

Assessment of mother's knowledge and practice in use of oral rehydration solution for diarrhea in rural Bangladesh

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ABSTRACT

Objective: To assess mothers' knowledge, attitude and use of oral rehydration solution (ORS) for diarrhea management at home, and feeding practices during diarrhea for children under 5-years of age, in a rural Health Development Project, Bangladesh.

Methods: This was a cross-sectional survey. This study was carried out in Cox's Bazar district, South Bangladesh, over a 2-week period, during May 1994. A sample of 300 households in the project area and a similar one in a control area were randomly selected using a multistage stratified technique. Data was collected by interviewing mothers at home using a standard questionnaire and through practical demonstration of how to prepare and use ORS correctly. Project and control households were compared regarding differences in knowledge and practice.

Results: More mothers in the project area received information regarding ORS than in the control area (63% versus 59%). The majority of mothers in both project and

control areas recognized ORS packets (97% versus 95%). A significantly higher proportion of mothers in the project area knew how to prepare ORS correctly (64% versus 55%). Mothers' skill of using ORS was significantly associated with having seen a packet of ORS and mothers' education. The ORS use rate was lower in the project area compared with the control area (74% versus 84%). No significant differences in feeding practices during diarrhea were detected.

Conclusions: The study showed that a significantly higher proportion of mothers in the project area knew how to prepare and use ORS correctly. However, the ORS use rate was inadequate. Repeated health education of mothers regarding diarrhea management is needed. Oral rehydration solution should be made available at health posts and households.

Keywords: Diarrhea, oral rehydration solution, household survey, project assessment.

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Diarrhea remains one of the major causes of morbidity and mortality in developing countries. The World Health Organization (WHO) estimated that 1000 million diarrhea episodes and 3.3 million (range: 1.5-5.1 million) deaths occur each year among children under 5-years-old.¹ In Bangladesh, diarrheal diseases are the major causes of morbidity and mortality in children below 5 years of age.²⁻⁵ The priority strategy for control of diarrhea is case

management using oral rehydration solution (ORS) and sugar salt solution (SSS). The WHO/United Nations International Children's Fund (UNICEF) recommended training of community based workers at the local level to manage, control and prevent diarrhea.⁶ Several studies in Bangladesh and elsewhere⁷⁻¹² showed the effectiveness of programs for teaching mothers how to prepare and use ORS for diarrhea management at home. A Health

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Development Project (HDP) was established in Ukhia thana villages to train village health promoters (VHPs) to provide primary health care services (including control of diarrhea) to the people in these remote areas. The hypothesis was that VHPs, trained by the HDP, had contributed to the improvement in mothers' knowledge and use of ORS for diarrhea management at home in the project area compared with a control area where no VHPs existed. The specific objectives of this study were to assess mothers' knowledge, attitude and use of ORS for diarrhea management at home and feeding practices during diarrhea for children under 5 years of age.

Methods. The study areas were Ukhia thana (the project area), with a high morbidity and mortality from preventable diseases^{2,13} and Ramu thana (the control area). Ukhia thana had a total population of 121,514 of whom 86.9% were rural.² Ramu thana had a total population of 167,480 of whom 81.9% were rural.² At the time of the study there were 55 VHPs. Village health promoters were males or females with 10 years of basic education and trained for 9 months on maternal and child health, sanitation and control of communicable diseases.

The target population consisted of households in which there was at least one child under 5 years of age. The study population comprised mothers in selected households, who had at least one living child under five years of age. The study was a quasi-experimental design¹⁴ using a cross-sectional household survey in both project and control villages. The sampling frame consisted of Unions (subdivisions of a sub-district), villages, and households. The power of the study and desired sample size of households was calculated using the standard formula,¹⁵ assuming equal number of households in the 2 areas. A multistage sampling design was used. A 2-stage sampling design was used in the project area. All the 5 unions in Ukhia thana were included. Five villages were selected out of 51 using probability proportional to size sampling procedure¹⁶ as a first stage. In the 2nd stage, a systematic sampling technique was applied to select 60 households from each village thus giving a total sample of 300 households. A 3 stage sampling technique was used to select households from Ramu thana, the control area. Five out of 9 unions were selected at first stage, 5 villages at 2nd stage and 60 households at the 3rd stage (namely a total sample of 300 households). Every 3rd household in which there was at least one child under 5 years of age was selected for interview.

Data was collected using a standard questionnaire designed in English and then translated into Bangladesh. It included modified questions from the questionnaires used by the WHO for diarrhea morbidity and treatment practices survey¹⁶ and also

from the child's questionnaire used by the Combating Childhood Communicable Diseases (CCCD) project in Zaire.¹⁷ The questionnaire included demographic data, knowledge, attitude and practice of mothers concerning diarrhea management. Five female college students administered the questionnaire from the same area of Cox's Bazar. The fieldwork was conducted during May 1994, which corresponded to the season of diarrhea.

