali	Galachipa (22)	309	5.10.84 - 13.10.84	21.10.84 - 3.11.84
Patuakhali	Mirzaganj (32)	321	19.10.84 - 25.10.84	5.11.84 - 17.11.84
Barisal	Kotwali (36)	355	3.11.84 - 10.11.84	19.11.84 - 25.11.84
Bhola	Lalmohan (38)	433	6.11.84 - 16.11.84	27.11.84 - 6.12.84
Bhola	Char Fassion(28)	369	18.11.84 - 27.11.84	8.12.84 - 16.12.84

Team 2

Area	Upazila	Sample size	Listing date	Data collection date
Norsingdi	Shibpur (27)	272	25.9.84 - 3.10.84	19.10.84 - 27.10.84
Faridpur	Bhanga (12)	345	24.10.84 - 30.10.84	31.10.84 - 10.11.84
Meherpur	Gangni (13)	430	15.10.84 - 3.11.84	12.11.84 - 22.11.84
Jhenaidah	Moheshpur (14)	288	4.10.84 - 13.10.84	24.11.84 - 30.11.84
Khulna	Terokhada (16)	323	12.11.84 - 19.11.84	2.12.84 - 9.12.84
Satkhira	Shyamnagar (15)	257	21.11.84 - 26.11.84	11.12.84 - 18.12.84

Research and Evaluation Division, BRAC
Special OTEP Evaluation Project
FIELD OPERATION SCHEDULE

Team 3

Area	Upazila	Sample size	Listing date	Data collection date
Mymensingh	Bhaluka (23)	422	30.9.84 - 13.10.84	20.10.84 - 1.11.84
Mymensingh	Gafargaon (33)	282	18.9.84 - 28.9.84	3.11.84 - 9.11.84
Kishoreganj	Tarail (25)	303	24.10.84 - 2.11.84	11.11.84 - 18.11.84
Kishoreganj	Karimganj (35)	292	15.10.84 - 23.10.84	20.11.84 - 27.11.84
Tangail	Gopalpur (21)	228	18.10.84 - 25.10.84	29.11.84 - 4.12.84
Tangail	Bhuapur (31)	202	26.10.84 - 2.11.84	6.12.84 - 12.12.84

Team 4

Area	Upazila	Sample size	Listing date	Data collection date
Norsingdi	Monohordi (37)	297	18.9.84 - 24.9.84	19.10.84 - 25.10.84
Sunamganj	Jagannatpur (17)	372	2.10.84 - 9.10.84	30.10.84 - 7.11.84
Comilla	Chandina (24)	228	30.10.84 - 5.11.84	10.11.84 - 17.11.84
Comilla	Homna (34)	318	6.11.84 - 10.11.84	19.11.84 - 26.11.84
Faridpur	Rajoir (11)	485	25.10.84 - 2.11.84	29.11.84 - 9.12.84
Barisal	Uzirpur (26)	369	27.10.84 - 2.11.84	11.12.84 - 18.12.84

APPENDIX 12: Event Calendar

1. If born during the 'Kartik storm' of 1316 (B.S.), the current age is 75 years.
2. If born during the devastating flood of 1326 (B.S.), the current age is 65 years.
3. If born during the Marriages Act of 1336 (B.S.), the current age is 55 years.
4. If born during the great famine of 1349/50 (B.S.), the current age is 41 years.
5. If born during the 1947 partition of India, the current age is 37 years.
6. If born during the 1971 Bangladesh War of Independence, the current age is 13/14 years.
7. If born during the 1974 famine, the current age is 10 years.
8. If born during 1958 Ayub Khan's Martial Law year, the current age is 26 years.

Interviewers: The above is a list of nationally known events. Apart from them, there may be local events which are even better remembered.
(B.S. is Bangla Saal or Bengali year).

APPENDIX 13: Repeatability Status Codes

Situation	Code
Only first interview done (by interviewer) and none attempted subsequently	01
First and second interviews done and both found same (by patient and treatment methods)	02
First and second interviews different and supervisor's interview not attempted	03
First and second interviews different and supervisor's found first one correct	04
First and second interviews different and supervisor's found second one correct	05
First and second interviews different and supervisor's found none correct	06
First and supervisor's done and first found correct	07
First and supervisor's done and first found not correct	08
Only supervisor's done	09
Second and supervisor's done and second found correct	10
Second and supervisor's done and second found not correct	11
Only second interview done	12

