
ORIGINAL ARTICLE

Home Oral Sugar Salt Solution Using the „Blue Spoon” for Acute Infantile Gastroenteritis

by

A. LATIEF AZIS, PITONO SOEPARTO, SUBIJANTO M.S., DANIEL
HARDJADINATA, MIEN KUMIAIJANTO and HARSONO SALINO

*(From the Department of Child Health, Medical School, University
of Airlangga/Dr. Soetomo General Hospital, Surabaya)*

Abstract

Ninety-one children aged between 2 - 24 months (mean age of 10.07 ± 5.29 months) with uncomplicated gastroenteritis were treated with home made oral sugar salt solution prepared by using the "Blue Spoon". They were randomly divided into 2 groups: those whose feedings were stopped and those who were still permitted to have their normal feedings while on oral electrolyte therapy. A total of four children (4,40%) developed dehydration following the administration of oral solution therapy. Vomiting was reversed in 24 out of 28 children following the administration of oral electrolyte solution. There were statistically no significant differences in failure rate e.g. the development of dehydration, vomiting and meteorism following oral electrolyte therapy between the two groups.

Almost all mothers (95,79%) followed the instructions as how to use the Blue Spoon and stated that it was a simple and a cheap means in preparing oral sugar electrolyte solution.

Introduction

Diarrhoeal diseases continue to be one of the primary causes of morbidity and mortality in the developing countries (Finberg, 1980; Sack et al., 1978). The role of glucose electrolyte solution in treating dehydration in acute diarrhoea is now well established as a simple, effective and relatively inexpensive fluid replacement therapy (Palmer et al., 1977).

Replacement of glucose by sucrose which is less expensive and easily available will not only simplify the treatment but also help in providing medical care even in the remoter regions of the developing countries. The differences in type and size of household spoon available in the community make the home oral electrolyte solution rather hazardous (Komang Kari, 1979).

To overcome these problems the use of the so-called "Blue advocated.

The purpose of this present study is to evaluate whether home-made oral electrolyte solution as prepared by using the Blue Spoon is really effective in preventing dehydration in acute infantile gastroenteritis and whether feedings during oral electrolyte solution therapy should be discontinued.

Material and Method

This study was performed during a five-month-period between August until December 1979. Patients attending the

out-patient Department of Child Health, Dr. Soetomo General Hospital Surabaya aged between 2 - 24 months with uncomplicated gastroenteritis were included in this study. They were randomly allocated into two groups:

I. In the first group patients were still permitted to have their common feeding while they were on oral electrolyte solution therapy.

II. In the second group the parents were asked to stop their children's feedings while they were still on oral solution therapy.

All the patients were treated ambulatorily and the parents were given the Blue Spoon, a blue-coloured plastic spoon, consisted of two scoops: a big and a small scoop proposed respectively for measuring sugar and salt. The one level measured sugar and salt were put together into a glass of water to make approximately 200 ml solution.

No antibiotics were given to the patients and mothers were asked to bring their children back on the next day for follow-up. Clinical observations were performed during the first and follow-up visit which consisted of:

- Nature/characteristic of diarrhoea and vomiting.
- Degree of existing dehydration.
- Meteorism.
- Possible occurrence of complications.

Mothers were questioned about any difficulties in using the Blue Spoon and how their children responded to it when

they were given home-made oral electrolyte solution to drink.

"No response to treatment" (failure) was considered if during oral fluid therapy dehydration developed or if the patient was unable to take the oral fluid due to excessive or persistent vomiting, or if the child was not willing to take the solution, or if hypernatremia complicated gastroenteritis.

Results

A total of 149 children entered this study but only 95 children came for follow-up the next day (63,76%), of whom four were excluded from this study because the parents did not use the Blue Spoon. Four children (4,40%) developed dehydration following the administration of oral salt sugar solution.

