Diarrhoea is a nutritional disease

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Summary

More hospitalised patients with diarrhoea than patients without diarrhoea were underweight for age. In a retrospective survey of patients hospitalised more than once with either diarrhoea or bronchopneumonia, the patients with diarrhoea were found to have a greater decrease in weight for age at the time of the second admission than the patients with bronchopneumonia.

The malnutrition associated with diarrhoea is due to a number of factors, including decreased intake, extra losses and malabsorption of nutrients. Patients on marginal food intakes may be unable to make up lost ground after diarrhoeal episodes and become malnourished.

A brief survey of health professionals’ attitudes suggested a tendency to overlook the nutritional component in the management of diarrhoea. Nutritional rehabilitation during and after episodes of diarrhoea ought to receive more emphasis in teaching and practice.

Acute infective diarrhoea is the commonest cause of post-neonatal mortality in black children under 5 years in this country, but exact statistics on incidence are not available.

The association of malnutrition and diarrhoea is very well known. Malnourished infants may have intestinal mucosal villous atrophy with resultant nutrient malabsorption leading to diarrhoea, and immune suppression with decreased resistance to intestinal infection. The impoverished socioeconomic circumstances associated with malnutrition commonly also lead to an increased prevalence of intestinal parasites and high rates of infection through crowding, unsafe water supply and lack of hygiene.

Diarrhoea is, however, also an important cause of malnutrition. This important phenomenon, which is of great clinical significance, can easily be overlooked in busy clinics and hospitals. The main focus in the treatment of the child with acute diarrhoea is administration of clear fluids or oral rehydration solutions, and the need for appropriate feeding is largely ignored.

A retrospective analysis of paediatric hospital admissions was therefore carried out to document once again the association of malnutrition and diarrhoea, and to test the assumption that recurrent admissions for acute diarrhoea are associated with a more serious decline in nutritional state than recurrent admissions for other infective conditions. In addition, a brief survey was done of health professionals’ perceptions relating to malnutrition as a sequel to diarrhoea.

Patients and methods

The nutritional state of all children admitted to the diarrhoea ward at King Edward VIII Hospital, Durban, during 1986 was compared with that of patients admitted to the other paediatric wards with diagnoses not including diarrhoea.

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Thereafter, a retrospective analysis of patients under 2 years of age who had been admitted with diarrhoea on consecutive occasions more than 2 weeks apart during 1986 was compared with a similar analysis of patients admitted repeatedly with bronchopneumonia without diarrhoea. Bronchopneumonia was chosen as the control condition because respiratory infections are similarly associated with overcrowding, poverty and the immune suppression of malnutrition. Fifty-eight patients with diarrhoea and 36 patients with bronchopneumonia fulfilled the above criteria and form the study and control groups respectively.

The statistical analysis was performed with the aid of the OXSTAT II package (Microsoft Corporation), using paired and unpaired t-tests as appropriate.

A group of senior professional nurses and doctors working in the paediatric department of King Edward VIII Hospital were asked to respond to the instruction: Please list the common complications/sequelae of diarrhoea seen by you and indicate a rank order of importance. The respondents were 12 nurses, 12 medical officers and 7 consultants. Their responses were graded according to the perceived importance of a deteriorating nutritional state as a consequence of diarrhoeal disease.

Results

The weight-for-age status had been recorded for 3,420 of 5,084 patients admitted with diagnoses other than diarrhoea; 1,170 of these (34.2%) were below the 3rd National Center for Health Statistics (NCHS) centile. In contrast, 1,127 of 2,108 patients (53.5%) admitted with diarrhoea during 1986 were below the third centile.

The diarrhoea and the bronchopneumonia groups are compared in Table I. The patients with diarrhoea had a similar weight for age at the time of the first admission, expressed as a percentage of the expected mean, but showed a greater negative change in weight between the first and second admissions than the patients with bronchopneumonia (P < 0.01).

When the patients were grouped according to a weight for age above or below 80% of the mean (corresponding to the 3rd NCHS centile) at the time of their first admission, the comparison showed the better-nourished children to have a shorter hospital stay than their malnourished counterparts. The patients with diarrhoea had a significantly lower weight for age at the second admission than at the first admission in both the well-nourished and the malnourished groups (P < 0.001); this was worse than the change in the bronchopneumonia groups (P < 0.05) (Table II).