RAHMAN RAHMAN HUQ & CO
Chartered Accountants

BANGLADESH RURAL ADVANCEMENT COMMITTEE

ORAL THERAPY EXTENSION PROGRAM

Receipts and expenditure statement for 39 months ended 30 September 1983

	RECEIPTS		
	Grants Received from Swiss Development Co-operation	20,945,071	
	Received from Swidish Free Church Aid	17,484,070	
		38,429,141	
	Interest (net)	290,915	
			Tk. 38,720,056
	EXPENDITURE		
1.	**RECRUITMENT AND TRAINING**		
	Staff recruitment	270,719	
	Staff training	1,255,062	
	ORW refresher course	85,429	
	Trainers salaries	69,436	
	Transportation	68,678	1,749,324
2.	**TEAMS**		
	ORW salaries	8,250,052	
	Re-inforcement	3,775,113	
	Team Co-ordinator salaries	2,966,861	
	Service staff salaries	880,038	
	Team housing (rent)	210,858	
	Team transportation	2,650,702	
	Team supplies - initial	799,154	
	Team supplies - operation	1,951,284	
	Team office supplies stationeries	243,013	
			21,727,075
3.	**AREA STAFF ACTIVITIES**		
	Salaries and benefits	1,023,838	
	Monthly expenses	512,131	
	Transportation	674,786	
	Furniture and equipment	262,583	
	Monitors' salaries	2,118,433	
	Monitors' transportation	485,806	
	Monitors' supplies	262,701	
			5,340,278

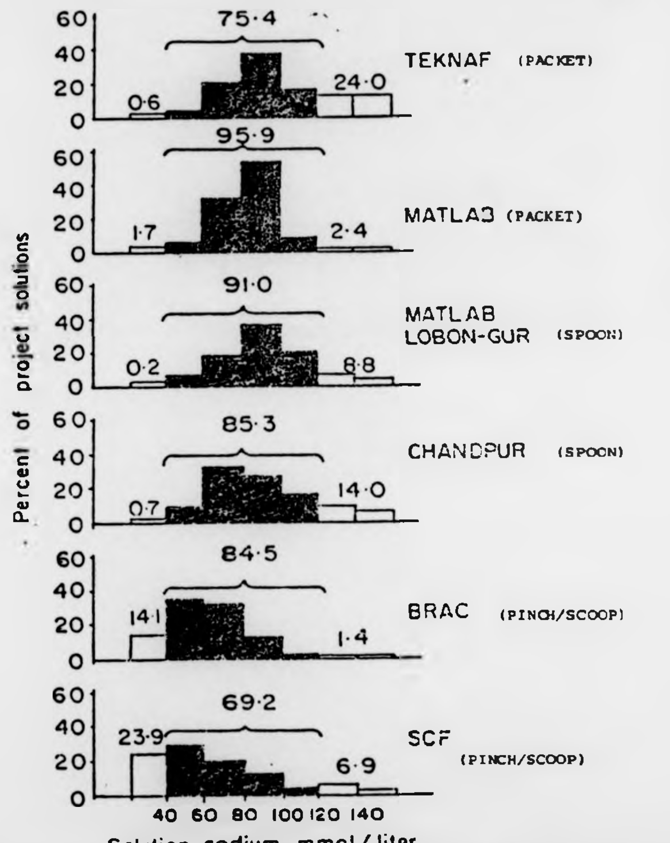
	Balance B/F		28,816,677
4.	IMPACT EVALUATION		
	A. Data Collection		
	Salaries and benefits	607,595	
	Travelling and transportation	131,695	
	Supplies and expenses	167,373	
		906,663	
	B. Data processing		
	Salaries and benefits	644,363	
	Travelling and transportation	50,566	
	Supplies and expenses	655,413	
		1,150,342	2,057,005
5.	ACTIVITY EVALUATION		
	Salaries and benefits	308,019	
	Travelling and transportation	128,747	
	Supplies and expenses	16,797	453,563
6.	ADMINISTRATION		
	Salaries and benefits	1,467,956	
	Office space rent	312,000	
	Furniture, fixture and equipment	323,528	
	Office supplies and expenses	209,904	
	Transport running cost	293,868	
	Management expenses	38,819	2,646,075
7.	VEHICLES AND BOATS		
	Central office	584,227	
	Area office	139,430	723,657
8.	PUBLICITY		
	Posters and advertising	422,337	
	Radio	79,860	
	Television	310,565	
	Cienema and slides	51,201	863,963

RAHMAN RAHMAN HUQ & CO
Chartered Accountants

Balance B/F		35,560,930
9. LABORATORY		
Furniture, fixtures and equipment	35,945	
Operational supplies	172,807	
Staff salaries	119,548	
		328,300
Total expenditure upto 30 September 1983		35,889,230
Balance of fund as on 30 September 1983		2,830,826
		Tk. 38,720,056

Appendix 15*

FREQUENCY DISTRIBUTION OF SODIUM CONCENTRATIONS IN ORS FROM 6 PROJECTS IN BANGLADESH*



* Sodium Content of Home-Made Oral Rehydration Solutions Collected from Different Projects in Bangladesh - by MA Wahed, S Zimicki, MM Rahman - ICCDR-B to be published

* Reproduced from Bhatia et al. (1983)