In this study, diarrhea was defined as 3 loose stools in any 24-hour period during the 2 weeks interval ending at the time of the interview.^{16,18} Oral rehydration solution use rate was defined as the proportion of cases of diarrhea treated with ORS.¹⁶ The term "use ORS correctly" implies the correct demonstration by mother, in front of the interviewer, of how to prepare ORS using the right volume of water and ORS.

Data was analyzed using statistical package for social sciences (SPSS)/PC software.¹⁹ The statistical tests used were chi-squared test, t-test, and Fisher's Exact test. Multiple logistic regression analysis was performed. A 5% level of significance and 95% confidence intervals were quoted.

Results. Three hundred (100%) of mothers in the project area and 293 (97.7%) mothers in the control area were interviewed. Reliability test (test-retest method) was carried out on knowledge and skill of preparation of ORS, with a Kappa index²⁰ of 0.62 for both project and control areas combined, 0.64 for project area, and 0.58 for control area. These indices were considered as ranging from fair to good agreement.²⁰ **Table 1** shows the basic demographic characteristics of the project and control areas. There were no statistically significant differences in the baseline characteristics. In the project area 82.3% of mothers were illiterate compared to 80.5% in the control area. The significant difference in the mean yearly income between the 2 areas was probably due to the difficulty in obtaining an objective estimation of income. Most of the families did not have stable jobs or fixed income. More mothers in the project area received information regarding ORS than in the control area as shown in **Table 2**. This difference was non-significant ($X^2=1.15$; $P>0.05$). Village health promoters were the main source of information regarding ORS in the project area while village doctors (traditional healers, or quacks) were the main sources in the control area. The majority of mothers in both project and control areas recognized ORS packets (96.7% versus 95.3%). Approximately 64% of mothers in the project area demonstrated practically how to prepare ORS correctly compared with 54.6% of mothers in the control area (**Table 2**). This difference was statistically significant. When comparison was restricted to only those who recognized ORS packets, the difference in correct

Table 1 - Demographic characteristics of project and control areas.

Demographic characteristic	Project area mean ± one SD	Control area mean ± one SD	P-value (t-test)
Mother's age in years	27.4 ± 6.7	27.7 ± 6.2	NS
Years of education of mother	1.0 ± 2.4	0.9 ± 2.2	NS
Years of education of father (head of household)	2.7 ± 4.2	2.6 ± 4.0	NS
n of persons in household	7.9 ± 3.8	7.0 ± 2.5	NS
n of children under 5 years in household	1.6 ± 0.7	1.6 ± 0.6	NS
Age of youngest child under 5 years (in months)	20.5 ± 14.0	20.9 ± 14.6	NS
Average yearly income of family in Taka (38 T=one USD)	30,483 ± 25,769.1	35,709.9 ± 27,330.8	<0.05
n of households with safe water supply	218 (72.7)	223 (76.1)	NS*
n of households with sanitary latrines (%)	30 (10)	21 (7.2)	NS*

n - number, NS - not significant, * - Chi-squared test, USD - dollar
SD - standard deviation

Table 2 - Knowledge and practice of mothers regarding ORS and diarrhea management in project and control areas.

Knowledge and practice	Project area n (%)	Control area n (%)	P-value
Received information about ORS	189 (63)	121 (58.7)	NS
Recognized ORS packets	290 (96.7)	279 (95.2)	NS
Knew how to prepare and use ORS correctly	193 (64.3)	160 (54.6)	0.02
Give ORS for treating diarrhea (ORS use rate)	57 (74)	79 (84)	NS
Gave syrup, coconut water, tubewell water for diarrhea	7 (9.1)	4 (4.3)	NS
Continued breastfeeding during diarrhea	74 (96.1)	83 (88.3)	NS
Gave solid or semi-solid food during diarrhea	70 (64.9)	56 (59.6)	NS
Did not give any fluids for treating diarrhea	13 (16.9)	11 (11.7)	NS

n - number, NS - not significant, ORS - oral rehydration solution

preparation of ORS was also significant ($X^2=5.11$; $P=0.02$). Although more mothers in the project area knew how to prepare and use ORS correctly, the ORS use rate was lower in the project area (74%; 95% confidence interval (CI) =64.2%-83.8%) than in the control area (84%; 95% CI=76.6%-91.4%). This difference was not significant. Multiple logistic regression analysis was used to identify the contribution of specific variables on the mother's skill of how to prepare and use ORS correctly (the dependent variable). Eighteen independent variables, considered to contribute to the mother's skill of how to prepare and use ORS correctly, were entered into the logistic model. **Table 3** shows the results of the analysis using forward stepwise regression. Years of education of mother contributed very little (a weak association). Mothers who had seen a packet of ORS before were 7 times more likely to prepare and use ORS correctly (odds ratio (OR)=6.78; 95% CI=2.26-20.23). Similarly mothers who received health education on use of sanitary latrines were 58% more likely to prepare and use ORS correctly. As shown in **Table 2**, more mothers in the project area continued breast-feeding and gave solid or semi-solid foods during diarrhea (95.9% versus 88.9%). However, more mothers in the control area gave other fluids such as coconut water or syrup (83.1% versus 88.1%). The main types of solid or semi-solid foods given during diarrhea were rice, banana, bread, sago and biscuits.

