In severe PCM cell mediated as well as humoral defense mechanisms are impaired. In vitamin A deficiency formation of epithelium is disturbed and wounding healing, i.e., in deficiency is retarded. This will predispose to infections. Infection on the other hand, will often aggravate or precipitate malnutrition. The more prolonged the infectious disease, the more severe is the malnutrition.
Malnutrition was more frequent and more severe among infants suffering from severe tuberculosis (meningitis, miliary tuberculosis), compared to a group suffering from acute infections (pneumonia) in the Pediatric Department of the Dr. Soetomo General Hospital, Surabaya (Ismedjiasto et al., 1974).

Vitamin A deficiency was found in 20% of the infants suffering from PCM in the Pediatric Department of the Dr. Soetomo General Hospital. The incidence was 30% in cases complicated diarrhoea (Ratna Indrawati et al., 1974). Almost all cases were complicated by an intercurrent infection, mostly respiratory infections.

A combination of PCM, vitamin A deficiency and infection will form a vicious circle (Fudjiadi and Harmanses, 1968; Roels, 1961; Olson, 1968; Scrimshaw, 1968).

**PROTEIN DEFICIENCY ↔ VITAMIN A DEFICIENCY**

1. a. absorption  
   b. conversion  
   c. transport  
   d. utilisation of vitamin A is decreased

2. Decreased  
   a. cell mediated immunity  
   b. humoral immunity

3. Retarded wound healing

INFECTIONS:

1. parenteral: increased requirements  
   2. enteral: decreased absorption

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**The Role and Training of Hospital Paediatric Nurses in Papua New Guinea.**

by

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**Abstract**

Demands for health services are increasing in all countries of the world. Both affluent and less affluent countries are starting to realise the importance of nurse practitioners to enable comprehensive health services to be made available to more people at cheaper cost.

The training programme for hospital paediatric nurses in Papua New Guinea has been designed to allow them to carry out effectively their future role of taking responsibility for the screening, diagnosis and initial treatment of sick children pending the availability of a doctor.

The nurses receive practical on the job training by rotating through specific areas during the one year post basic course in paediatric nursing. The areas are acute paediatric ward, gastroenteritis ward, special care nursery, paediatric outpatients, nutrition rehabilitation unit and MCH clinics.

The nurses learn to diagnose the common acute paediatric illnesses. They learn standardised management regimens for each of these common childhood illnesses.

They also learn how to carry out the practical procedures required to allow them to diagnose and treat these illnesses, and become skilled in doing such procedures as lumbar punctures and intravenous rehydration.

Received 15th July, 1974.
Health service demands are increasing in all countries of the world. In America, nurse practitioners and paediatric nurses are being trained in several centres to provide many of the services previously done by doctors. They provide a cheaper service, allow a wider coverage of the population and perform their tasks as well as doctors.

The utilisation of nurse practitioners allows fullest advantage to be taken of scarce and expensive high level manpower. It thus enables health services to be available to more people at much cheaper cost (Silver, 1968; Silver and Hecker, 1970; Salder et al., 1972).

There is clearly a much greater need for nurse practitioners in developing countries such as Papua New Guinea than in developed countries such as America. Indeed, most nurses in Papua New Guinea now function as doctors of first contact. It is essential, then, that their training provides them with adequate skills for screening, diagnosis and treatment of patients.

A 12 months' post-basic course in paediatric nursing recognised by the Nursing Council of Papua New Guinea has been established at Port Moresby. After satisfactory completion of the course the nurses are assigned to paediatric wards in the regional and district hospitals of the country.

The need for paediatric nurses

One third of the population of Papua New Guinea are children under ten years of age, yet 40% of hospital admissions and 60% of hospital deaths occur in this age group. Clearly, children form both a large and a vulnerable group.

Infections are responsible for 90% of the admissions of children to hospital. At least one third of these children are also malnourished, so that the main cause of the high morbidity and mortality among young children is infection and malnutrition, each adversely interacting on the other.

Four infections — lower respiratory infection, diarrhoea, malaria and meningitis — account for 45% of all paediatric admissions to hospital and 55% of all paediatric deaths in hospital.

The majority of paediatric admissions and deaths are, therefore, caused by only a few acute diseases. Diseases which, if recognised early, can be readily treated and the child is able to return to full function. Most children suffer from, and die from, acute infections which can be readily recognised and which are capable of being successfully managed by standardised treatment regimens.

