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## New Aspects of Malnutrition in Jakarta

by

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The title of this paper is rather pretentious, since many of these so-called new aspects have been studied in other countries before in a more intensive way. However, in Indonesia they have received the attention of the medical world only in recent years. The purpose of this paper is to report on the present state of nutritional surveys and research. As a matter of fact it is not feasible to discuss all new aspects of malnutrition in this paper.

Especially after the Medical School University of Indonesia, Jakarta had been assigned as the site for the SEAMEO Regional Graduate Applied Nutrition Course it is expected that in the coming years the educational and research activities in nutrition will increase with the improvement of research facilities as well as manpower.

Since the description of the clinical picture of the syndrome of protein calorie malnutrition by Cicely D. Williams (1933, 1935) much attention had been given to this nutritional disorder, especially in the developing countries. P.C.M. constitutes an important medical, social and public health problem in this part of the world. In 1957 Poey Seng Hin reported 138 kwashiorkor cases, 76 males and 62 females. Most of them (86%) were children of three years or younger with the highest frequency between the ages of one and two years. Their daily diet did not contain sufficient animal protein, calories and vitamins. Additionally Poey Seng Hin found other contributing factors: ignorance about the value of protein rich food, superstitious attitudes, prolonged breastfeeding, neglecting supplementary feeding, bad hygienic conditions, predisposing

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to infectious diseases or parasitic infestations.

### Classification

The clinical classification of P.C.M. still presents difficulties. In Jakarta the severe types of P.C.M. are clas-

sified as follows: 1. kwashiorkor, 2. intermediate forms (marasmic kwashiorkor) and 3. marasmus.

Lately the following classification is used for certain research projects (Wellcome Working Party, Editorial Lancet, 1970):

Nutritional status	Percent of SWFA	Edema
Normal	<80	no
Underweight	60 - 80	no
kwashiorkor	60 - 80	yes
marasmic kwashiorkor	<60	yes
marasmus	<60	no

As suggested by the Wellcome Working Party weight is expressed as a percentage of standard weight for age (SWFA) compared with the 50th percentile Harvard Standards.

In field studies the assesment of the nutritional state of preschool children is done using the arm circumference as a public health index of P.C.M., the so-called "Quack-Stick" (Arnold, 1969).

#### International standard

100% or more	= 0 = fat
86 - 99%	= 1 = normal
81 - 85%	= 2 = suspected P.C.M.
75 - 80%	= 3 = mild P.C.M.
<75%	= 4 = severe P.C.M., including kwashiorkor and marasmus.

This method is very suited for the detection of suspected and mild cases of P.C.M., the group of underweight children. Usually this group

has almost no signs apart from their retardation of growth. However, these children are especially vulnerable to the effects of infections and

other stresses of life. Poorwo Sudarmo (1958) called them the group of "neither sick nor healthy" children.

#### New Urban Families

After World War II in many countries there has been a steady drift of people from the rural areas to towns. About 85% of Indonesia's population based their life on agriculture. The site of government administration and some educational centers usually constitute the urban areas in Indonesia. In addition there are only a few industrial centers like the capital city of Jakarta and Surabaya in East Java (Samsudin, 1971). At this moment Jakarta has a population of approximately 5,000,000 in comparison with the pre-World War II number of 500,000 inhabitants. The new urban families moved to the urban areas due to economic pressure:

1. the land owned is too small for daily living;
2. failure of the harvest and
3. insufficient job opportunity outside the farm.

They are experiencing the urban way of life for the first time. Economic, employment and housing difficulties contribute to an unbalanced and unsatisfactory diet especially of the children. A decline in breastfeeding usually occurs in new urban families. Early weaning and inadequate supplementary feeding are important causes of undernutrition in the first year of life (Workshop on Nutrition, Vienna, 28 August 1971).

#### Early Protein Calorie Malnutrition

Based on scattered available data Samsudin (1971) found P.C.M. in 30 - 50% of the children belonging to the age group of 1 - 3 years. Full-blown kwashiorkor was found in 1 - 2% of hospitalized children with a peak incidence for the age group 12 - 16 months. This early P.C.M. will have adverse effect on the subsequent mental development of these children considering the fact that the brain development will occur from the last trimester of pregnancy until the age of 6 year with a peak of intensity between birth and 6 months (Winick, 1969; Monckeberg, 1969; Sutedjo, 1971).

Darwin Karyadi et al. (1971) reported the results of a reexamination of 31 children aged 9 to 15 years whose nutritional state had been studied over a 2 year period approximately 10 years before. At that time 10 of them were classified as undernourished and 21 were regarded as healthy. Ten years later the original undernourished and the healthy groups still showed a significant difference both in height and weight. The I.Q. was measured with the Wechsler Intelligence Scale for Children (W.I.S.C.) test adapted to Indonesian children and the Goodenough-Harris test for the older children. The I.Q. values were low and significant lower in the original undernourished group

in comparison with the healthy children. Generalized or focal slow activity of the brain waves was found on the E.E.G. of 64.5% of all the children. Both groups of these children came from families with a low income. There are indications that early undernutrition during the second and third year of life or at a younger age resulted in retardation of both physical and intellectual developments.

