Social and nutritional parameters of acute diarrhoea

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SUMMARY Data were collected on 60 children who were admitted for acute undifferentiated diarrhoea during a 5-month period to this hospital. Stool cultures for bacterial pathogens were all negative. Social and economic factors in the homes of the children were conspicuous.

Diarrhoea is a common reason for admitting children to hospital. Pathogenic factors include the infectious agent (if any), host resistance, and immunological deficits, but nutritional and socioeconomic factors can also have a great effect on the morbidity of acute diarrhoea—at least in developing countries. In the present investigation the role of socioeconomic and nutritional factors was studied in children with diarrhoeal disease in a developed and industrialised country.

Methods

Data were collected from the case histories of 60 patients admitted consecutively to this hospital for diarrhoeal disease during the 5 months from 1 January to 31 May 1977.

Nationality, conditions at home, marital status of the parents, and the care of the child served as parameters of the social background.

The child's nutritional status was assessed in terms of weight-for-age and height-for-age, which were related to the standards of Prader and Budliger.¹ Weight-for-height was recorded, and the weight on admission was compared with that at discharge. Prematurity and weight for gestational age at birth were factors also taken into consideration.

Results

The overall distribution in terms of the child's age and sex is shown in the Figure. 24 out of 60 children came from families of foreign labourers (Table 1). 18 children came from unstable homes (Table 2). Seven children had either been born before 37 weeks' gestation, or had been small for gestational age (birthweight <10th centile), Table 3. The perinatal records for 6 children were missing.

Figure Age and sex distribution of 60 children admitted for diarrhoeal disease.

Table 1 Nationality of 60 children suffering from diarrhoea

Nationality	Children
Swiss	36
Italian	13
Spanish	4
Yugoslavian	4
Turkish	2
German	1

Table 2 Number of Swiss compared with foreign children from unstable homes

	Foreign children (n=13)	Swiss children (n=5)
Nursing home/family	1	1
Day care centre (crèche)	6	2
Relatives	3	1
Parents away from Switzerland for at least a week	2	1
Neglect	1	0

Table 3 Premature infants and those of birthweights below 2500 g compared with weight-for-height and height-for-age on admission and change in weight during admission

Age (months)	Sex	Gestational age (weeks)	Birthweight (g)	On admission				Weight change
				Weight (g)	Weight centile	Height (cm)	Height centile	
18	F	40	2500	10 150	25th	88	>97th	-370
26	F	40	2500	12 000	25th-50th	90	75th	-300
27	M	36	2490	12 250	10th-25th	95	90	0
74	F	40	2500	16 150	3rd-10th	117	50	+850
38	F	40	2500	10 400	< 3rd	95	25th-50th	?
18*	M	34	2400	8 300	< 3rd	72	< 3rd	+660
101	M	Premature	2500	27 700	50th-75th	133.5	50th-75th	0

*Weight, and particularly height, well below the 3rd centile. Congenital hypothyroidism was excluded.

28 children were underweight on admission (weight >1 SD below the expected weight for height). The discharge weights of 16 children were lower than they had been on admission to hospital and in 3 children weights on discharge remained the same (Table 4).

The stools of all children admitted for diarrhoea were routinely screened three times for bacterial pathogens (enteropathogenic *Escherichia coli*, pathogenic *Salmonella* sp., and *Shigella* sp.) but not for viruses. All were negative.

Discussion

Boys were affected twice as often as girls. There were 21 infants below 1 year and 20 children aged between 1 and 2 years.

The total population of Switzerland was 6 400 000 in January 1977, of which foreigners accounted for 990 000. The proportion is somewhat different for the age group 0-14 years, with 1 358 000 children of Swiss parents and 280 000 children of foreign parents.⁹ A disproportionate 40% of all children admitted for diarrhoea were still from the latter group. Most foreigners are labourers from Mediterranean countries; some are resident others are seasonal. They seek higher salaries, part of which is sent back to their families at home. As both mother and father work, children are often cared for elsewhere. The care a mother gives to her child is adversely affected by poverty and poor social conditions,² and this together with abrupt changes in feeding in quality or quantity must put the children at risk for gastrointestinal upset.

Even if the nationality of the children were to be disregarded, the importance of such social factors is underlined by the fact that 30% of the 60 children came from unstable homes. Eight children stayed in a day care centre, 4 because both parents were working, and 4 because their parents were separated or divorced, or the mother was single. One child had

been placed in a nursing home and 1 was with a different family. Three children whose parents were foreign labourers were taken care of by relatives, a feature of the extended family system of meridional people. 'Granny' protected a battered child of young Swiss parents. One 6-month-old boy who was obviously dirty and neglected on admission came from a Turkish family with 5 children below 10 years.

Low birthweight babies (preterm or retarded intrauterine growth) are known to adapt poorly to physiological insults in the neonatal period. Seven (12%) of our group had low weights at birth, about double that in the Swiss population;³ 5 of them showed an obvious deficit in weight-for-height on admission.