Over one third of hospital paediatric deaths in Papua New Guinea occur within 24 hours of the child's
tional deficiency after complete development of the central nervous system, will decrease the child's activity and indirectly affect learning ability and behaviour. This handicap will be felt if the malnourished infant has become an adult. It will indirectly also affect its family, the community as a whole and inhibit technological development of the country (Darwin Karjadi, 1971; Soewondo, 1971; Monkeberg, 1971).

Ignorance and a low IQ of the mothers will be a handicap in overcoming malnutrition in their children. This is one cause of the persistence of malnutrition in the succeeding generation.

Technological progress of a country will also be inhibited, since this requires technical knowledge, which is difficult to achieve, if learning ability is impaired. This situation will secondarily inhibit economical development, so that it can be concluded that:

a. malnutrition

b. unfavourable environment which does not stimulate mental activity and development, leading to decreased mental ability and secondarily to underdevelopment

c. poor socio-economic conditions,

will act synergistically on each other and form a vicious circle.

MALNUTRITION

DECREASED

MENTAL ABILITY

UNDER-DEVELOPMENT

Nutritional as well as environmental conditions should be improved to achieve optimal mental development.

1.3. Decreased resistance against infection

Nutritional deficiencies and infectious diseases are two major problems among infants in Indonesia. These two conditions often have a synergistic effect on each other.

PCM and vitamín A deficiencies, which are the most common deficiencies among infants, are both associated with a decreased resistance against infections
Give Fast
20 ml. per kg.

Then Each Hour
25 ml. if weight under 5 kg.
50 ml. if weight 5 - 9 kg.
75 ml. if weight 10 - 14 kg.
100 ml. if weight 15 kg. or more.
Repeat 20 ml. per kg. FAST if child continues to look dehydrated.
Encourage Breast Feeding and Oral Fluids

**Initial Treatment of Meningitis**

Diagnosis — Lumbar puncture shows cloudy C.S.F.

1. Put up Glucose-Saline intravenously.
   10 ml. per hour if weight under 5 kg.
   25 ml. per hour if weight 5-14 kg.
   50 ml. per hour if weight 15 kg. or more.

2. I.V. Cryst. Penicillin 1,000,000 U. every three hours.

3. I.V. Sulphadimidine 50 mg. per kg. (max. 1.5 g.) every six hours.

4. I.V. Chloramphenicol 25 mg. per kg. (max. 500 mg.) every six hours.

5. I.M. Chloroquine 0.1 ml. per kg. stat.

6. Phenobarbital 15 mg. every eight hours if weight under 10 kg. 30 mg. every eight hours if weight 10 kg. or more.

7. I.V. Diazepam (Valium) 0.1 ml. per kg. (max. 2 ml.) if child convulses or Paraldehyde 0.1 ml. per kg. if Diazepam (Valium) not available.

Particular attention is paid in the special care nursery to teach the nurses how to take care of low birth weight babies, especially the practical aspects of feeding and the importance of maintaining the mother's lactation.

Large numbers of children attend the paediatric outpatients each day, and the nurses are taught how to screen the sick from the not sick children.

Over 80% of new outpatient attenders have either a respiratory infection, a skin infection or diarrhoea. Serious illnesses apart from lower respiratory infection and diarrhoea account for less than 3% of new attenders. So among the paediatric outpatient population there is a limited disease spectrum in which diagnosis is readily apparent to those adequately trained in over 90% of cases. Management along standardised lines is also appropriate for 85% of cases. Thus it is adequately trained nurses, and not doctors, that are required to screen, diagnose and treat the children that attend the outpatient department.

The nurses learn how to make up various milk food that children may require. They learn the importance

The most common nutritional deficiencies among Indonesian infants up to two years of age, are protein calorie malnutrition (PCM) and vitamin A deficiency (Trowell et al., 1954; Poey, 1957; Ten Doesschate, 1958; Monckeberg, 1971; Mc Laren, 1968). The younger the infant the more severe are its hazards. Prematures, small for dates and ill newborns require special attention. This group is prone to the development of malnutrition, since its nutritional reserves are less than in older children and adults (Heird, 1972). Severe protein calorie malnutrition results in physical growth retardation and histopathological changes in the brain (Stock, 1963; Cheeck, 1968, 1970; Drilissen, 1968; Srinivasan, 1968, 1969; Darwin Karjadi, 1971; Monckeberg, 1971; Soewondo, 1971), the gastrointestinal tract (Bowie, 1967; Brabezat, 1967, 1968; Mendes, 1968; Montgomery, 1964; Hassen, 1971; Sumoto et al., 1974), the pancreas and other organs which may cause functional disturbances. The critical period for brain development is the first six months of life (Winick, 1969).

