D R A F T

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

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Introduction

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

In these camps, as in most disaster situations, 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).

Alarmed, the Honduran Ministry of Health established health centers in each camp staffed by nurse auxiliaries. Finding that over 50% 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 a diarrheal diseases control program which could be administered by trained auxiliaries on the health center level utilizing oral rehydration therapy.

With supplies and technical assistance from PAHO, a pilot study was planned and carried out in one of the refugee camps, Campo Luna, during November and December, 1978. The objectives were to reduce the incidence of severe dehydration- thereby reducing the hospital referral rate- due to diarrheal cases presenting at the health center and, secondly, 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 shown on the clinical level (3,4,5,6) there have been few studies to evaluate its use by auxiliaries in a field setting (7,8). The present study is believed to be the first field trial of oral rehydration therapy in an emergency or disaster situation.

Materials and Methods

Seventy-one refugee children presenting to the Campo Luna Health Center with mild or moderate diarrhea were admitted to the study during November - December, 1978, (Table 1.). Cases severely dehydrated or with complications (e.g., fever $\geq 39^{\circ}C$, bloody stools, >2 stools or >2 vomiting episodes per hour, convulsions) were excluded and immediately referred to hospital.

Diagnoses and assessment of dehydration were performed by a trained nurse auxiliary solely on the basis of the following clinical signs: decreased skin turgor; sunken eyes and/or fontanelle; rapid, faint or irregular radial pulse; diminished urine output; dry mucosa; general appearance of the child.

The auxiliary noted other presenting symptoms, elicited case histories from the mothers of the patients and nutritionally assessed 53/71 patients who were less than two years of age according to the Gomez classification (Table 2.).

Mothers were provided with 2 liters of Oralyte solution and were instructed to administer their children as much solution as they could tolerate with an initial regimen of 200 cc. every 3-4 hours.

Breastfeeding was encouraged and water and milk were given ad libitum. In addition to demonstrating the correct preparation and use of Oralyte solution, the auxiliary informed the mothers on proper feeding and weaning practices and the means of prevention, early recognition and prompt treatment of childhood diarrheal episodes.

With full rehydration and cessation of diarrheal symptoms patients were discharged from the study.

Results

Table 1. shows the age distribution of the Campo Luna study group. Also shown are 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.

Eighty-three percent of the cases occurred in children less than 2 years of age, 45% in those less than 1 year.

The relative frequencies of the five most common clinical signs vis-à-vis degree of dehydration at time of admission are presented in Table 2. Those presenting with ≤ 4 symptoms were classified as having "mild" dehydration while those with more than 4, including the more serious signs (dry mucosa, decreased skin turgor, sunken fontanelle),were considered "moderate"; one case was judged "severe".

Vomiting prior to admission was reported in 39 of 68 (57.4%) case histories elicited and was more frequent in moderately than in

mildly dehydrated children ($.10 > p > .05$). Half of the children presenting had experienced ± 2 days of diarrhea prior to admission. The 35 children judged mildly dehydrated had experienced an average of 2.8 ± 0.12 days of diarrhea prior to admission compared to 3.4 ± 0.14 days for those classed as moderately dehydrated ($p < .01$). Dehydration did not vary significantly with age. Mean number of watery stools for all patients prior to admission was 4.6 ± 0.26.

Thirty of 53 children below 2 years (57.0%) were found to be mildly to severely malnourished (Table 2.); malnutrition was significantly associated with extent of dehydration ($X^2 = 4.567$, 1 d.f.; $p = .03$) but not with duration of diarrhea prior to admission.

The mean duration of treatment for all 71 cases was 3.1 ± 0.10 days, with a range of 2 - 5 days. Duration of treatment was positively related to the number of symptoms presenting at admission ($X^2 = 10.377$, 2 d.f.; $.025 > p > .01$) and with duration of diarrhea prior to admission ($t = -2.242$, 63 d.f.; $p = .014$) but was not significantly related to nutritional status.

Over the treatment period each patient consumed an average of 1.279 l. of Oralyte solution. Average total fluid intake was 2.216 l.; there were no significant differences between mildly and moderately patients in either Oralyte or total fluid intake.

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

Discussion

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 duration using oral rehydration therapy with comparable fluid intake (average 1.300 l.) 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% of the mothers reported they had attempted administering oral therapy to their children prior to consulting the health center (Oralyte had previously been introduced to Campo Luna mothers through mass health education efforts), only 3 (4.2%) could identify three or more symptoms of dehydration in their children and 38% could not identify any.

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

Table 1.

Age distribution and age-specific diarrheal attack rates for Campo Luna study group (1 November - 31 December, 1978)

Age (yrs.)	Population	Cases	Attack Rate (per 100 pop.)
< 1	67	32	47.8
1	60	21	35.0
2 - 4	183	11	6.0
5 - 14	484	7	1.5
Total	794	71	8.9

Table 3.

Degree of Dehydration:Campo Luna study group

Age (months)	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)

Table 2.

