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Attachment 1.

Date 20/5/82

ETHICAL REVIEW COMMITTEE, ICDDR,B.

Principal Investigator A. M. Molla. Trainee Investigator (if any) _____

Application No. 82-025 Supporting Agency (if Non-ICDDR,B) _____

Title of Study Intake and utilization of calories from rice starch electrolyte therapy in acute diarrhoea

Project status:
( ) New Study
( ) Continuation with change
( ) No change (do not fill out rest of form)

Circle the appropriate answer to each of the following (If Not Applicable write NA).

Source of Population:
(a) Ill subjects ✓ Yes No
(b) Non-ill subjects Yes No
(c) Minors or persons under guardianship ✓ Yes No

Does the study involve:
(a) Physical risks to the subjects Yes ✓ No
(b) Social Risks Yes ✓ No
(c) Psychological risks to subjects ✓ Yes No
(d) Discomfort to subjects ✓ Yes No
(e) Invasion of privacy Yes ✓ No
(f) Disclosure of information damaging to subject or others Yes ✓ No

Does the study involve:
(a) Use of records, (hospital, medical, death, birth or other) ✓ Yes No
(b) Use of fetal tissue or abortus Yes ✓ No
(c) Use of organs or body fluids ✓ Yes No

Are subjects clearly informed about:
(a) Nature and purposes of study ✓ Yes No
(b) Procedures to be followed including alternatives used ✓ Yes No
(c) Physical risks ✓ Yes No
(d) Sensitive questions Yes ✓ No
(e) Benefits to be derived ✓ Yes No
(f) Right to refuse to participate or to withdraw from study ✓ Yes No
(g) Confidential handling of data ✓ Yes No
(h) Compensation &/or treatment where there are risks or privacy is involved in any particular procedure ✓ Yes No

5. Will signed consent form be required:
(a) From subjects ✓ Yes No
(b) From parent or guardian (if subjects are minors) ✓ Yes No
6. Will precautions be taken to protect anonymity of subjects ✓ Yes No
7. Check documents being submitted herewith to Committee:
___ Umbrella proposal - Initially submit an overview (all other requirements will be submitted with individual studies).
___ Protocol (Required)
___ Abstract Summary (Required)
___ Statement given or read to subjects on nature of study, risks, types of questions to be asked, and right to refuse to participate or withdraw (Required)
___ Informed consent form for subjects
___ Informed consent form for parent or guardian
___ Procedure for maintaining confidentiality
___ Questionnaire or interview schedule *

* If the final instrument is not completed prior to review, the following information should be included in the abstract summary:
1. A description of the areas to be covered in the questionnaire or interview which could be considered either sensitive or which would constitute an invasion of privacy.
2. Examples of the type of specific questions to be asked in the sensitive areas.
3. An indication as to when the questionnaire will be presented to the Cttee. for review.

I agree to obtain approval of the Ethical Review Committee for any changes involving the rights and welfare of subjects before making such change.

A. M. Molla
Principal Investigator

Trainee

82027

27/5/82

SECTION 1 - RESEARCH PROTOCOL

1. TITLE: Intake and utilisation of calories from Rice Starch Electrolyte Therapy in Acute Diarrhoea due to Cholera, ETEC, Rotavirus and Shigella

2. PRINCIPAL INVESTIGATOR: Dr. A.M. Molla

   CO-INVESTIGATORS: Dr. Ayesha Molla, Dr. Masud Ahmed, Ms. M. Khatoon & Dr. W.B. Greenough, III

3. STARTING DATE: 15th June, 1982

4. COMPLETION DATE: 31st December, 1982

5. TOTAL DIRECT COST:

6. AVAILABILITY OF FUNDS:

   a) Remarks of Programme Head: Approved by NNS.

   b) Controllers Remarks:

7. Signature of the Programme Head: [signature]

   Date: 19/5/1982

8. ABSTRACT SUMMARY:

Previous study in ICDDR,B demonstrated that an ORS containing 30 g/L of rice powder along with the WHO recommended electrolytes was as effective as sucrose electrolyte solution in treating acute diarrhoea due to cholera and ETEC infection. It is hypothesized that the polysaccharide rice starch unlike glucose or sucrose being digested by the intraluminal enzymes is free from osmolar problems like diarrhoea and vomiting even when used in higher concentration in the oral rehydration solution. Thus, in the proposed study a higher amount (100 g/L) of rice powder will be used in the oral rehydration solution to provide more calories through ORS, while treating acute diarrhoea due to cholera, E. coli, rotavirus and shigella. Standard WHO recommended glucose electrolyte solution will be used as an ORS for comparison. A total of 125 patients, 100 children of 1-5 years old (50 for each type of ORS) and 25 adults with V. cholera will be included in this study. The results of this study will be analysed to determine the co-efficient of absorption of calories, calorie balance, efficacy, digestibility, and the rate of reduction of stool output by the two types of oral rehydration solution. This study will be carried out in a metabolic set up in the ICDDR,B Dacca Hospital. If required, further studies may be carried out in hospital as well as in field situations in order to increase the calorie density of ORS during diarrhoea using higher amounts of the cereal (rice) based electrolyte solution.

9. REVIEWS:

a) Research involving human subjects: _____ _____

b) Research Committee: _____

c) Director: _____

d) BMRC: _____

e) Controller/Administrator: _____

SECTION II - RESEARCH PLAN

A. INTRODUCTION:

1. Objectives:

Previous study in ICDDR,B, demonstrated that 30 g/L of rice powder in the ORS was as effective as sucrose electrolyte solution in treating acute diarrhoea due to V. chclerae and ETEC. Results of this study prompted us to hypothesize that a higher concentration of rice powder (100 g/L)* along with standard electrolyte content may well be used in ORS for the treatment of acute diarrhoea in order to provide extra calories during the treatment of diarrhoea. WHO recommended standard glucose electrolyte solution will be used for comparison. Results of both the solutions will be analysed to assess the efficacy as ORT, co-efficient of absorption of calories from the ORS, calories and electrolyte balance, digestibility and the rate of reduction in stool output by the two types oral rehydration solution.

