

GROWING UP IN THE KATHMANDU VALLEY

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Summary

Malnutrition is an underlying or associated cause of an estimated 60% of deaths in the child populations in developing countries. Surveys in Nepal have shown around 70% of the population under 5 years are affected by some form of malnutrition. While the basic factors in malnutrition are associated with lack of food and inappropriate use or non-use of food available, the cause and effect cycle between malnutrition and infectious disease is well demonstrable in Nepal. Nutritional problems are mainly of energy, protein-energy malnutrition, Vitamin A deficiency, anaemia, as well as a high incidence of goitre and cretinism in some areas. Nutrition programs are directed towards these deficiencies as well as general measures against the spread of infectious disease. The necessity for a co-ordinated multi-sectorial approach is well recognised.

I. INTRODUCTION

Nepal is a small Himalayan kingdom with an area of 54,000 square miles and a population of around 12,600,000 people, 42% of whom are under the age of 15 years. 90% of the population are engaged in agricultural pursuits but less than 15% of the land area is available for cultivation. Population per physician is 26,000 (96,300 in the hills) and adult literacy rates are 15%. Per capita GNP in 1975 was \$US 111. Infant mortality rates per 1000 (1975) was 120 with 54% of all deaths being under 5 years of age (Table 1).

TABLE 1. Comparative statistics

	Australia	Nepal
Area (square miles)	2,968,000	54,000
Population	14,000,000	12,600,000
% population under 15	20	42
Population per physician	800	26,000 (96,300 in the hills)
Adult literacy rates (%)	98	15
Infant mortality rates/1000	17	169
Per capita income (\$US)	5,300(1974)	111(1975)

Nutrition surveys have been limited but two studies have highlighted an alarming situation. Pourbaix (1974) studied 1044 pre-school children from 17 areas and in 1975 a national Nepal Nutrition Status Survey was conducted by HMG and USAID jointly, on 6562 children from 221 selected sites. Based on weight for age criteria results are

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tabulated in Table 2 and weight for height criteria in Table 3. From these figures it is clear that the incidence of clinically detectable malnutrition is very high and Pourbaix estimated by extrapolation that there must be approximately 124,000 malnourished children in danger of death in Nepal, unless immediately hospitalised or rehabilitated - both alternatives are largely unfeasible.

TABLE 2. Nutrition status by weight for age

	Pourbaix	USAID/HMG 1975 using IAP standards
Normal	30%	29.3%
1st degree malnutrition	29%	41.5%
2nd degree malnutrition (needing careful watch)	25.4%)	24.0%)
3rd degree malnutrition (needing treatment)	15.6%) 41%	5.1%) 29.1%

TABLE 3. Nutrition status by weight for height

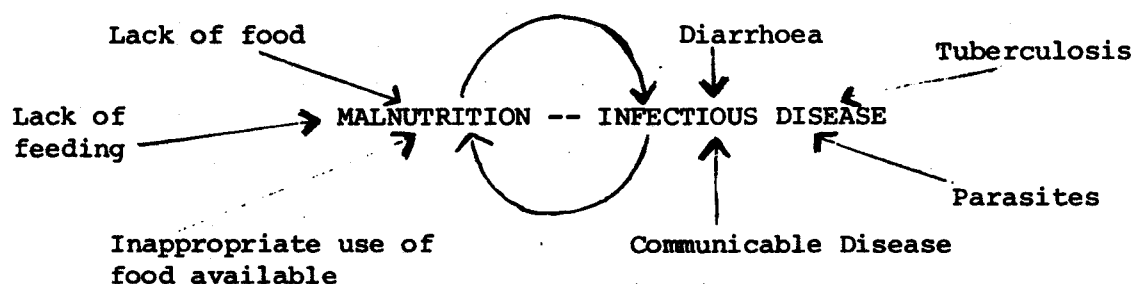
	Pourbaix '74	USAID/HMG 1975
Normal	12.1%	12.6%
Slight deviation (90-99)	31.0%	41.5%
Needing careful watch (80-89)	37.6%) 57%	39.2%) 47%
Needing treatment (below 70)	19.3%)	6.8%)

Specific deficiencies have highlighted protein, energy, vitamin A and B, nutritional anaemia aggravated by hookworm infestation and goitre and creatinism, which in some areas is amongst the highest incidence in the world.