This fact was also true for the whole group of 60 children, of whom 28 (47%) were underweight on admission, although the heights of 23 of them were >50th centile. Height-for-age can be looked on as indicating long-term previous dietary history, as opposed to weight-for-height which reflects the current nutritional status of the child.⁴ Thus half the children were in a fairly acute state of malnutrition.

This weight deficit did not merely reflect the acute state of dehydration, as shown by two observations. Firstly, the weights of many of the children, though rising during rehydration, dropped again when maintenance feeding was restored. Secondly, 17 (28%) of the children weighed less at discharge than on admission, and 2 (4%) showed a flat weight curve. We concluded that a substantial number of children were truly underweight before the acute disease, while some others were unable to cope with oral nourishment after they had been rehydrated.⁵

Thus it seems that the well-known pattern of 'malnutrition-diarrhoea' of poor countries is to a lesser degree also applicable to the so-called developed world, as far as special population groups are concerned.

Stool cultures in our cases showed no pathogens, but even if pathogens had been found, they would not

Table 4 Age, weights, sex, period of stay in hospital, and mode of rehydration/nutritional rehabilitation of the 19 children who either lost weight or just maintained it during their stay in hospital

Case	Age (months)	Sex	On admission		On discharge		Weight loss (g)	Stay in hospital (days)	Management	
			Weight (g)	Centile	Weight (g)	Centile			Intravenous infusions	Oral
1	27	M	12250	10-25	12250	10-25	0	4		Fluids + diet, 1st-4th day
2*	24	M	9060	<3	8950	<3	110	6		Fluids + diet, 1st-6th day
3	15	M	9100	3-10	8980	3-10	120	12	1st-5th day	Fluids + diet, 1st-12th day
4	69	M	17800	3-10	17600	3-10	200	7	1st-5th day	Fluids + diet, 1st-7th day
5†	9	F	9150	75	9140	75	10	5		Fluids + diet, 1st-5th day
6‡	4	F	6750	50-75	6740	50-75	10	6	1st-3rd day	Fluids + diet, 1st-6th day
7§	24	M	10900	3-10	10500	3	400	11	2nd-7th day	Fluids 1st-2nd, 3rd-11th days
8	15	M	9240	3-10	8980	3	260	3		Fluids + diet, 1st-3rd day
9	41	M	14500	10-25	14000	10	500	7		Fluids + diet, 1st-7th day
10	19	F	10700	25-50	10450	25	250	3	1st day	Fluids + diet, 1st-3rd day
11	6	F	7450	50	7400	50	50	7		Fluids + diet, 1st-7th day
12	18	F	10150	25	9780	10-25	370	5		Fluids + diet, 1st-5th day
13	72	F	18700	25-50	18700	25-50	0	6	6-9th day	Fluids + diet, 1st-6th day
14	17	M	11870	50-75	11600	50	270	13		Fluids + diet, 1st-6th, 8-13th days
15	5	M	8340	90	7970	75	370	16		Fluids + diet, 1st-16th day
16¶	26	F	12000	25-50	11700	25	300	1	1st-2nd day	Fluids + diet, 1st day
17	21	F	10450	10-25	10210	10-25	240	6		Fluid, 1st-6th day
									Diet, 3rd-6th day	
18	20	M	11100	10-25	10520	10	580	5	1st-3rd day	Fluids 1st-5th day
									Diet, 4-5th day	
19	31	M	15000	75	13650	25-50	1350	8	2nd-5th day	Fluids + diet, 1st-8th day

Infusions commonly used at this hospital are 10% glucose in 1/1, 1/2, 1/4, or 1/7 (below 3 months of age) strength saline water. Depending on the degree and type of dehydration (hypotonic or hypertonic), on the hydrogen ion homeostasis and electrolyte disturbance the following solutions are supplemented: intramuscular NaBic (8.4%), KCl and RingerBic (1000 mg contains sodium 134 mEq/l, potassium 4 mEq/l, chloride 111 mEq/l, bicarbonate 27 mEq/l).

Oral fluids commonly prescribed at this hospital are: black tea with sugar, glucose and water, Coca Cola or similar, or 'triple-mixture' (1/3 sweetened tea, 1/3 plain mineral water, 1/3 orange juice). Oral food generally starts with carrot soup (100 mg providing 20 kcal or 83.7 kJ), and then gradually a diet is introduced — such as mashed bananas, mashed potatoes, rusks, and other foods so long as they are not highly seasoned and are free of roughage.

*Weight curve had not increased since 1 year of age. Coeliac disease clinically excluded.

†Lambiasis. Treated with metronidazole.

‡Ampicillin given as bacterial infection suspected.

§Alimentary difficulties.

||Prolonged hospital stay for social reasons.

¶Short hospital stay due to parents' wish (father was a physician).

necessarily have been the cause of the diarrhoea. This fact has been repeatedly proved in the case of enteropathogenic *E. coli*, where many carriers are asymptomatic.⁶⁻⁸

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