2. Background:

Use of Glucose in the ORS

Scientific basis of oral rehydration solution rests on the discovery of carrier mediated transport of glucose and the fact that its presence on the mucosal side of the small intestine

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* In vitro experiment showed that 100g rice powder goes into easy suspension in one litre of water and the consistency is thin liquid and is lighter than the milk shake.

enhances the absorption of sodium and water (1,2,3,4,5,6). Phillips reported that oral administration of Glucose-containing solutions could reduce the net stool output of cholera patients (7). This idea was expanded by Hirschhorn et al (8) in a perfusion study in cholera patients using glucose electrolyte solution and showed a significant reduction in net stool output by adding glucose. Since then several practical regimens based on glucose electrolyte solutions were developed to treat diarrhoea both in adults and children (9,10,11).

Alternatives of Glucose in ORS

Glucose, a monosaccharide has been used as the most available of the successful promoters of sodium and water absorption. However, glucose is still quite expensive and at times not readily available in the developing countries where diarrhoea is a major health problem. Thus alternatives to glucose have been sought. One successful alternative to glucose in oral rehydration solution has been sucrose. Instead of 20g of glucose, 40g of sucrose has proved successful in the treatment of diarrhoea (12,13). Other alternatives to glucose or sucrose have been tried (14). However research continues on oral rehydration therapy for simplification, reduction of cost, and to provide increased nutrition during diarrhoea. Studies have shown direct or indirect nutritional benefit from oral therapy in diarrhoea (15,16) but this aspect of oral rehydration solution could not be reproduced by many and remains controversial. Thus further research is necessary on this aspect of oral rehydration.

Cereal as a substitute of glucose:

An oral rehydration solution is needed which will stimulate the absorption of salts and water and at the same time improve and sustain nutrition during diarrhoea, specially in vulnerable children. The use of chicken soup with glucose or a cereal starch has been suggested (17). Cereals being staple diets oral rehydration using the starch source common to the community will be advantageous. This would simplify ORS and its application more practicable at the level of the vulnerable population. In the countries of Asia and South East Asia rice is most commonly used and is easily available. Rice is a unique starch containing a mixture of two different poly glucose, amylose and amylopectin. Amylose has a linear structure and is composed of glucose units linked by 1,4 glucosidic bonds and in amylopectin though it has branched structure, majority of the glucose units are linked by 1,4 glucosidic bonds (18). Fig. 1 illustrates the structure of starch. Rice has 7-10% protein in its composition with many important amino acids. Among them glycine and Lysine (30-40 mg per 100g) are important. Glycine has already been shown to promote the transport of sodium from the intestinal lumen (19) although quantitatively the amount of glycine in rice is rather insignificant. Acid hydrolysis converts 80-86% of rice starch into glucose (20). Salivary and pancreatic - amylase attack the 1,4 links of rice starch converting the poly saccharide into glucose in duodenal and jejunal lumen (21). Even a one month old infant can also digest enough starch for caloric needs (22).

The advantages of the rice starch are summarized below:

* Rice is cheap and easily available.
* Being familiar more easily acceptable.
* Amounts sufficient to provide full caloric needs are feasible.
* Cost and storage problems of glucose or sucrose in ORS are eliminated.
* Usual household reserve for rice will sufficce.
* Being food, osmolar problems of glucose or sucrose are eliminated.
* The water used will always be safe as preparation of all starch cereals requires boiling. Fuel cost is not additional as this is necessary for survival and care of life.

Considering the above advantages ICDDR,B carried out a pilot study on rice powder electrolyte solutions as oral rehydration therapy. In this study 30g of rice powder replaced sucrose or glucose and the electrolytes were same as recommended by WHO. The results were very encouraging and the success rate was comparable with the sucrose electrolyte group (22). A pre print of the paper from the results of the study is attached.

Based on the results of the pilot study, this study proposes to use a higher amount of rice powder (100 g/L)* for oral rehydration solution and evaluate the efficacy, caloric balance, digestibility, percent of absorption of calories and rate of reduction in stool output by the two types of ORS in patients with acute watery diarrhoea.

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* In vitro experiment showed that 100g rice powder goes into easy suspension in one litre of water and the consistency is thin liquid lighter than milk shake.

Diarrhoea Malnutrition Cycle

The immediate impact of acute diarrhoea on the health is dehydration due to loss of fluid and electrolyte. This is an acute form of malnutrition and can be termed as fluid electrolyte malnutrition (FEM) (23). Scientific attention on FEM has led to the discovery of oral glucose electrolyte solution and is an effective tool to cure and prevent FEM. The invariable and insidious accompaniment of diarrhoea is protein energy malnutrition (PEM). The PEM following diarrhoea might involve several factors (24,25,26) e.g.

1. Anorexia i.e. the child loses appetite and eats less.
2. Withholding or modification of food by the parents as a measure to control diarrhoea.
3. Malabsorption of nutrients during and after diarrhoea.
4. Increased catabolism due to infection.

Repeated episodes of diarrhoea and its nutritional cost cause severe malnutrition which inturn produces compromised immunological status. This state of affairs makes the subject vulnerable to not only diarrhoeal attacks but also to many other systemic infections. Fig. 2 illustrates the consequences of recurrent attacks of infection on the growth of a child (27,28). Thus a FEM-PEM cycle is set up through which the victim has to pass and in case of a child the end result of this cycle is disastrous. In the developed countries of the world few hours or even few days of starvation or caloric deprivation may not have severe effect on the health but in case of a child of a poor country where the nutrient intake and nutritional status may be at a critical level, effective measures must be taken to

break the FEM - PEM cycle. An oral rehydration therapy capable of providing adequate calories during diarrhoea therapy can be the effective intervention to break the FEM - PEM cycle.

Calories in oral rehydration solutions:

Currently available ORS consist mainly of sucrose and glucose electrolyte solution. 20g of glucose can provide 80 Kcal, 40g sucrose 160 Kcal and 100g rice powder 400 Kcal per litre, provided the fructose from the sugar is absorbed. But the cost should be weighed against the benefit provided by the substance. A comparison of cost effectiveness is shown below:

Type of media	Amount per 10 litre	Cost per 10 litre	Calories provided*
Sucrose	400 g	Tk. 10	1600 K.cal
Glucose	200 g	Tk. 10	800 K.cal
Gur	400 g	Tk. 5	1600 K.cal
Rice powder	1000 g	Tk. 6	4000 K.cal

Thus almost with the same cost as the other carrier media double the amount of rice powder can be used and more than twice the calories can be provided as long as the use of high concentration of rice powder does not cause any difficulties in digestion and also effectiveness.