II. MALNUTRITION - INFECTIOUS DISEASE CYCLE

The cause and effect cycle between malnutrition and infectious disease is well demonstrable in Nepal.

Fig. 1. Malnutrition and infectious disease interrelationship



(a) Contributing Factors in Malnutrition(i) Lack of food

Regional imbalance - 2/3 of the food production is in the Terai (plainlands) but 2/3 of the population live in the hill regions. Transport difficulties due to the terrain make movements of food very difficult and expensive.

Only 14% of the land mass qualifies as arable.

40% of the population are below the poverty line.

High population growth rate - 2.5% in 1976.

Lack of health care facilities leads to overall increase in the incidence of disease and loss of work power.

(ii) Lack of feeding

Feeding practices. The withholding of food and fluids when the child is ill, e.g. diarrhoeal disease, measles, contributes greatly to the high incidence of protein-energy malnutrition.

Infrequent feeds. Traditionally only two meals a day are taken in Nepal with a small snack only in between. Small stomachs cannot take in the volume of rice required for adequate energy at one time. Toddlers are often left in the care of an older child while mother is out working in the fields. Food is often available but not given.

(iii) Inappropriate use of food available

With increased contact from outside many of the traditional practices are now being replaced with a detrimental nutritional effect, e.g. there has been a noticeable increase in bottle feeding and decline in breast feeding in urban areas. Introduction of mechanisation has meant highly polished rice, highly refined flour and sweet biscuits replacing traditional snacks. Good vegetable proteins are often eaten in a coarse form and are poorly digested.

(b) Principal Factors in Infectious Disease(i) Diarrhoeal disease

This is a major killer of children in the developing world, both from fluid loss in the acute diarrhoea and tipping the balance in an already nutritionally compromised child. Chronic dysentery has a disastrous effect.

(ii) Tuberculosis

Surveys have shown an alarming infection rate in children being highest in the urban areas and lowest in the hills. Giri (1976) showed an infection rate in the Kathmandu valley area in the 0-5 years age group of up to 35%. In children a definite diagnosis of tuberculosis is notoriously difficult and frequently a trial of therapy is commenced on clinical suspicion only.

(iii) Parasites

Heavy ascaris infestation is common and appears to be related to the incidence of protein-energy malnutrition though the relationship is not clear cut. Anaemia has an obvious association with hookworm infestation.

(iv) Communicable diseases

Communicable diseases such as measles have disastrous sequels in an undernourished population and epidemics leave a wake of marasmus and kwashiorkor, and further increased susceptibility to chronic disease such as tuberculosis.

III. FEEDING PRACTICES

The staple crops of Kathmandu valley are rice (monsoonal), wheat and corn (winter). In other areas, millet, buckwheat and potatoes are staples. Soya beans, black gram, green gram and other pulses provide the main source of protein in the diet. Mustard is grown for the oil. Potatoes are a staple vegetable and pumpkin, onion, radish, cauliflower,

a variety of spinches and other vegetables are extensively cultivated. Outside Kathmandu valley the variety of vegetables is much restricted because of unsuitable climate or infertile soil, lack of water and unavailability of vegetable seeds. Buffalo and chicken are the chief sources of animal protein for lower Hindu castes. High caste Hindus may be vegetarian, but generally consume mutton (goat meat). Animal protein is usually available only on special occasions related to religious festivities. Buffalo and cows milk is usually available but in very limited quantities.

Two main meals and a small snack is the eating pattern. The meals consist of a large serve of cereal and small portions of pulse soup and vegetable curry. Traditionally, the snack is beaten rice, roasted soya beans and corn.

Foods are classified as hot or cold and related to certain diseases and physiological conditions, which are similarly categorized. There is a diversity of cultures but a surprisingly common thread of beliefs and traditions relating to food is evident. These are mentioned below.