TABLE 1: *Education level of mother*

Level of Education	N	Number of Patients	
		Present on follow-up	Absent on follow-up
Illiterate	15	7 (46,67%)	8 (53,33%)
Elementary School	78	48 (61,54%)	30 (38,46%)
≥ High School	56	40 (71,43%)	16 (28,57%)
		$0,10 < P < 0,50$	

Table 1 shows the percentage of patients who came for follow-up as grouped according to the level of education of the patients' mother. The difference bet-

ween both groups is statistically not significant ($0,10 < P < 0,50$).

Table 2 shows the age and sex distribution of the patients studied.

TABLE 2: *Age and sex distribution*

Age (month)	N	Male	Female	Mean age ± SD
0 — 6	26	16	10	$10,07 \pm 5,29$ months
6 — 12	44	23	21	
12 — 18	15	9	6	
18 — 24	6	1	5	

± : SD

TABLE

3: Status of patients before and

Group of patient	Number of patients		Mean age (month)	Status of patients on oral electrolyte solution therapy					
	Male	Female		Vomiting		Meteorism		Dehydration	
				Before	After	Before	After	Before	After
Cont. Feeding.	27	17	10,53 ± 5,27	15	3	2	4	0	3
Stop feeding.	22	25	9,37 ± 4,56	15	1	2	1	0	1
	P > 0,50 +		P > 0,50 +	P = 0,30 ×		P = 0,283 ×		P = 0,424 ×	
T o t a l	49	42	10,07 ± 5,29	28	4	4	5	0	4

± : SD.

× : Fisher Exact Probability Test.

+ : Chi Square Test.

TABLE

4: The responses of parents and

No. of patient entered the study	Parents who used Bsp. following instructions		Statement of parents in making oral solution		Acceptability of oral solution	
	Correctly	Incorrectly	Easy	Difficult	Good	Poor
N = 91	N = 91 (100%)	—	N = 91 (100%)	—	N = 85 (93,41%)	N = 6 (6,59%)

N = Number

Table 3 shows the status of diarrhoea, vomiting, meteorism and dehydration before and 24 hours following the oral administration. Patients were grouped into those who were allowed to have their common feedings (Continuous Feeding) and those whose feeding were stopped during the oral electrolyte therapy (Stop Feeding Group).

There were no significant differences in sex and age distribution between both groups ($p > 0,50$). Symptoms of vomiting disappeared following the administration of oral electrolyte solution in 24 out of 28 children who were vomiting on their first visits.

There were no significant differences in number of patients who still had diarrhoea, vomiting and meteorism between both continuing and stop feeding group, 24 hours after taking the oral electrolyte solution.

No significant differences between both groups were also noted concerning the number of patients who developed dehydration ($p = 0,424$, Fisher test).

All the mothers who participated in this study were not familiar with the Blue Spoon before. Only 36,84% of them had ever heard of oralit (oral electrolyte solution), of whom more than half knew it already from the physicians. 27,27% of the mothers had ever used oralit in treating diarrhoea.

Almost all the mothers (95,79%) followed the instructions in using the Blue Spoon to prepare oral salt sugar solution, while four mothers did not use the Blue Spoon because of the following rea-

sons: diarrhoea did not exist any longer in two, the Blue Spoon was lost in one and one other refused to use the Blue Spoon because she was not convinced of the efficacy of home made oral electrolyte solution as compared with oral electrolyte solution derived from the dispensaries.

On follow-up visits all the mothers who used the Blue Spoon when preparing oral salt sugar solution performed it correctly (100%) and all of them stated that the use of the Blue Spoon was a simple means in preparing oral electrolyte solution as all of the materials needed was already available in every home. Only six children (6,59%) refused to drink oral salt solution, two of whom subsequently developed dehydration and needed intravenous fluid replacement therapy, one child continued to have diarrhoea without the development of dehydration and three children improved.

Mothers whose children were improved on Blue Spoon made oral salt sugar solution stated that they will continue to use the Blue Spoon whenever their children contract diarrhoea.