Only 8 of the 58 patients with diarrhoea showed a positive change in weight for age between the first and the second admissions, while 16 of 32 bronchopneumonia patients had improved their weight-for-age status.

The responses to the questionnaire presented to the paediatric health professionals are shown in Table III.

Discussion

This retrospective survey has yet again confirmed the important association of diarrhoea and malnutrition. A higher pro-
portion of the patients with diarrhoea than of the children with bronchopneumonia had a weight under the third centile. As expected, the nutritional state of the patients with recurrent disease was poorer, but diarrhoea patients fared worst; 36 of 58 (62%) had a weight-for-age less than 80% of expected, as opposed to 16 of 32 patients (50%) with recurrent bronchopneumonia. In children whose weight-for-age was above 80% of expected at the first admission, diarrhoea was associated with a greater deterioration of the nutritional state by the time of the second admission than was bronchopneumonia. In these children, the low weight-for-age at the second admission is likely to be a consequence of the diarrhoea.

Patients with diarrhoea may become malnourished for a variety of reasons. A decreased intake of food is considered a very important factor. This is due to anorexia and also to a mistaken belief that ‘resting the gut’ through withholding food is beneficial. Increased losses of nutrients include large endogenous protein losses with high rates of purging. Intestinal mucosal injury results in malabsorption of a variety of nutrients. Patients on marginal food intakes may not be able to compensate for the increased requirements resulting from the above, and consequently cannot regain lost ground.

Malnourished children required longer hospitalisation for episodes of diarrhoea than well-nourished patients. This illustrates the fact that in impoverished communities malnourished children do not necessarily suffer from more frequent episodes of diarrhoea, but do take longer to recover from each episode. Every bout of diarrhoea then becomes yet another step in the vicious downward spiral of diarrhoea-malnutrition.

The brief survey of the health professionals’ perceptions regarding the nutritional consequences of diarrhoea suggests a preoccupation with the immediate risks of circulatory and metabolic disturbances.

It is evident that in the management of each episode of diarrhoea, both the short-term problem of dehydration and the longer-term risk of a deteriorating nutritional state must
be addressed. Parents especially must be helped to recognise the nutritional risk to their children, and there is clearly a need for greater emphasis on nutritional rehabilitation during and after episodes of diarrhoea, which must be reflected both in teaching and in practice.

REFERENCES


Comparison of the sodium contents of six commonly recommended oral rehydration solutions

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Summary

The sodium contents of six differently prepared oral rehydration solutions (ORS) were measured. A total of 452 solutions were prepared in our gastro-enteritis unit. The finger-pinch-and-cup method produced sodium values that were too high and too variable. The most acceptable sodium level was achieved using half a 5 ml medicine teaspoon or 1 level common household teaspoon of salt caused sodium levels to be low but still acceptable and safe. We recommend that half a teaspoon of salt in 1 litre of water be used when preparing an ORS.

In the mid-1970s the World Health Organisation proposed a formula for the preparation of a glucose/electrolyte oral rehydration solution (ORS), while in 1985 the South African Paediatric Association (SAPA) recommended an adapted formula. The main difference between these two formulas is in the chloride and sodium content. The WHO recommendation is designed to cater for sodium losses due to cholera, where the average faecal sodium loss is 101 mmol/l. The faecal sodium concentration in infantile diarrhoea is about 56 mmol/l.

At present, recommendations for preparing home-made salt-and-sugar solutions vary. There is particular concern about the danger of a too-high concentration of sodium in these home-made solutions. This study was designed to compare the sodium content of six commonly recommended ORS.

Material and methods

The solutions were prepared by 2 paediatric registrars, 2 experienced nursing sisters, and 14 mothers of infants admitted to the gastro-enteritis unit at Ga-Rankuwa Hospital. Preparation instructions were clearly specified (Table I).

A 1-litre Coca-Cola bottle has a volume of 1050 ml. No mark identifies the 1000 ml level. This caused dilution of solutions 1, 2 and 5. This is applicable to most commonly available household containers, and a dilution or concentration effect may therefore occur unless a volumetrically marked container is used. The sodium concentrations in the different solutions were determined with an Astra 8 analyser (Beckman Instruments), utilising ion-selective electrodes.