(a) Pregnant Women

The relationship between the birth of a healthy child and diet of a pregnant woman is generally recognized. Thus, to the extent it can be afforded, pregnant women are given special food considerations. There are no significant food prohibitions. However, the women themselves voluntarily decrease food intake hoping to restrict the size of the child and prevent delivery problems. Also, the consumption of two large volume meals per day is uncomfortable and difficult to digest during the latter half of the pregnancy.

(b) New Mothers

The new mother deserves the most expensive and prestigious foods. Meat is regarded as beneficial, but budget usually limits this to one meal. Special sweets are prepared. White rice and clarified butter should be eaten three to four times daily. Most pulses and almost all vegetables and fruit are prohibited. This very restrictive diet may continue for three months and must be deleterious to the health of the woman and the vitamin content of her breast milk. A beverage-soup made from the herb omum (*Trachyspermum ammi*) is believed to increase lactation. Omum is an excellent source of calcium and iron.

(c) Infants

Infants receive only breast milk until 5-6 months of age, when a symbolic ceremony of religious significance is conducted and a variety of solid foods are offered to the child. Weaning is thus commenced but the necessity for supplementary food and calories from this age is not recognized. Mothers are not conscientious in teaching and encouraging their babies to eat. A short suck on the breast is easier and more convenient for the mother, especially if she is working in the fields, and generally pacifies a hungry baby. The traditional weaning food is a porridge of ground rice or wheat or corn, a small amount of expensive clarified butter and salt. Recently glucose biscuits have become regarded as a suitable weaning food. Fortunately breast feeding is continued for 2-3 years, but an increase in bottle feeding is evident. Basically infrequent feeding of bulky low energy concentrated food results in the consumption of insufficient energy.

IV. NUTRITIONAL PROBLEMS AND PROGRAMS

(a) Protein Energy Malnutrition

This is the main nutritional problem in Nepal. Growth rates of infants begin to slow after 6 months of age. The undernourished child has a high probability of becoming locked in the malnutrition-infectious disease cycle. When the child begins refusing food it is described as "runche" (meaning crying or unhappy), a condition cured by appeasing the Gods (Bomgaars 1976). Lack of appetite is accepted as an indication that food is not the problem. Thus feeding is neglected.

Since the recognition of undernutrition as a major contributing factor to the high infant mortality in Nepal, attention has been on appropriate nutrition education of all extension workers. These include health workers, community development personnel, teachers and university students who are required to spend one year prior to graduation working in rural communities. Education focusses on:

- (i) Recognition of protein-energy malnutrition - use of the tape to measure the mid-upper-arm-circumference is taught (Shakir *et al.* 1974). The tapes are widely distributed to these workers. The significance of the terms "sukheko" (dried up) "phuleko" (swollen) which describe marasmus and kwashiorkor respectively, and the "runche" syndrome are taught.
- (ii) Preventive health education, e.g. promotion of breast feeding immunization against infectious disease, child spacing, and a clean sanitary environment.
- (iii) Promotion of the preparation of a local weaning food cereal-pulse mix and oral rehydration as a treatment for diarrhoea.

This information is summarized in Nepal's "12 Child-Care Messages, For better health and nutrition of children". These were the result of co-operation between various sectors in the government and international aid organizations and the realization of the importance of "speaking with one voice". These messages are widely propagated throughout the country via media such as Radio Nepal, and they are printed on the covers of primary texts and development booklets. Various nutrition education materials such as posters, flash cards and film strips which illustrate the Child Care Messages have been developed. Preliminary reports on the effectiveness of this education campaign are encouraging.

(b) Vitamin A Deficiency

Van Dijk (1968) reported a high incidence of Bitot's spot in pre-school children in Kathmandu valley. Pourbaix (1974) did not observe any case of clinically established xerophthalmia but considered that seasonal incidence as described by Van Dijk may have influenced his result. The Nepal Nutrition Status survey did not examine for signs of Vitamin A deficiency. In view of the lack of information other than verbal reports of night blindness and the high incidence of the problem in the neighbouring countries of Bangladesh and northern India, it cannot be discounted that Vitamin A deficiency is possibly a significant nutritional problem in Nepal.

