

W.H.O. Seminar on Protein-Calorie Malnutrition

BY

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In September this year the World Health Organisation held an inter-regional seminar on the treatment and prevention of protein-calorie malnutrition of early childhood. The seminar took place at Makerere Medical School, Kampala, Uganda, and I was privileged in being invited to attend as the delegate for Southern Rhodesia. If I wondered beforehand how we could spend two weeks talking about malnutrition, I soon found the time passing almost too quickly to absorb the wealth of information which poured out from the conference room, and the mass of literature with which we were provided proved to be quite a headache when we eventually took our leave at Entebbe Airport and found the baggage scales registering nearly 10 lb. overweight.

The seminar was officially opened on 7th September by the Honourable Dr. E. Lumu, Minister of Health to the Uganda Government, and Dr. F. W. Lowenstein, of the Nutrition Unit, W.H.O. Headquarters, Geneva, replied for the W.H.O. The speakers were in the main lecturers on the staff of Mulago hospital, who unreservedly gave of their time, and to them the success of the seminar was due. We were also fortunate in having two speakers from the Food and Agricultural Organisation in Rome. A heavy burden fell on Professor D. B. Jelliffe

as a result of the illness of Professor R. F. A. Dean just before the conference began, but none of the talks was cancelled and we were very pleased to hear Professor Dean also towards the end of the seminar. The lively discussion after each session left no doubt as to the general interest in the various subjects which had been chosen.

Initially, consideration was given to the basic principles of nutritional requirements in children, in pregnancy and lactation, to fluid and electrolyte needs, growth and development and the principles of infant feeding. The concept that maternal, foetal and early childhood nutrition are one was stressed, and also the fact that the relatively high protein needs of the growing child were not being met in developing countries. This was reflected in a falling off of the growth curve during the second six months of life and associated with retarded bone growth, which is one of the earliest signs of kwashiorkor. Difficulties of artificial feeding in African circumstances complicated matters and emphasised the need for breast feeding as long as possible. Nor were the diets of pregnant and nursing mothers adequate, but women had to be very badly nourished before this affected the quality of breast milk. At Mulago hospital maternal morbidity and mortality and still-birth rates were very high, and it was felt this was related to malnutrition of childhood and adolescence and also to early child-bearing before epiphyseal fusion, resulting in stunting and cessation of growth respectively. Pelvic size was bound up with maternal height, and although the usual pelvis was the gynaecoid type it was small and the baby was not always correspondingly small

to compensate for this, leading to disproportion and difficulties in delivery.

The medical aspects of protein-calorie malnutrition were then dealt with and the many variations in the clinical picture, with kwashiorkor at one end of the scale and nutritional marasmus at the other. Interesting, but rare, manifestations of the severe condition were tremor, the twitching syndrome and early optic atrophy which usually cleared during the recovery stage and in which the etiology still remained in doubt. Infection and infestation had an adverse effect on nutrition and resulted in a negative nitrogen balance which not infrequently precipitated the full-blown picture. In turn, many dietary deficiencies seriously interfered with tissue integrity, thus lowering the host's resistance to infection, and this interaction between nutrition and infection accounted for much of the high mortality and morbidity rates. Success in control, therefore, depended on efforts directed against both. In Kampala parotid gland enlargement and pancreatic fibrosis had been shown to be late effects of protein-calorie malnutrition, and in Ethiopia rickets was often associated with malnutrition.

Pathological and biochemical changes were described in detail. It was generally accepted that the usual routine tests (plasma protein and blood urea) only indicated a low intake of protein and that Whitehead's aminoacid imbalance ratio was the most useful single investigation in kwashiorkor. In this condition the essential aminoacids were reduced in concentration while the non-essential ones remained unaltered. This screening test was based on the estimation of these aminoacids in two groups and the calculation of an "imbalance ratio." It was a rapid chromatographic method and the imbalance was corrected by successful treatment. Unless it was corrected, protein synthesis might be inhibited and the patient would then die. The imbalance was the earliest biochemical abnormality so far discovered and was useful also in children living on a poor diet, but not yet clinically suffering from kwashiorkor. Therefore it would detect the potential kwashiorkor child. It was of value, too, in comparing the efficacy of various therapeutic diets.

A visit to the M.R.C. Infant Malnutrition Research Unit was interesting. The present diet under trial was based on the fact that in protein-calorie malnutrition synthesis of unessential aminoacids continued and was encouraged by calories derived from carbohydrates, together with the knowledge that disaccharides, particularly lactose, were liable to cause diarrhoea in



Dr. F. Lowenstein, of W.H.O., replying to Dr. Lumu, Minister of Health, Uganda (seated), at the opening of the seminar. Professor Jelliffe is on Dr. Lumu's right.

some acutely ill children. Milk was not used, therefore, and the diet was a synthetic lactose-free one based on the composition of mother's milk, but consisting essentially of calcium caseinate 4 g./kg. to supply the protein. Sucrose was added to supply calories for the most efficient utilisation of protein in the diet and also dextrose to provide a rapidly absorbed, easily metabolised source of glucose which should diminish the risk of death due to hypoglycaemia seen in some cases. Other additions were potassium chloride because potassium was required during the cell synthesis that accompanied recovery, disodium hydrogen-phosphate to balance the excess calcium in calcium caseinate, sodium chloride to compensate for the considerable loss of sodium during the diuresis and magnesium hydroxide, also necessary for cellular synthesis. Deficiency of magnesium accounted for some of the electrocardiographic changes found in kwashiorkor. Cotton-seed oil provided extra calories, and it was recognised that vitamins should be supplied for satisfactory recovery. Finally, in the Buganda child, folic acid was required for correction of the anaemia, and this was also included in the special diet. This diet was still in the experimental stage and not meant to be taken as a concrete recommendation, though the principles had application in the general treatment of kwashiorkor.