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* Hypothetical calculation assuming the 100% absorption of the carbohydrates from different source.

3. RATIONALE

a. Rice powder as replacement of sucrose or glucose in the oral rehydration solution was shown to be equally effective in treating acute diarrhoea.

b. Rice is a staple food and available in every house in Bangladesh and most of the other developing countries. The cost of rice is almost half of that of sucrose and glucose with more nutrients.

c. Rice being a food digested by the intraluminal enzymes, releases the glucose molecules slowly. This eliminates the osmotic problems and thus permits the use of more calories and provides more carrier molecules for rehydration.

d. If a high concentration of rice powder e.g. 100 g/L could be utilized, calories sufficient to sustain all needs could be provided even in the acute phase of diarrhoea.

e. Thus a study which will use maximum amount of the rice powder in ORS solution, without making it too thick to drink, will combine replacement of fluid and electrolytes losses and fulfill the nutritional needs and if successful will have major implications in the treatment of diarrhoea and nutritional rehabilitation following diarrhoea.

B. SPECIFIC AIMS:

1. To study the efficacy of highest possible amount of rice powder (100g/L) as a carrier molecules with same WHO-recommended electrolytes in correcting dehydration, maintaining hydration and electrolyte balance in acute diarrhoea due to cholera, E. coli, rotavirus and shigella infection.

2. To study the digestibility of this solution by analysing the glucose content in 24 hours stool before and after acid hydrolysis.

3. To study and compare the percent of absorption of calories from the rice powder electrolyte and glucose electrolyte solution while being used as oral rehydration in acute diarrhoea due to cholera.

4. To study and compare the rate of reduction of stool output by the two types of ORS in acute cholera patient.

5. To evaluate the additional advantages of the rice powder electrolyte solution over the glucose electrolyte solution by assessing the oral intake, stool output, weight gain and positive caloric balance at the end of the 24 hours balance study.

B. METHODS AND PROCEDURE:

1. Composition of the oral rehydration solution to be used in the study.

Two types of solutions will be used, solution A and solution B. The compositions of the solutions are given in Table 1.

Osmolarity of both the solutions has been determined. Solution A (Glucose) has an osmolarity of 330 after preparation of the complete formula and that of solution B with 100 g of rice powder and boiling for 5 minutes was 208, mosmoles per litre. The osmolarity of the only electrolytes without glucose or rice powder was 190 mosmoles per litre and that with 80g of rice powder was also 208 mosmoles/L. Thus it is clear that unlike glucose rice powder being a food does not cause any increase in osmolarity and is less likely to produce any osmolar load in the intestinal lumen.

2. Selection of patients

100 children and 25 adults with history of acute diarrhoea of not more than 48 hrs duration will be admitted into the study. The criteria for the selection of patients are given in Table 2. The degree of dehydration will be assessed according to the WHO criteria (29). Any patients showing signs of systemic infection and history of previous treatment will be excluded from the study. Parents or guardians attending the patient will be explained about the study procedure and only after the informed consent is obtained patients will be admitted into the study ward. Admission weight and height will be taken and the admitting physician will carry out a thorough physical examination. Attempts will be made to admit the children weaned from breast milk. Shigella patients either showing pus cells 25/HPF in the stool or positive rectal swab and/or stool culture and showing signs of toxaemia will receive ampicillin according to the standard therapeutic regimen of ICDDR,B. No other patients will receive antibiotics and in case antibiotics is needed on clinical grounds, the patient will be excluded from the study and transferred to the general patient care unit.

3. Laboratory Investigations on Admission and During the Study

On admission some routine laboratory investigations necessary for normal clinical care will be carried out. These will include: blood for TC, DC, HCT, Electrolytes; stool and urine analysis. In addition rectal swab for culture in all plates, and ELISA test for rotavirus will also be done. E. coli isolates will be tested for ST and LT toxins. Electrolytes will be determined from catheter specimen of stool on admission and every 24 hour. Electrolytes from the urine and vomitus (if any) will also be determined every 24 hours until the study is ended. . Post hydrolysis glucose content will be determined from the catheter specimen of stool at 8 hour interval by glucose oxidase method.

4. Initiation of fluid therapy

Patients will be randomised and assigned to either of the two study solutions A and B. Blinding will not be possible as the physical characteristics of the solutions are distinguishable by appearance. All patients except those with mild dehydration will receive initial hydration by intravenous route using standard acetate solution and the amount of fluid to be administered will be determined as follows:

* Severe dehydration: fluid equal to 10% of the admission body weight over first 4 hours.

* Moderate dehydration: Fluid equal to 7.5% of the admission body weight over 3-4 hours.

* Mild directly into oral therapy

Bringing all the patients into a comparable state of hydration will ensure valid scientific comparison of the various criteria of the study.

5. Clinical Procedure:

Before starting the ORS each patient will be fed a charcoal Tablet followed by oral rehydration solution. ORS will be used only to maintain the ongoing losses in the stool, urine and vomitus. The appearance of the marker will be taken as "Zero" hour and the balance study will be continued for 24 hours during which strict measurement of intake and output will be maintained at 8 hour interval.

At the end of 24 hours a second marker will be fed to the patients. Stool and vomitus will be collected on ice in a bucket over 8 hours and then will be frozen at 20^{o}c below Zero. Each 24 hours stool and vomitus will be thawed, blended and sample from the blended aliquotes will be analysed for calories. The following procedures will be continued during the study period:

a. Weight and height on admission and 8 hourly.
b. Vital signs (P, T, R, BP) on admission and 4 hourly.
c. Hydration status and clinical assessment 4 hourly.
d. Blood for Hct, Spgr, and electrolytes on admission, 24 hrs, and 48 hrs.
e. Measurement of intake and output 4 hourly.

The ORS will be measured in grams and be fed by the mothers under the close supervision of the study nurses. Accurate weight of the ORS upto 0.1g will be taken by using a Toledo Scale each time before and after the feeding of ORS. Measured quantities of plain water will be allowed to each child. Clinical evaluation will include examination of the skin elasticity, mucous membrane, eye signs of pulmonary oedema. Patients will be under constant observation of the study nurse, clinical research officer and one of the investigators. Special attention will be paid on the acceptibility of the ORS, feeling of well being by the patient. In case the patients fall behind in hydration i.e. signs of severe dehydration becomes clinically apparent, intravenous fluid will be started after taking a sample of blood for sp gr and will be considered failure.