In food restriction the ratio of calories to protein in the diet is important (Montgomery, 1964; Check, 1968). If protein intake is very low, while calories are not so radically restricted, the result will be a decrease in cell size, but cell multiplication remains normal. Calorie restriction will disturb cell multiplication, while cell size is still normal (Mendes, 1958). A mixture of these two conditions is usually found in marasmus and kwashiorkor.

The hazards of severe malnutrition in early infancy are manifold. To discuss them all in detail would be impossible. This article is an attempt to discuss the most important aspects. Severe malnutrition in early infancy will not only affect the malnourished infant, but indirectly also its family and even the community as a whole.

1. **Direct Hazards to the Malnourished Infant**

The most important are:

1. Physical retardation
2. Retardation in brain growth and development
3. Decreased resistance to infection
4. Predisposition to diarrhea
5. Blindness due to vitamin A deficiency

1.1. **Physical growth retardation**

Body weight and body length are below normal in PCM. About 60% out of 181 infants admitted to the Pediatric Department of the Dr. Soetomo General Hospital, between January and June 1973, were underweight (body weights were below 80% of the Harvard stan-
II. Indirect hazards affecting:

A. Other siblings in the family.

Frequent illness and a high mortality rate of the malnourished infant necessitate more intensive care and increase expenses for treatment. This will be a cause of neglect of other children in the family.

B. The community:

1. Health centres and pediatric wards are often overloaded by malnourished infants who often suffer from recurrent and chronic infectious diseases.

2. Rehabilitation centres and schools have to be set up for the blind.

3. The possibility of impairment of learning ability might inhibit technical development and progress.

Regarding the many impacts and the complexity of this problem, it is important to discuss what can be done to improve prevention and treatment of malnutrition in early infancy. It is also important to stimulate teamwork among medical and nonmedical departments who are involved with nutritional problems, nutrition education, food production and distribution. Most probably periodic evaluation and comparison of results will improve the methods used to overcome this problem.

of food and how to ensure and maintain adequate nutrition for the sick child.

The nurses also spend time in the Nutrition Rehabilitation Unit. Here they learn the importance of social factors in the causation of malnutrition, and participate in an active educational programme of teaching families better nutrition.

Although the hospital paediatric nurses are mainly concerned with sick children, it is necessary for them to be knowledgeable on the preventive and educational aspects of child health. They learn to utilise a sick child's time in hospital for necessary preventive and educational work with the family. The child's immunisation status is checked while he is in hospital, and deficiencies remedied before he is discharged home. Advice on child care and family planning may be needed and the nurse must be able to provide this. Also, adequate follow up of the child, after his discharge from hospital, requires good liaison between hospital staff and the community health staff. The hospital nurse must know what community health facilities are available to provide ongoing care for the child.

The paediatric nurses become familiar with the working and problems of community paediatricians by spending one month attached to M.C.H. Clinics. During this time they are actively involved in antenatal clinics, young child clinics, immunisations, school health, dental health, family planning, health education, home visiting, pre-school activities, and social welfare.

The training given to the paediatric nurses is essentially practical as it has been found that they learn best by doing. Most of the teaching takes place in the real life situation of the wards and outpatients. However, six hours per week are spent in the classroom on tutorials, discussion groups and individual projects, and a series of lectures are given on ward management and administration.

Conclusion

The hospital paediatric nurses are trained for total care of the sick child. They are taught to diagnose the common childhood illnesses and to initiate specific treatment pending the arrival of a doctor. They free the doctor of much routine work and thus allow him to spend more time at those tasks that specifically require his expertise and knowledge.

The use of nurses especially trained for their role in diagnosis and treatment is essential if adequate paediatric services are to be provided. To delegate suitable responsibilities to specifically trained nurses is not a detrimental dilution of standards of medical care. An adequate number of well-trained and supervised nurses properly used, is of much better value than a few doctors desperately attempting the impossible.
REFERENCES

