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A DIARRHEAL DISEASES CONTROL PROGRAM AMONG NICARAGUAN REFUGEE CHILDREN IN CAMPO LUNA, HONDURAS

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The study reported here provided oral rehydration therapy for 71 mildly to moderately dehydrated children with diarrheal disease at a Nicaraguan refugee camp in Honduras. This trial, apparently the first of its kind in an emergency or disaster – related situation, showed that if properly instructed and supervised, mothers can successfully deliver oral rehydration therapy to their children in a field setting.

Introduction

As a result of recent unrest in Nicaragua, thousands of refugees fled that country and made their way to southern Honduras. There many live in hastily constructed camps administered by the International Red Cross, the U.N. High Commission on Refugees, the Honduran Government, and various other relief agencies.

In these camps, as in most disaster-relief sites, overcrowding, poor sanitation, and a highly transient population are major risk factors favoring the transmission of communicable diseases (*1, 2*), the most important of which are usually diarrheal diseases (*2*).

Concerned about this problem, the Honduran Ministry of Health established health centers in each camp staffed by nurse auxiliaries. Then, finding that over half of all refugee health center consultations were due to acute diarrheal diseases, mostly in young children, the Honduran authorities decided to test the feasibility of establishing a diarrheal diseases control program that could be administered by trained auxiliaries at the health center level utilizing oral rehydration therapy.

With supplies and technical assistance obtained from PAHO, a pilot study was planned and carried out in one of the refugee camps, Campo Luna, during November and December of 1978. Its objectives were (1) to reduce the incidence of severe dehydration among diarrheal patients arriving at the health center, thereby reducing the hospital referral rate, and (2) to determine whether or not an auxiliary with limited training could correctly triage and supervise oral rehydration of children with diarrheal diseases.

While the efficacy of oral rehydration has been clearly demonstrated at the clinical level (*3, 4, 5, 6*), there have been few studies to evaluate its use by auxiliaries in a field setting (*7, 8*). To the best of our knowledge, the pilot study reported here constitutes the first field trial of oral rehydration therapy in an emergency or disaster – related situation.

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Materials and Methods

Seventy-one refugee children arriving at the Campo Luna Health Center with mild or moderate diarrhea were admitted to the study during November and December of 1978 (Table 1). Those exhibiting severe dehydration or complications (e.g., fever above 39°C, bloody stools, more than two stools or two vomiting episodes per hour, convulsions) were excluded from the study and immediately referred to a hospital.

Diagnoses and assessments of dehydration were performed by a trained nurse auxiliary solely on the basis of the following clinical signs: decreased skin turgor; sunken eyes or fontanel; rapid, faint, or irregular radial pulse; diminished urine output; dry mucosa; and general appearance. The auxiliary also noted other presenting symptoms, elicited case histories from the mothers of the patients, and nutritionally assessed those 53 of the 71 patients who were less than 2 years of age according to the Gómez classification (Table 2).

Mothers were provided with 2 liters of "Oralyte"[7] solution and were instructed to administer as much solution to the children as they could tolerate, beginning with an initial regimen of 200cc every 3 to 4 hours. Breastfeeding was encouraged, and water and milk were given *ad libitum*. The auxiliary demonstrated how to correctly prepare and use the Oralyte solution. She also informed the mothers about proper feeding and weaning practices and about prevention, early recognition, and prompt treatment of childhood diarrheal episodes. When the patients were fully rehydrated and without diarrheal symptoms they were discharged from the study.

[7] "Oralyte," or WHO-recommended oral rehydration solution (ORS), contains the following: glucose 20 g.; sodium chloride 3.5 g; sodium bicarbonate 2.5 g; potassium chloride 1.5 g. (To be dissolved in one liter potable water).

Table 1. Age distribution and age-specific diarrheal disease attack rates among children in the Campo Luna study group (1 November-31 December 1978).

Age (years)	Study group population	Cases	Attack rate per 100
<1	67	32	47.8
1	60	21	35.0
2 – 4	183	11	6.0
5 – 14	484	7	1.4
Total	794	71	8.9

Table 2. Degrees of dehydration among children in the Campo Luna study group.

Age (months)	Degree of dehydration						Total	
	Mild		Moderate		Severe			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
< 6	9	(12.7)	8	(11.3)	–	–	17	(23.9)
6 – 11	7	(9.9)	8	(11.3)	–	–	15	(21.1)
12 – 23	12	(16.9)	9	(12.7)	–	–	21	(29.6)
≥ 24	7	(9.9)	10	(14.1)	1	(1.4)	18	(25.4)
Total	35	(49.3)	35	(49.3)	1	(1.4)	71	(100.0)

Results

Table 1 shows the age distribution of the Campo Luna study group. It also shows the estimated age-specific diarrheal disease attack rates, based on the total refugee camp population and the number of cases observed over the two-month study period. No sex differences were observed with respect to these attack rates.

Eighty-three per cent of the cases occurred in children less than 2 years of age, and 45 per cent afflicted children less than 1 year old.