S. Soewondo et al. (1971) obtained confirmation in an empirical study of the assumption that nutritional state influences the functions of intelligence. The study was done on 85 children in several states of nutrition with the above mentioned W.I.S.C. test adapted to Indonesian children. The lower the degree of nutritional state, the greater it affects the functions of verbal activities, abstraction, attention and concentration. Performance tests were also unsatisfactory, probably due to their environmental conditions. The effects of undernutrition on perception were not clearly shown in this study. For an optimal function of the intelligence the improvement of the nutritional state should be accompanied by an improvement of socio-economic, psychological and educational conditions.

#### **Malnutrition of pre-school children.**

Next to the problem of early P.C.M. the pre-school children in developing countries still remain

the most vulnerable group for protein-calorie malnutrition. Scrimshaw (1971) mentioned the role of environment factors in interrelationship of nutrition and infection causing a high mortality rate in this age group. For prevention and combating malnutrition in pre-school children supplementary feeding is recommended using the Mothercraft Center system. The mothers received education on how to feed their children with locally available foodstuff and how to care for their children through active participation using techniques that are compatible with their understanding and financial limitation.

Darwin Karyadi et al. (1971) conducted a study on 56 children with P.C.M. During a period of three months food supplementation was given to them containing "full fat soy flour". The nutritional composition of this "full fat soy flour" is protein 35.85%, fat 19.62%, carbohydrate 30.52%, moisture 9.74%, calcium 374.20 mg%, phosphorus 694.20 mg%, ash 4.28 gm%, iron 16.54 mg% and calories 330 per 100 gram. At the end of the study an increase of the body weight and height was found especially in the age group 1 - 3 years. Signs of P.C.M., vitamin A deficiency and infections found at the start of the study had disappeared almost entirely.

Only one case with tuberculosis in addition to the P.C.M. did not improve.

### **Tuberculosis and malnutrition.**

Supardi Sudibyo et al. (1974) examined 192 pre-school children physically and anthropometrically in a Mothercraft center. Twenty six children with P.C.M. were given a daily food supplementation for a three months period with a calculated amount of protein and calories. Mostly local supplementary foodstuff were used. The nutritional state of the 26 cases appeared to be still unsatisfactory at the end of the study. Mantoux test and chest X-ray films revealed 17 cases with active pulmonary tuberculosis. Most likely the tuberculous infection is the main cause of the failure in improving the nutritional state of the affected children.

### **Infections and malnutrition.**

As mentioned earlier the role of infections and parasitic infestations in childhood is very great in determining the incidence of P.C.M. Shanty towns in urban areas are without an adequate water supply and the sanitation is poor, also in Jakarta. Especially diarrhea is a prominent symptom in P.C.M. and will accelerate the development of this disease.

### **Microbial contamination of the gut.**

Enteric pathogens are common in the stools of P.C.M. children in Indonesia and other developing countries. Michael Gracey et al. (1973) studied the microbial flora of the

stomach and small intestines of 21 malnourished Indonesian children in Jakarta to examine the possible contribution of these bacteria to their disease patterns. Specimens of gastric and small intestinal contents were obtained by pernasal intubation. In both gastric and small intestinal aspirates a wide variety of micro-organisms were isolated: gram positive cocci, enterobacteria such as *Escherichia coli*, *Klebsiella* sp., *Pseudomonas* sp., *Salmonella paratyphi* B, *Shigella* sp., *Streptococci* and anaerobic bacteria, were also isolated including *Bifidobacteria*, *Peptostreptococci* and *Bacteroides*. In several patients a significant overgrowth by *Candida* sp. was found especially when they are receiving antibiotic therapy. In a control group consisting of 21 relatively well-nourished Australian children of Caucasian origin the gastric contents of fasting subjects were relatively sterile and the small intestinal flora sparse. It is suggested that the bacterial contamination of the upper gastrointestinal tract is another manifestation of the synergism of nutrition and infection characteristic of malnutrition.

### **Lactose intolerance.**

Problems of malabsorption are commonly associated with gastroenteritis, P.C.M. and post bowel surgery. A study on carbohydrate (lactose) intolerance and fat malabsorption had been done in Indonesi-

an children by Suharyono et al. (1974) and Sunoto et al. (1973). Lactose intolerance was found in 86.4% of P.C.M. children with clin-test, lactose loading test and/or biopsy. This biopsy revealed a notable villous atrophy in the upper small intestines in children with severe kwashiorkor.