For the first 24 hours patients will not be allowed usual food but ORS and measured quantities of plain water. This is necessary to ensure correct measurement of glucose, calories, and electrolyte content in the stool taking each type of ORS. Moreover if food is allowed during therapy, glucose molecules available from the food will participate in the hydration and will interfere in assessing the efficacy of the ORS, calorie absorption and balance from the ORS and also the electrolyte balance from the ORS. However, patients in the glucose electrolyte group will receive a constant infusion of 10% glucose solution inorder to avoid the chance of hypoglycaemia. Significant increase in the post hydrolysis glucose content of the stool will be considered inadequate digestion of rice starch by the luminal

enzymes. Increased passage of unhydrolysed starch in the stool associated with increased output and clinical failure of oral therapy will be considered significant. The output will be matched by ORS only during the study period. At the end of the study a starch based diet will be allowed to each patient. The composition of the diet is shown in the Table 3 and the nutrient content will be predetermined.

6. Failure of oral therapy or indications for discontinuation of the study.

Failure of oral therapy willbe defined as the inability to maintain hydration or failure to correct electrolyte imbalance. The failure will be judged by rise in HcT, rise of pl. Sp. gr to more than 1030, fall in body weight & BP, signs and symptoms of electrolyte imbalance like restlessness or lethergy, excessive vomiting. In case of one or several of the above criteria is developed, severe enough to interfere with the therapy, the oral therapy by the particular type ORS will be considered failure. The failure cases will receive intravenous therapy with the standard intravenous fluid.

The investigations and information those will be collected are shown in the flow sheet attached.

4. ANALYSIS OF DATA:

Flow sheets for the study will be prepared and for each study patient a flow sheet will be filled in. Informations in the flow sheet will be analysed and paired T test will be done to compare between the results among

the patients receiving the two types of oral rehydration solutions. An example of the flow-sheet is attached. Tables will be prepared to compare the results of the therapy of the two types of solution used. The co-efficient of absorption of the calories in the oral rehydration solution will be calculated for both types of solution by using the formula of

$$\frac{\text{intake - output}}{\text{intake}} \times 100.$$

From the results calculations will be made to assess the following aspects for both types of ORS.

a. percent of absorption of calories and calorie balance.
b. effect of therapy by weight gain, Stool output change in the serum specific gravity, urine output etc.
c. Biochemical parameters like ser. electrolyte, stool electrolytes and electrolyte balance, post hydrolysis glucose content.
d. Net stool output at 8 hour period.
e. Cummulative calorie balance at 8 hour period.

Examples of table and figures are attached.

D. SIGNIFICANCE:

The results of this study will be able to show that the highest amount of rice starch is possible to administer through the oral rehydration solution during acute diarrhoea without compromising the efficacy of the solution and the acceptibility by the patient. This

study will also determine the added advantages of a cereal (rice starch) used in the oral rehydration solution over the conventional glucose/sucrose electrolyte solution. Depending on the results of this study it will be possible to use the appropriate amount of rice starch in the ORS to treat acute diarrhoea and simultaneously provide calories in the subsequent trials in the hospital set up and also in the field condition.

E. FACILITIES REQUIRED:

i. No new office space is required.

ii. Laboratory facilities for routine microbiology, biochemistry and clinical pathology are adequate.

iii. Hospital resources - the study will utilise patients selected from the treatment centre and outpatient. The study will be conducted in the study ward. Only 2 patients in each type of ORS i.e. maximum of 4 beds will be utilized at any time.

iv. Animal resources - will be necessary for E. coli toxin assay.

v. Statistical data analysis: Help of Statistical Branch will be utilized. Mini computer HP 85 will be adequate for the purpose of data analysis.

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Table 1

Compositions of the Types of ORS Tube Used in the Study

Ingredients (gms/L)	Sol A	Sol B
Nacl	3.5	3.5
Kcl	1.5	1.5
$NaHco_3$	2.5	2.5
Glucose	20	-
Rice powder	-	100
Osmolality	330	208

Table 2

Criteria for the Selection of Patients

Particulars	Aetiologies			
	Cholera	Rotavirus	E. coli	Shigella
Age (yrs)	1-5	1-3	1-5	1-5
Dehydration	Moderate to severe			
Duration of illness	24 hrs	24-72 hrs	24 hrs	24-48 hrs
Stool exam				
D/F for vibrio	+ve	-ve	-ve	-ve
M/E, puscells & RBC upto	5-10	upto 5-10	upto 5-10	$\geq$ 25 puscells
Number of patients	10	10	10	10

* 10 patients in each aetiology will be studied. Thus for two types of solutions 80 patients will be neccessary but 100 patients will be selected for the study in order to ensure adequate number of patients in each group. In addition 20 adult cholera patients (10 in each type of ORS) will be selected on which intensive studies e.g. rate reduction in the stool output will be carried out.

Table 3

Composition of the Study Diet

Items of Food	K.cal/gm	Protein g%
Boiled rice	1.2	2.12
Curry	1.34	7.56
Banana	1.24	1.81
Whole milk	0.77	2.37
Bread	3.01	8.06

Table 4

Effect of Therapy by Two Kinds Oral Rehydration Solutions (Mean ± SEM) after 48 hours

Particulars	Sol. A	Sol B
Output (mls/kg/24 hrs)		
Stool		
Urine		
Vomitus		
Intake (mls/kg/24 hrs)		
Oral fluid		
Plan water		
Sr. Spgr.		
On adm		
after 24 hrs		
" 48 hrs		
Body weight (kg)		
On adm.		
24 hrs		
48 hrs		
Disch.		
% of body weight gained at disch.		
% success		

Table 5

Biochemical Parameters of Study Patients after 48 hrs of Therapy

Particulars	Sol A	Sol B
Electrolytes (mmol/l)		
Na^+		
K^+		
Cl^-		
HCO_3^-		
Calories (Kcal/kg/24 hrs)		
Total intake in 24 hrs.		
Total output stool		
" vomitus		
Cal. balance = Kcal in 24 hrs.		
Post hydrolysis sugar content (mmol/l)		

Table 6

Comparison between the success and the failure group taking two types of ORS

Particulars	Success Gr.	Failure Gr.
Number		
Percent		
Adm. Ser Spgr.		
Stool output (mls/kg/24 hr)		
Oral fluid consumed "		
Urine output "		
Post hydrolysis sugar in the stool (mmol/l)		