The relative frequencies of the most common clinical signs vis-á-vis the children's degree of dehydration upon admission are presented in Table 3. Those showing less than five of the previously mentioned symptoms were classified as having "mild" dehydration; those with more serious signs (dry mucosa, decreased skin turgor, sunken fontanel) and at least five symptoms were considered "moderate"; one case was judged "severe."[8]

Vomiting prior to admission was reported in 43 of 71 (60.6 per cent) of the cases studied and was more frequent in moderately than in mildly rehydrated children ($.10 > p > .05$). Half of the children presenting symptoms had experienced two days of diarrhea or

[8]For logistical reasons it was decided to include the latter in the study; this exceptional case was later referred to hospital services.

Table 3. Degree of assessed dehydration among the 71 Campo Luna children studied—by symptoms, degree of malnutrition, duration of diarrhea before admission, mean number of stools before admission, mean duration of treatment, and mean volumes of Oralyte and total fluids consumed.

Characteristics of patients with diarrhea	Assessed degree of dehydration: Mild (N = 35)		Moderate (N = 35)		Severe (N = 1)		Total (N = 71)	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Symptoms								
watery stools	35	(100)	35	(100)	1	(100)	71	(100)
history of vomiting	16	(45.7)	26	(74.3)	1	(100)	43	(60.6)
fever (38°C)	8	(22.9)	27	(77.1)	1	(100)	36	(50.7)
dry mucosa	—	—	30	(85.7)	1	(100)	31	(43.7)
poor skin turgor	—	—	24	(68.6)	1	(100)	25	(35.2)
sunken fontanel[1]	—	—	9	(25.7)	—	—	9	(12.7)
Malnutrition[2]								
none	16	(45.7)	7	(20.0)	—	—	23	(32.4)
mild	8	(22.9)	9	(25.7)	—	—	17	(23.9)
moderate	3	(8.6)	6	(17.1)	—	—	9	(12.7)
severe	1	(2.9)	3	(8.5)	—	—	4	(5.6)
undetermined	7	(20.0)	10	(28.6)	1	(100)	18	(25.4)
Mean duration of diarrhea prior to admission (days)	2.4 ± 0.25		3.6 ± 0.44		—		3.0 (range: 0-10)	
Mean number of watery stools prior to admission	—		—		—		4.6 ± 0.26	
Mean duration of treatment (days)	2.8 ± 0.12		3.4 ± 0.14		—		3.1 ± 0.10 (range: 2-5)	
Mean volume of Oralyte consumption (ml)	1,226 ± 68		1,331 ± 73		—		1,279	
Mean volume of total fluids consumed (ml)	2,277 ± 136		2,154 ± 112		—		2,216	

[1]Assessed only in those 53 of the 71 children who were less than 2 years of age.
[2]Gómez classification.

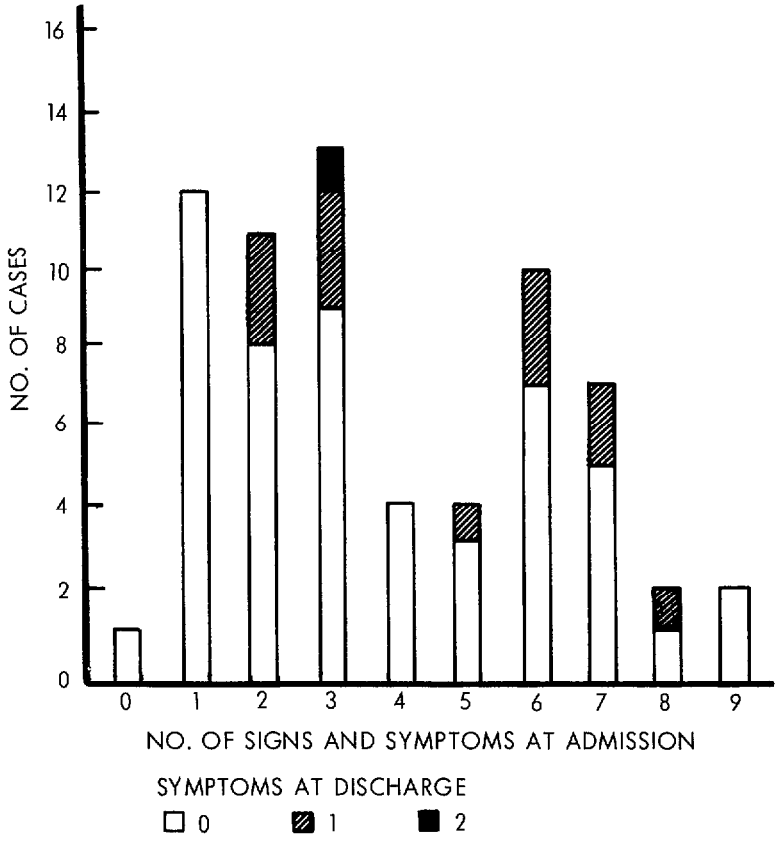
less before admission. The 35 children judged mildly dehydrated had experienced an average of 2.8 ± 0.12 days of diarrhea before admission, compared to 3.4 ± 0.14 days for those 35 classed as moderately dehydrated ($p < .01$). Dehydration did not vary significantly with age. The mean number of watery stools for all patients before admission was 4.6 ± 0.26.