Discussion. More mothers in the project area were knowledgeable regarding ORS, although not significantly different from the control area. This was consistent with a similar study carried out in Ukhia thana in 1990²¹ using a similar methodology, which showed that 76% of mothers had heard information regarding ORS. The higher proportion of mothers' knowledge regarding recognition of ORS packet in the project area possibly reflected the health education activities of VHPs. This was further supported by the fact that VHPs were the main source of information regarding ORS. The possible reason for the higher proportion of mothers in the project area demonstrating correctly how to prepare and use ORS was the health education by VHPs through home visits.^{22,23} Health education by government health workers was a remote possibility due to a lack of health services in these remote areas and a shortage of health workers. A similar household survey in Ukhia and Ramu thanas carried out in 1990 showed that 86% of mothers knew how to prepare ORS correctly.²¹ Several studies in Bangladesh and elsewhere have shown that health programs using community health volunteers were effective in improving mothers' knowledge and skills of managing acute diarrhea.²⁴⁻³¹ However, other studies showed the failure of community health workers programs to achieve their objectives.^{32,33}

Table 4 - Logistic regression analysis showing variables associated with mother's skill of how to prepare and use ORS correctly.

Variable	Regression coefficient	Standard error	Odds ratio	95% confidence interval of odds ratio	P-value
Mother having seen a packet of oral rehydration solution before	1.9136	0.560	6.78	2.26-20.23	0.006
Health education on use of sanitary latrine	0.4562	0.176	1.58	1.12-2.23	0.0094
Years of education of mother	0.1169	0.044	1.12	1.03-1.23	0.0076
Constant	-2.0121	0.565	-	-	-

Although both areas showed high ORS use rates, possible reasons for the lower ORS use rate in the project area compared with the control area were: 1. Non-availability of ORS packets due to the very few health facilities in the area. 2. The HDP had no strategy to distribute ORS packets through VHPs. The project assumed that ORS had already been provided by the Ministry of Health and was available in pharmacies for purchase. 3. Extreme poverty of the people³⁴ that they could not afford to buy ORS packets. The HDP might need to look at this problem of ORS availability in the future. A study in Matlab area of Bangladesh³⁵ showed that two-thirds of care givers did not provide ORS to diarrhea affected children. The common reasons given were that ORS packets were unavailable and mothers did not presume ORS as useful in stopping diarrhea and vomiting. A review of ORS use rates estimated in different Bangladeshi National Surveys showed a wide variation in use rates ranging from 14-78%.³⁶ Several methodological biases were responsible for these variations. In this study bias was minimized by using an appropriate sampling design, female interviewers, a clear definition of acute diarrhea, and using the child's mother as a respondent. However, the high ORS use rates in this study might partially be due to over reporting by mothers. Probable reasons for the association of mothers' correct preparation of ORS with health education on sanitary latrines and having seen a packet of ORS before were the holistic approach adopted by VHPs in delivering health education to mothers at home and the practical training of mothers using ORS packets. The majority of mothers in the project area recalled better feeding practices during diarrhea such as continuing breastfeeding and giving solid or semi-solid foods. This finding was consistent with a study carried out in Bangladesh to determine the cultural factors related to patients with diarrhea,³⁷ which showed that almost all mothers of fully and partially breastfed children continued to breastfeed them during the acute and convalescent stages of diarrhea. The non-significant differences in the knowledge and practices of mothers concerning feeding during diarrhea might

partially be due to the services provided by non-governmental organizations in these remote areas.

This study showed that a significantly higher proportion of mothers in the project area knew how to prepare and use ORS correctly compared with mothers in the control area. However, mother's use of ORS for treating children with diarrhea was inadequate. Assessment of mother's feeding practices for children with diarrhea showed a high proportion of mothers in the project area who continued breastfeeding and gave fluids during diarrhea although not significantly different from the control area. Village health promoters should educate mothers repeatedly regarding correct preparation of ORS and emphasize its use for treating every case of diarrhea at home. Oral rehydration solution packets should be made available at all health posts and to VHPs by the HDP.

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