Summary of diarrheal episodes in 71 Campo Luna children, 1 November - 31 December, 1978

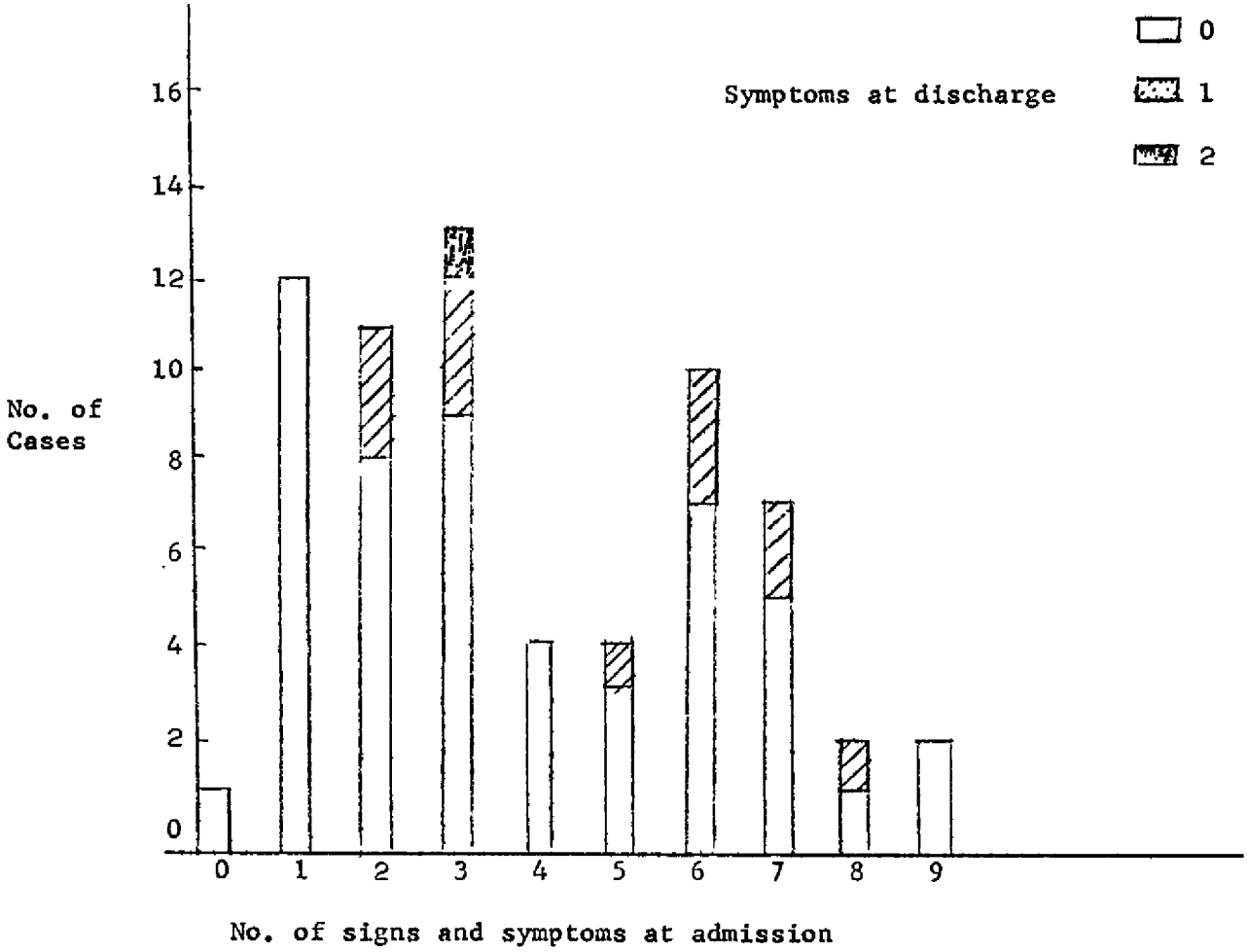
Characteristics of patients with diarrhea	Assessed Degree of Dehydration			
	Mild (N = 35)	Moderate (N = 35)	Severe (N = 1)	Total (N = 71)
Symptoms				
watery stools	35 (100)	35 (100)	1 (100)	71 (100)
history of vomiting	16 (45.7)	26 (74.3)	1 (100)	43 (60.6)
fever 38°C	8 (22.9)	27 (77.1)	1 (100)	36 (50.7)
dry mucosa	- -	30 (85.7)	1 (100)	31 (43.7)
poor skin turgor	- -	24 (68.6)	1 (100)	25 (35.2)
sunken fontanelle[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 stools prior to admission	-	-	-	4.6 0.26
Mean treatment duration (days)	2.8 ± 0.12	3.4 ± 0.14	-	3.1 ± 0.10 (range 2-5)
Mean volume Oralyte consumption (ml.)	1226 ± 68	1331 ± 73	-	1279
Mean volume total fluids (ml.)	2277 ± 136	2154 ± 112	-	2216

1. assessed only in 53/71 children ≤ 2 years of age.

2. Gomez classification.

Figure 1.

Number of signs and symptoms at admission and discharge (N = 71)



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