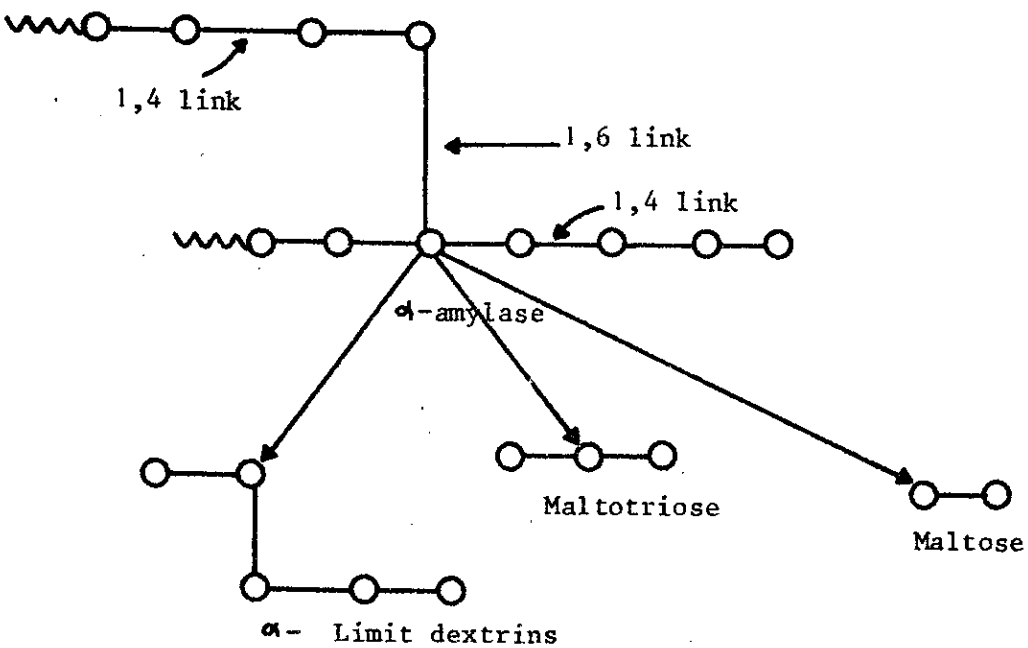
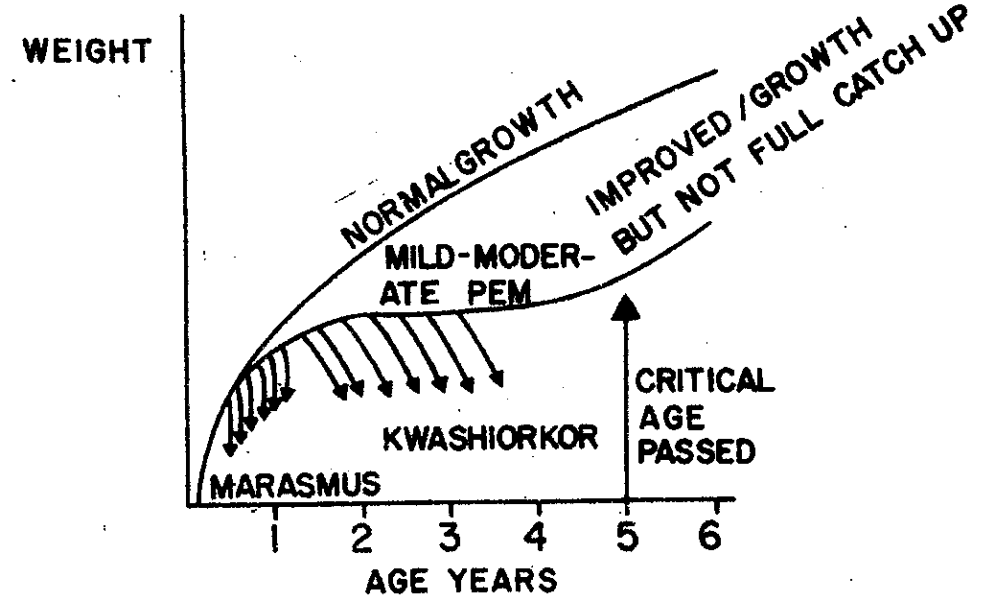


Fig. 1 Action of α- amylase on Branched starch.

Fig. 2

EFFECT OF INFECTION AND PEM ON GROWTH
CAMERON, M. ET AL.
MANUEL ON INFANT FEEDING AND YOUNG CHILDREN.
UN PROT. CAL. ADV. GROUP