In the general paediatric wards at Mulago hospital mixtures of dried skimmed milk, calcium

caseinate, cane sugar and cotton-seed oil were still the basis of diet. Routine penicillin, streptomycin and chloroquin were given and there was no hesitation in treating as tuberculous any child who failed to do well or to gain weight satisfactorily, even in the absence of definite proof. Hypothermia was regarded as common and dangerous in kwashiorkor requiring vigorous treatment, and was considered to be due to the lowered metabolic rate and altered biochemistry. The value of tube feeding, blood transfusion and rehydration should not be forgotten, but anabolic steroids had not proved their worth in this condition.

Rehabilitation was discussed next, and ideally the rehabilitation centre formed the intermediate stage between hospital and home. In the vicinity of the hospital and under medical direction it could take not only cases discharged from hospital in the recovery phase, but selected milder cases not in need of specialised hospital treatment. One such centre was about to be opened in Kampala. Here mother and child would stay until the mother had sufficient knowledge and training to carry out correct feeding at home. With food and cooking facilities essentially the same as those in her own home, she would be taught how to supplement the basic African diet with the protein her child needed. This rehabilitation was the bridge between treatment and prevention. It aimed to restore the healthy child to its family and to improve health and



Professor D. B. Jelliffe demonstrating a case of kwashiorkor to some of the delegates.

social conditions within the family so as to prevent relapses in the same child or further cases of protein-calorie malnutrition in the same family. Also important was the final stage or follow-up of protein-calorie malnutrition. This required either visiting nursing auxiliaries or was a function of the rural health centre or dispensary, and we had the opportunity of visiting examples of both of these. At the very fine Kasangati Health Centre records were kept of all the homes in the district, and medical and follow-up services provided for these children as well as health education for the parents. Medical students took an active part in visiting homes and advising parents on food preparation, hygiene, sanitation and other problems related to preventive medicine. The centre was also part of the community life; in the evenings the local inhabitants were able to meet in the hall for social functions and concerts or to watch television, and in this way they identified themselves with the centre.

Epidemiology was considered in some detail, and in studying prevalence many factors, such as economic background, agricultural and social data, had to be taken into account. The distribution of population in an area had to be matched with the production and availability of food there. In Uganda assessment of food intake had been carried out by sending observers to the homes of non-literate communities for a whole day to record meals and quantity consumed per meal by each member. Assessments had been carried out also by questioning mothers at child health centres. Regional and seasonal variations within countries were discussed and the many factors that played a part, such as breast feeding and weaning practices, available crops, physical, biological and parasitic environment, cultural and psychological factors and human relationships. International comparisons were very important, too, in picking out high and low incidence areas and relating them to diet.

Prevention was one of the most important aspects, and early diagnosis would pay dividends. For this one depended on size and shape of the child as an index of nutrition, and when it was not possible to work out weight for age measurements because the age was not known, disproportion between head and chest circumference was probably more reliable than other measurements such as height or skin fold thickness, particularly if combined with the aminoacid imbalance ratio. Health education played a major part in prevention, but required trained

health educators and emphasis on health and nutrition education in the curriculum for medical students, as well as provision for rehabilitation and health centres. Mass media methods, using radio, television, films and the Press, had been used successfully to reach the population, but these were still in their infancy in Africa. Other interesting aspects concerned with prevention were the use of protein-rich foods and sometimes unconventional sources of protein. Applied nutrition programmes were necessary to utilise locally grown foods and to increase the purchasing power of the people, remembering that success depended on the co-operation of the local community. Considerable time was spent discussing the organisation of maternal and child health services at a national and also at a local level, and it was recognised that simplicity was the keynote.

There was a useful lecture on the value of rehydration units with practical demonstrations of techniques and methods used, and here again was another opportunity to reach the mother with health education. Immunisation was an important part of the programme, too, to cover the weaning period and toddler group, and ought to be carried out before six months old. Ideally in the future it might be possible to use the multipuncture technique, giving several vaccines together at birth with a jet gun, and then a second dose of vaccine at the post-natal visit at six weeks old. This would overcome difficulties of sterilisation, trained personnel and poor re-attendance. Chemo-attenuation of disease was another possibility to be explored, e.g., chloroquine added to the drinking water to prevent malaria or tetrachlorethylene given regularly as a depot drug for hookworm.

Protein-calorie malnutrition remains a tremendous challenge to all concerned with the care of young children in developing countries, and the team at Kampala presented a pattern of approach to the whole problem which was a valuable guide to those of us who as yet have had little opportunity for extensive research projects in this direction. We came away with a clearer concept of how to tackle the problem with available resources, the possibilities that exist regarding assistance, financial and otherwise, and what can be achieved despite many difficulties. The seminar was indeed a most stimulating experience.

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