Thirty of the 53 children below 2 years of age (57.0 per cent) were found to be mildly to severely malnourished (Table 3); malnutrition was significantly associated with the extent of dehydration ($X^2 = 4.567$, 1 degree of freedom; $p = 0.03$) but not with the duration of diarrhea before admission.

The mean duration of treatment for all 71 cases was 3.1 ± 0.10 days, within a range of 2 to 5 days. The duration of treatment was positively related to the number of symptoms presented upon admission ($X^2 = 10.377$, 2 d.f.; $.025 > p > .01$) and with the duration of diarrhea before admission ($t = -2.242$, 63 d.f.; $p = 0.014$) but was not significantly related to nutritional status.

During treatment, the patients consumed

Figure 1. The numbers of children showing different numbers of diarrheal disease signs and symptoms upon admission and at discharge (N = 71). The nine clinical signs and symptoms used for diagnosis were diminished skin turgor; sunken eyes; sunken fontanel; rapid, faint or irregular radial pulse; diminished urine output; dry mucosa; and general appearance. One patient was judged severely dehydrated at discharge, another had continuing vomiting, and 12 others had mucoid stools.



an average of 1.279 liters of Oralyte solution per person. The total average fluid intake was 2.216 liters per person. There were no significant differences between mildly and moderately dehydrated patients with regard to either Oralyte intake or total fluid intake.

Sixty-six of 71 patients completed the study. One of these, who was judged severely dehydrated upon admission, was referred to a hospital. Of the remaining 65, 52 (80.0 per cent) were discharged completely asymptomatic, 12 (18.5 per cent) left fully rehydrated but with mucoid stools persisting; and one patient was discharged despite continued vomiting (Figure 1).

Discussion and Conclusions

The advantages of oral rehydration therapy in a similar refugee-camp setting were clearly demonstrated by Mahalanabis et al. *(9)*, although that study dealt primarily with cholera. In a controlled study, Lishnevsky and Potter *(10)* reported nonsignificant decreases in diarrheal disease durations using oral rehydration therapy with comparable fluid intake (average 1.300 liters) over the treatment period.

Pizarro et al. *(11)* reported 92 of 100 Costa Rican infants with acute diarrhea were successfully rehydrated with oral fluid administered by their mothers. The present study also underscores the importance of educating mothers with regard to diarrheal disease and the proper use of oral rehydration. Although 59 per cent of the mothers reported they had attempted administering oral therapy to their children before consulting the health center (Oralyte had previously been introduced to Campo Luna mothers through mass health education efforts), only three (4.2 per cent) could identify three or more symptoms of dehydration in their children, and 38 per cent could not identify any.

As McCord and Kielman found in Punjab villages *(7)*, the present study shows health auxiliaries can successfully diagnose the extent of dehydration on a presumptive basis alone. The data also show that two indicators of severity—the duration of treatment and the duration of diarrhea before admission—were significantly associated with the number of dehydration symptoms identified by the auxiliary. Finally, the results demonstrate that given proper instruction and supervision, mothers can successfully deliver oral rehydration therapy to their children in a field setting.

SUMMARY

Although oral rehydration's efficacy in treating diarrheal disease has been clearly demonstrated at the clinical level, few studies have evaluated its efficacy when used by auxiliaries in a field setting. The pilot study reported here provided treatment for 71 mildly to moderately dehydrated children at a Nicaraguan refugee camp in Honduras. Under nurse auxiliary tutelage and supervision, appropriate fluids were administered to the children by their mothers. This pilot study appears to have provided the first field trial of oral rehydration therapy in an emergency or disaster-related setting.

Sixty-six of the 71 children completed the course of treatment. Fifty-two (80 per cent) were completely asymptomatic at discharge; 12 were fully rehydrated but had persistent mucoid stools; one was discharged despite continued vomiting; and one, deemed severely dehydrated, was referred to a hospital. Overall, the study underscored the importance of educating mothers about diarrheal disease and the proper use of oral rehydration. It also demonstrated that, given proper instruction and supervision, mothers can successfully deliver oral rehydration therapy to their children in a field setting.

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EEC MAKES GRANT FOR DISASTER PREPAREDNESS AND RELIEF

The European Economic Community, through the Commission of the European Communities, has agreed to provide financial support for the Disaster Preparedness and Emergency Relief Program of the Pan American Health Organization. The grant, for the amount of US$1,584,000, is to be disbursed over a period of five years.

This support is being provided for the purpose of "improving the capability of the countries of the Latin American Region to respond to and minimize the effects of natural catastrophes such as earthquakes and cyclones, and to contribute to the process of development and self-support of disaster-prone countries."

In the immediate future, the grant will be used to "establish or improve mechanisms of coordination, to provide a focal point in the health sector at the national and subregional level for handling disasters, and to prepare health service personnel to act efficiently and rationally in the aftermath of a natural disaster in their own or in neighboring countries requesting assistance."

Source: Pan American Health Organization, *Disaster Preparedness in the Americas,* No. 6, January 1981, p. 4.