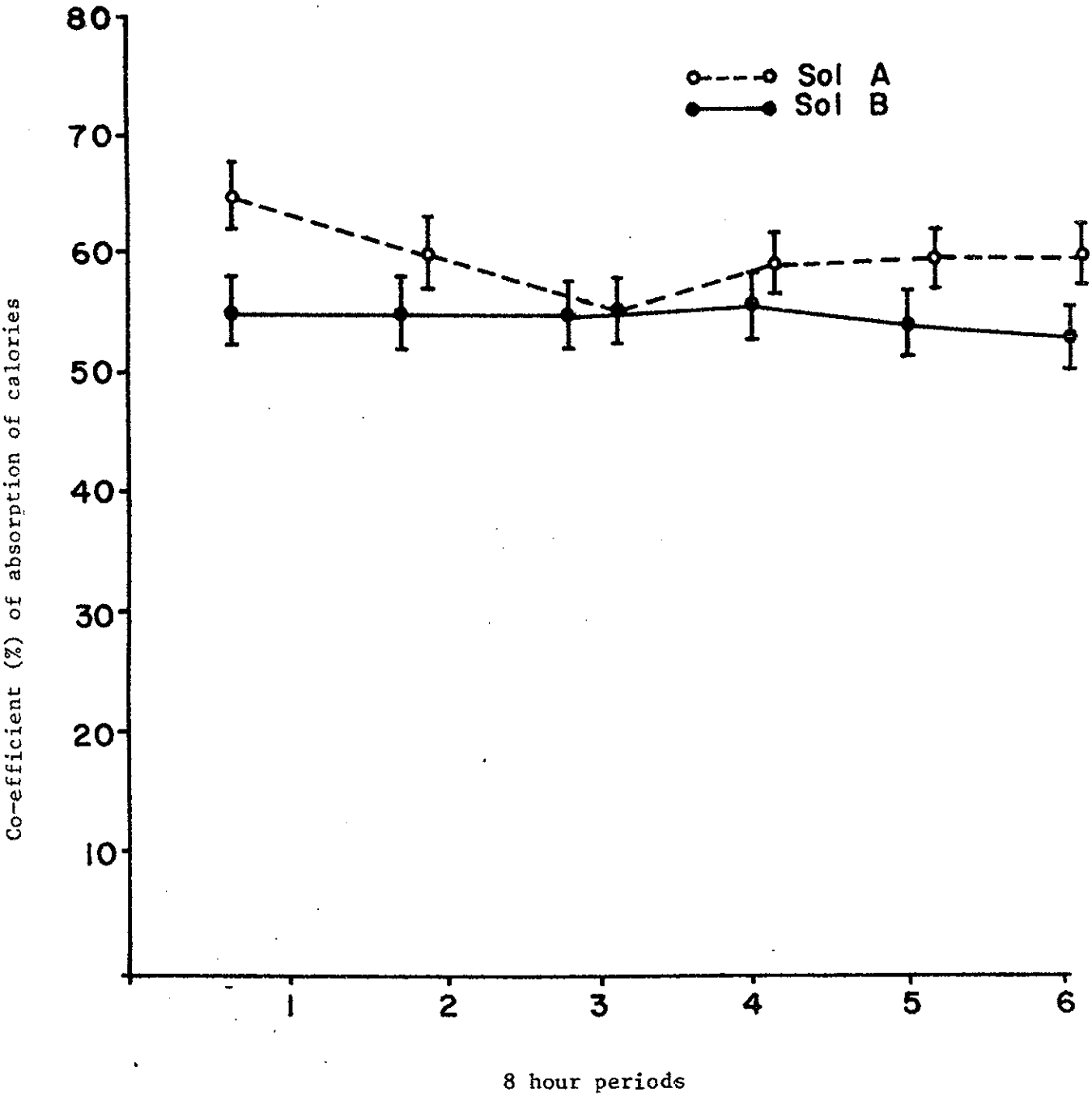


Fig 3 Hypothetical comparison of the rate of absorption calories from the two types of ORS.

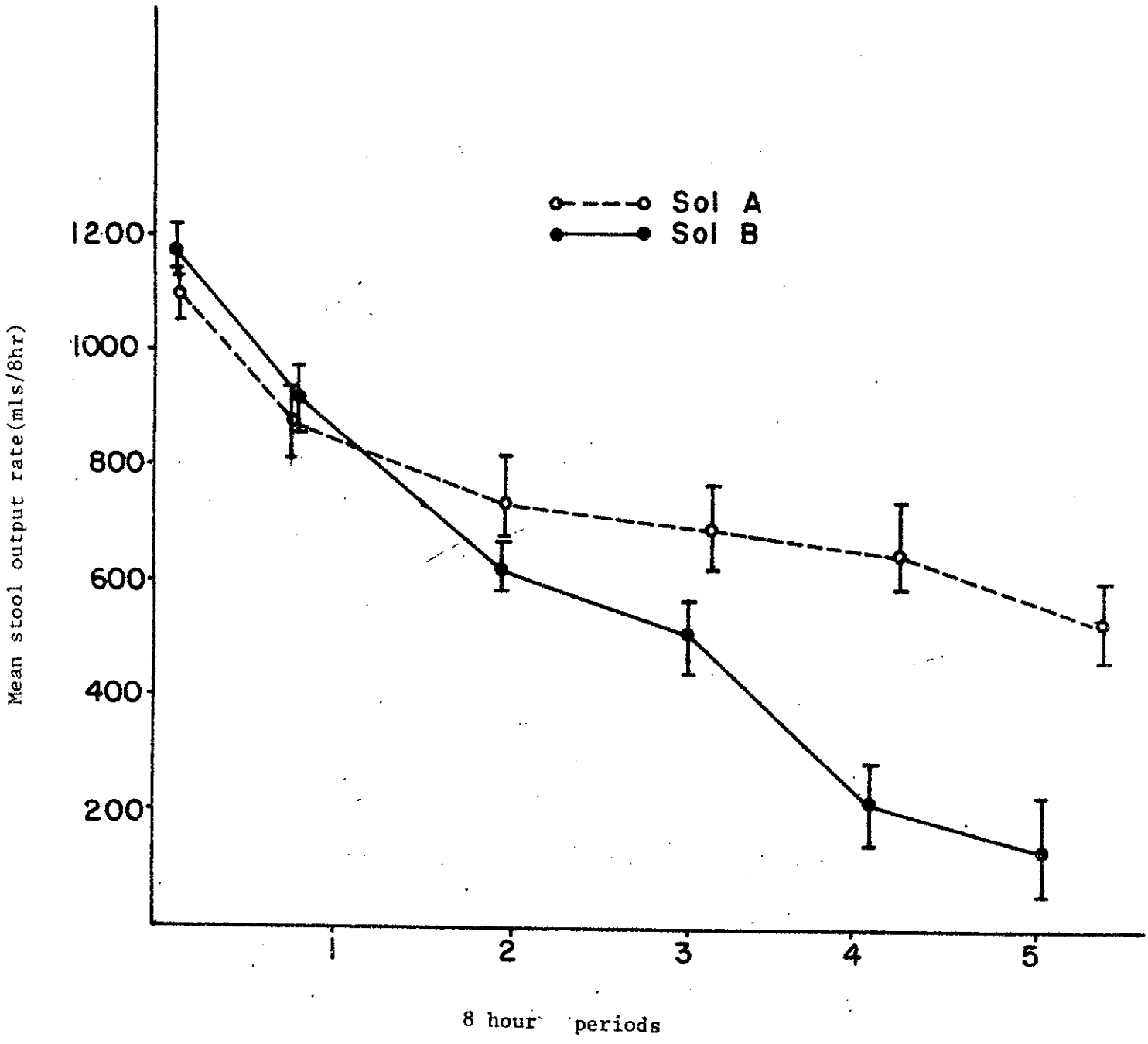


Fig. 4. Hypothetical comparison of stool output in diarrhoea patients receiving two types of ORS.