(c) Nutritional Anaemia

Information on nutritional anaemia is very limited. Nepal Nutritional Status Survey reports an incidence of 19.5% of infants 6-23 months of age and 25.9% of children 24-71 months of age, with low haemoglobin levels. It must be considered that anaemia is probably a serious problem in the vulnerable population, women of child bearing age,

considering their frequent pregnancies and restricted diet during early lactation.

At present there are no specific programs to treat anaemia and Vitamin A deficiency. Iron/folic acid and Vitamin A tablets are available to Maternal Child Health Clinics and Health Posts but these serve a limited population. It is planned to train extension workers to use anaemia recognition cards, initially developed by the Voluntary Health Association of India. Extension workers are encouraged to promote, by example, the consumption of locally available greens, e.g. nettles which have a good nutrient composition.

(d) Endemic Goitre and Cretinism

Although an alarming problem through most of Nepal it is not prevalent in pre-school children in Kathmandu (Pourbaix 1974). There is iodization of salt in Nepal but problems relating to the iodine content and distribution throughout the country exist. Attempts are being made to improve this. In a few isolated areas, with international assistance, iodized oil injection programmes have been implemented with excellent results.

V. CONTROL OF INFECTIOUS DISEASE

(a) Education

Intensive and repetitious education is needed to break through traditional practices, using mass media of communication. Health education in oral rehydration is receiving top government priority through media such as Radio Nepal. The use of RD-sol, an electrolyte powder made in Nepal is being promoted as well as education on the home preparation of such solutions using simple home ingredients.

(b) Immunisation

Immunisation is an indirect promotor of nutrition. The effectiveness of DPT vaccination is unquestioned. In a 12 month period, 1978-79, there were 52 admissions with Diphtheria in Shanta Bhawan Hospital. Not one of these children had had even one DPT immunisation. The value of BCG in the prevention of Tuberculosis has been increasingly under question. Recent figures from the same hospital have shown that 40% of the new patients with Tuberculosis have good BCG scars. Measles vaccination has recently been introduced but the fragile nature of the vaccine has lead to a disappointing lack of immunity in some villages.

(c) Birth Spacing

The relationship between family size and the nutritional status of mother and child is well known. Nepal has a very active Family Planning Program linked with their Maternal and Child Health programs. Acceptance of family planning is closely linked with a decrease in childhood malnutrition and childhood death rates.

(d) Environmental Sanitation

Poor sanitation and lack of safe water are major factors in the spread of infestation and infectious disease. Sanitation programs in Nepal are in their infancy, and emphasis is being given to the provision of safe water. Educational programs for personal and food hygiene are also essential.

VI. CONCLUSION

In any strategy for the control of malnutrition the line of attack moves from treatment of the individual malnourished child to measures for prevention with control of infectious disease and programs directed towards the more appropriate use of the food resources available, and finally to the underlying factor of poverty. Increasing the gross national product alone is not effective as such moves inevitably do not reach the underprivileged. It has been well shown that new agricultural technologies produce marked increase in yields but tend to only assist the rich farmers. Strategies must be directed towards the weaker economic segments. While international aid on a government to government level should not be spurned, concentration needs to be made on small communities with their active participation. Traditionally health care programs have tended to be on an above-down basis. The pendulum is now swinging violently in the opposite direction with the catch phrase "Community Participation". While the latter is essential and some share in responsibility must be taken by the individual small community, support and motivation is required for the recognition and resolution of the problems.

In Nepal the problem of childhood malnutrition is well identified and plans are being formulated and implemented for a multisectorial attack. The need for co-ordination of efforts at all levels of planning implementation and evaluation is recognised. At a ministerial level the National Nutrition Co-ordination Committee is involved in policy co-ordination and major decision-making. The need for this to extend to a local community development committee for co-ordination at the periphery is recognised as a top priority.

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