After weaning the great majority of the Indonesian people will have no milk in their daily diet. It seems this will influence the production of lactase causing a lactase deficiency in a considerable number of Indonesian adults and perhaps older children (Sutedjo et al., 1969; Samsudin, 1971). They are not able to digest milk and cannot obtain high quality cow's milk protein. Treatment of the lactose intolerance of the P.C.M. children consists of feeding with low lactose milk formula. The small content of lactose in such a formula will stimulate the microvilli to produce lactase again after recovery. To hospitalized lactose intolerant children self-prepared "Eiwitmelk" was given with a lactose content of 1.4% and to the non-hospitalized children Almiron milk powder (Nutricia, Holland) with a lactose content of 1.0% for a period 2 to 3 months (Faried Bakry et al., 1973).

#### **Vitamin A deficiency and malnutrition.**

Nutritional surveys carried out in different parts of Indonesia reve-

aled that vitamin A deficiency was closely associated with P.C.M. in addition to infections, local food habits, sanitary conditions and other socio-economic factors. Samsudin et al. (1973) and Darwin Karyadi et al. (1973) carried out a study on the prevention of vitamin A deficiency in pre-school children in a subrural village. In their trial prevention of vitamin A deficiency was studied by means of administering 200,000 I.U. of vitamin A mixed with 40 I.U. of vitamin E as an emulsion. Addition of vitamin E will promote the absorption and metabolism of vitamin A since vitamin E will prevent the oxidation of vitamin A. The emulsion of vitamin A and E was administered twice with an interval of six months. The trial was done on 368 children. No single case of fullblown kwashiorkor was encountered, 27.6% of the children revealed signs of vitamin A deficiency. No signs of vitamin B<sub>1</sub> deficiency were seen and there were only a few cases with vitamin B<sub>2</sub> and vitamin C deficiency. *Ascaris* infestation was found in 71.9% of the cases, 17.8% had trichurias and none with *ancylostoma*. Tuberculin test with Mantoux 1/100 was positive in 32.2% of the xerophthalmia group and in 26.4% of the nonxerophthalmia cases. A sample of 28 cases with positive tuberculin test was found suggestive for pulmonary tuberculosis on chest films.

Beneficial association was found between the administration of "oral massive dose vitamin A" and the nutritional status, gastroenteritis and skin infections. Curative and preventive effect on ocular signs and symptoms of xerophthalmia as well as improved serum vitamin A levels were demonstrated even after one year. The occurrence of xerophthalmia could not be prevented or cured in four cases, who were suffering from tuberculosis. The final results of the treatment of xerophthalmia were 28% cured, 1.1% unprotected and 70.9% protected (Swaminathan et al., 1970). At present a new study is being done by Samsudin et al. in Jakarta with the administration of 300.000 I.U. of vitamin A. The dose of 200.000 I.U. is enough for the prevention of xerophthalmia in small children, but not in older ones. Especially in the last mentioned group a curative effect cannot be expected with this dose. So far no side effects due to the increased dose of 300.000 I.U. vitamin A are seen. The evaluation of the results will be different from Swaminathan's evaluation.

From an ecological viewpoint it is already known that protein, calorie and vitamin A deficiency are caused by poverty, ignorance about proper nutrition, superstitious attitudes, the enormous increase of population and bad hygienic conditions resulting in recurrent infections and parasitic

infestations. The Third National Congress of Pediatrics in Surabaya (1 - 6 July 1974) has made the following recommendations to the government:

1. Improving the socio-economic condition of the population.
2. Increasing food production.
3. Encouraging the national food industry leaders to improve the methods of food conservation to prevent wasting of foodstuff.
4. Improving the food distribution system.
5. Legislating the production, storage, distribution of foodstuff.
6. Intensification of education in nutrition and health.
7. Ecological approach in varying the diet composition especially for pregnant mothers and children.
8. Control of population explosion.

In addition eradication of infections and improvement of sanitary conditions are necessary for improvement of the nutritional state considering the interrelationship between host nutrition and infection (Sutedjo, 1974). Most of these items are presently already included in the frame work of the Second National Five Years Development Plan.

#### Summary

A description of kwashiorkor in Jakarta in 1957 followed by the discussion of some new aspects of this nutritional disorder such as the problem of the now urban families,

early protein calorie malnutrition and its adverse effect on mental development, the severity of P.C.M. in pre-school children, the interrelationship of nutrition and infections in particular gastrointestinal infections and tuberculosis, lactose into-

lerance in P.C.M. and the association of vitamin A deficiency with P.C.M. Recommendations of the Third National Congress of Pediatrics in Surabaya (1-6 Juli 1974) in connection with the problem of childhood nutrition are also mentioned.

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