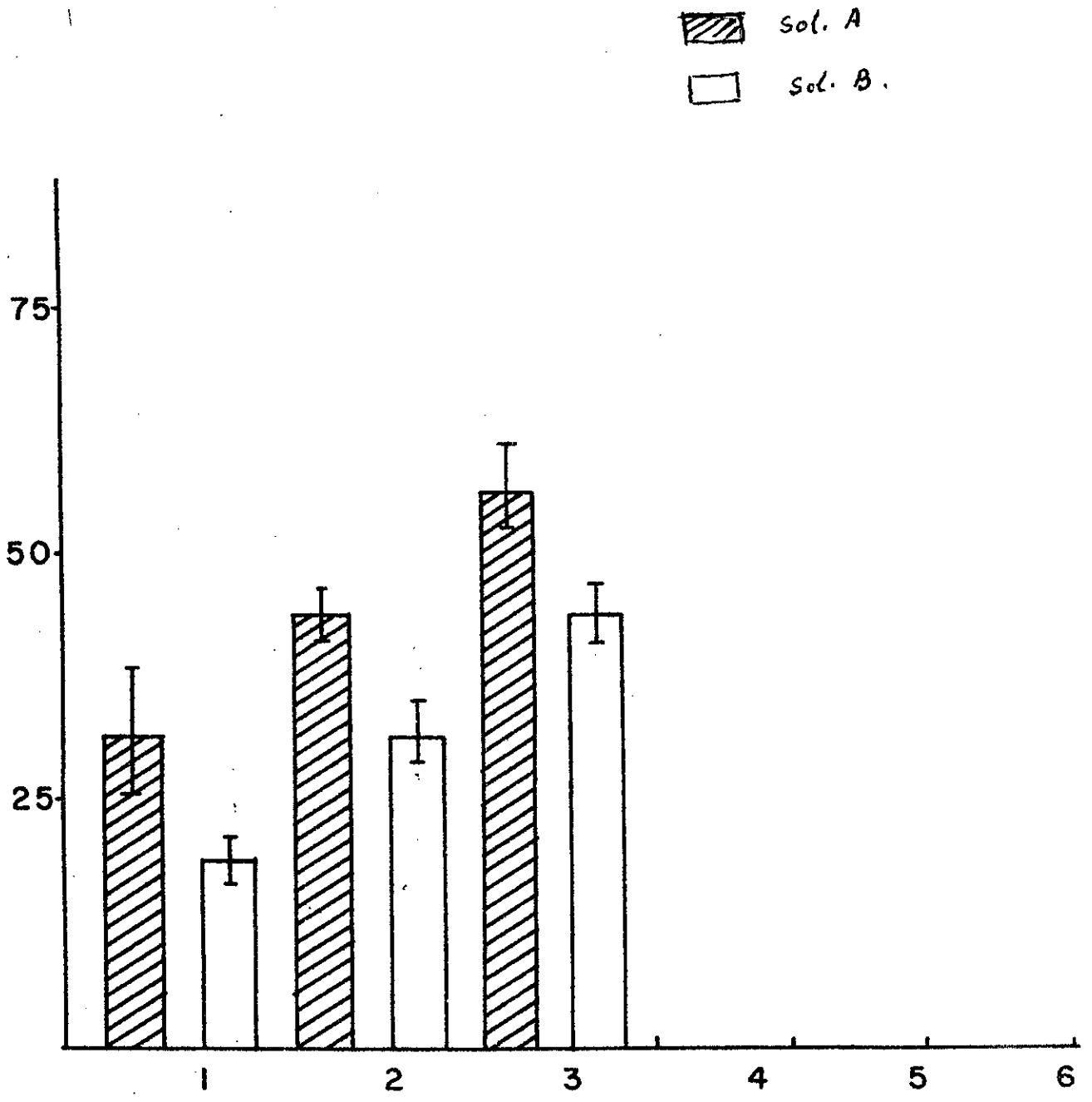


Fig. 5. Cumulative calorie balance after 48 hours of therapy with two different types of ORS.

SECTION III - BUDGET

A. DETAILED BUDGET

I. PERSONNEL SERVICES

Name	Position & Annual Salary	% of Effort	Project Requirements Taka	Dollars
Dr. A.M. Molla	Scientist $ 40,000	25% x 6m	-	5000
Dr. Ayesha Molla	Asso. Scientist Tk. 119,000	20% x 6m	11900	-
Dr. S.A. Sarker	Physician Tk. 61,000	20% x 6m	6100	-
Miss M. Khatoon	Res. Officer Tk. 30,000	25% x 6m	3750	-
Mrs. N. Majid	Res. Dietician Tk. 30,000	25% x 6m	3750	-
4 Sr. Staff Nurses	Tk. 30,000	4 x 25%	3000	-
1 Study clerk	Tk. 24,000	25%	3000	-
Sr. Res. Officer	Tk. 30,000		30000	-
		SUB TOTAL Tk.	88500	$ 5000

2. SUPPLIES AND MATERIALS

	Taka	Dollars
Stationery goods	5000	
Xeroxing and mimiographing	2000	
Medical illustration	10000	
PUC bags		$ 250
Miscellaneous	2000	
SUB TOTAL Tk.	19000	$ 250

3. EQUIPMENT

Major equipments are available in the laboratory and some minor equipment like electric balance and some spare parts will be necessary. $3000

Casio fx 120	$ 100
Electric Blender	$1250
	$4350

4. LABORATORY TESTS:

			Taka	Dollar
Blood test (Tc, Dc, HcT, TWBC)	Tk. 12.0 x 400	=	4800	-
Stool test (m/E)	Tk. 2.50 x 250	=	625	-
Stool for culture in all plates	Tk. 15 x 200	=	3000	-
E. coli toxin assays (ST & LT)	Tk.14.50 x 200	=	2900	-
ELISA for rotavirus	Tk. 10 x 200	=	2000	-
Biochemical tests:				
Carb	Tk. 50 x 400	=	20000	-
Cal.	Tk. 48 x 400	=	19200	-
Electrolytes	Tk. 22 x 800	=	17600	-
Stool glucose content	Tk. 40 x 250	=	10000	-
	SUB TOTAL		Tk.132125	-

5. TRANSPORTATION:

Transportation of patients at the end of the study	Tk. 350 x 1500	= Tk.5250
	SUB TOTAL	Tk.5250

6. PATIENT HOSPITALIZATION

200 x 10 = 2000 pt. days	1000 x 200	= Tk. 200,000

Grand total Tk. 285,375

B. BUDGET SUMMARY

1.	Personnel	Tk. 88,500	$ 5000
2.	Supplies and Materials	Tk. 20,000	$ 250
3.	Equipment	Tk. -	$ 4350
4.	Laboratory tests	Tk. 80,250	-
5.	Transportation	Tk. 5,250	-
6.	Patient hospitalization	Tk.200,000	-
	Grand Total	Tk.394,000	$ 9600

Total cost: Tk.394,000 $ 9600

Grand total: $19700 + 9600 = $29,300

30% overhead = $ 29,300 + 10,000

= $ 39,300.