Discussion

The aim of oral therapy is to prevent and treat dehydration, which is the main complication of diarrhoeal illness. The treatment involves prompt replacement of fecal losses of water and electrolyte by an oral glucose/sucrose solution (Pierce and Hirschorn, 1977; Sack et al., 1978). In areas where infantile diarrhoea is an endemic, debilitating and often fa-

tal illness ad libitum oral therapy may be most beneficial. In such areas treatment must be simple and inexpensive (Hirschorn et al., 1973). Oral glucose electrolyte solution is now well established as a simple, effective and relatively inexpensive fluid replacement for diarrhoeal diseases.

Glucose which is necessary to promote intestinal absorption of sodium concomitantly of water is relatively expensive and may not be available in the remote areas (Palmer et al., 1977). Sucrose has been suggested as a substitute of glucose (Moenginah et al., 1975; Palmer et al., 1977; Sack et al., 1980). Although Nalin (1968; 1975) stated that more treatment failures occurred in oral sucrose than glucose treated patients (especially cholera) others were of the opinion that the replacement of glucose by sucrose was equally effective (Sack et al., 1980).

In this study home-made salt-sugar solution prepared by using the Blue Spoon appeared to be quite effective in treating and preventing the development of dehydration. The success rate was 95.60%. Palmer et al. (1977) in their investigation found a success rate of 86% on sucrose and 87% on glucose electrolyte solution, and when restricted to patient with cholera also showed no significant difference between the two solutions (68% success on sucrose and 78% success on glucose).

A recently published study in India suggested that reduction in diarrhoeal mortality can be measured when therapy is given mainly at home by healthy auxiliaries and mothers (Sack et al., 1978).

The most difficulty in making oral electrolyte solution is the wide variety in type and size of household spoon available in the community (Komang Kari et al., 1979). Consequently it is reasonable to understand that home-made oral electrolyte solution prepared by using common household spoons will give a quite wide range of concentrations. To overcome these difficulties, the government has advocated the use of the Blue Spoon.

The main hazards in the use of self-made oral electrolyte solution by unsupervised mothers was incorrect preparation of the fluid which resulted in high salt containing fluid and caused delay in seeking medical care (Sack et al., 1978). Sedgwick (1976) in his study found that 13% of unsupervised mothers tended to make the solution too concentrated. In this study however none of the children showed any signs and symptoms of hypernatremia. In our study 36.24% of the mothers did not come for follow-up.

There was no statistically significant difference in the level of education of mothers who did and did not come for follow-up.

Almost all the mothers participating in this study followed the instructions correctly in using the Blue Spoon and encountered no difficulties in preparing home made oral electrolyte solution, though they were not familiar with the Blue Spoon before. The above data obviously indicate that the Blue Spoon is simple enough as a means to prepare home-made sugar-salt solution even by people with low level of education.

Maintaining nutrition during acute diarrhoea is essential to prevent the adverse effect of fasting, more over nutrition can be maintained because the gut remains to absorb a variety of nutrients (Pierce and Hirschorn, 1977). There is no physiological reason for the bowel to rest during diarrheal illness (Sack et al., 1978).

A recent study in the Philippines (WHO, 1977) documented that children with diarrhoea particularly with recurrent episodes do better nutritionally when treated with oral fluid and continue food intake during the diarrhoeal illness. The major effect of the oral fluid seems to be the quick reversal of nausea, vomiting and anorexia, so much apart of the diarrhoea, therapy allowing the children's

own appetite thus to increase food intake (Sack et al., 1978).

In this study there were no statistical significant differences as to the development of dehydration, vomiting and meteorism between the stop feedings and continue feedings groups. It seems therefore that there were no adverse effects on continuing feeding during the acute diarrhoeal diseases. Food intake should thus be continued during diarrhoeal episodes while patient is on oral sugar salt solution. The use of the Blue Spoon may provide the need of a simple and reliable method in medical care to treat and to prevent dehydration in acute infantile gastroenteritis especially in the remoter areas which are beyond the reach of health facilities.

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