CONSENT FORM

International Centre for Diarrhoeal Disease Research is carrying out research to find out simple, effective and in expensive treatment for diarrhoeal diseases. Oral glucose saline is one of the results of such research. Recently this centre has developed a new oral rehydration solution in which rice powder instead of glucose has been used and in a previous trial this has been found successful. ICDDR,B would like to carry out further research on oral rehydration solution in which 100g of rice powder will be used along with the same electrolytes in one litre of water. We would request you/your child to participate in this study. The study will last for 24 hours and during this period you/your child will be fed with either glucose electrolyte solution or rice-powder electrolyte solution for the treatment of diarrhoea. Besides measurementof stool, urine, or vomitus 3cc of blood will be drawn on admission and at the end of 24 hours treatment. The blood test will be mainly used to evaluate the effect of treatment. You/your child may choose not to participate in this study and in any case appropriate treatment of diarrhoea as available in this centre will be provided to you/your child.

Date:

Finger print/Signature of the patient/guardian.

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Signature of the Investigator

অনুমতি পত্র

আন্তর্জাতিক, উদরাময় গবেষণা কেন্দ্র টাইফয়েড রোগের নিরাময়ের জন্য সহজ, কার্যকরী এবং সুলভ চিকিৎসা উদ্ভাবনের নিমিত্তে নানা রকম গবেষণা চালাইতেছে। মুখে খাবার স্যালাইন-এর আবিষ্কার এই ধরনের গবেষণারই অন্যতম ফল। ইদানিং এই গবেষণা কেন্দ্র লবণের সাথে গ্লুকোজের পরিবর্তে চাউলের গুঁড়া মিশিয়ে এক ধরনের নতুন খাবার স্যালাইন তৈরি করিয়াছে এবং পূর্বতন পরীক্ষা নিরিক্ষায় ইহার উপকারিতা অন্য যে কোন স্যালাইনের সমতুল্য বলিয়া প্রমানিত হইয়াছে। আই, সি, ডি, ডি, আর, বি. এই স্যালাইন সম্পর্কে আরও গবেষণা চালাইবার মনস্থ করিয়াছে এবং এই ব্যাপারে আপনার বা আপনার অসুস্থ ছেলেমেয়ের অনুমোদিতা কামনা করিতেছে। এই পরীক্ষার জন্য মুখে খাবার স্যালাইনের মধ্যে বিভিন্ন রকমের লবনের পরিমান ঠিক রাখিয়া ১০০ গ্রাম চাউলের গুঁড়া রান্না করিয়া মিশানো হইবে। এই খাবার স্যালাইন আপনার/আপনার ছেলেমেয়ের টাইফয়েড রোগের চিকিৎসার জন্য ব্যবহৃত হইবে। হাসপাতালে থাকাকালীন ১ম ২৪ ঘন্টা এই গবেষণা চলিবে। গবেষণা চলাকালে মল, মূত্র এবং যদি বমি হয়, তা একেও বিভিন্ন রকমের পরীক্ষা করা হইবে। তাহা ছাড়া ভর্তির সময় এবং ২৪ ঘন্টা চিকিৎসা চলার পর ৩ মিলি রক্ত নেওয়া হইবে। রক্ত পরীক্ষার ফলাফল প্রয়োজনে আপনার বা আপনার ছেলেমেয়ের চিকিৎসার জন্য প্রয়োজন হইবে। এই গবেষণাতে অংশ গ্রহন করা সম্পূর্ন আপনার ইচ্ছার উপর নির্ভর করে এবং অংশ গ্রহন না করিলেও আপনাকে বা আপনার বাচ্চাকে এই হাসপাতালে সর্ব প্রকার প্রয়োজনীয় চিকিৎসা করা হইবে।

তারিখ _____

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রোগীর বা অভিভাবকের স্বাক্ষর
বা টিপসহি

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চিকিৎসকের স্বাক্ষর

Abstract Summary for Ethical Review Committee

1. 100 children of 1-5 years old, suffering from acute diarrhoea due to V. cholerae, E. coli, rotavirus and shigella infection and 25 adult male with cholera will be included in this study. Patients without any complication and having moderate or moderate to severe dehydration without history of previous treatment of any kind will be taken into the study.

   30 g rice powder in place of 20g of glucose or 40g sucrose per litre water along with WHO recommended electrolytes has been shown to be equally effective. Rice being a cereal and a polysaccharide is free from osmolar problem, it is cheap and is easily available in the houses of the developing countries where glucose is not available and diarrhoea is a major health problem. An amount of 100g of rice powder is planned to use in one litre of ORS so that a substantial amount of calories could be provided to the patient during treatment of diarrhoea without any considerable cost. Children with diarrhoea and compromised nutritional status will greatly benefit from this calorie rich ORS.

2. There are no significant risks in this study. The comparison group receiving glucose-electrolyte solution will be under cover 5% dextrose to avoid any possible chance of hypoglycaemia.

3. The study will be carried out in a metabolic ward. Patients will stay under constant supervision of a nurse, an experienced clinical research worker and a physician. Appropriate measures will be taken whenever any complication arises.

4. Only hospital number of the patient will be used during analysis of the data.

5. Informed consent will be obtained from the patient or parents or guardian of the patient after full explanation of the procedure in Bengali.

6. No detail interview except relevant history of illness.

7. All patients will be benefited from the study. ORS with glucose is used as a therapy for diarrhoea all over the world. It is anticipated that the group of patients treated with rice-powder electrolytes will receive adequate calories which might help in early rehabilitation.

8. Hospital records and body fluids like stool, urine, vomitus and 3 mls of blood will be required.