FACULTY OF MEDICINE AND HEALTH SCIENCES

UNIVERSITI MALAYSIA SARAWAK

A CROSS-SECTIONAL STUDY OF SOCIO-ECONOMIC AND ENVIRONMENTAL FACTORS AFFECTING NUTRITIONAL STATUS OF CHILDREN BELOW SEVEN YEARS IN THREE IBAN LONGHOUSES: RUMAH SENGALANG, RUMAH RAMAN AND RUMAH TERAI IN DEBAK, BETONG DIVISION FROM JUNE TO JULY 2002

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DECLARATION

We declare that this research originates from our own effort, except for certain facts and citations with which the sources have been clearly listed in the bibliography.

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ABSTRACT

Malnutrition is implicated in more than half of all child deaths (below seven) worldwide. Most of the malnourished children are from developing countries and two thirds of those are living in South East Asia. A cross-sectional study was carried out on the nutritional status of children under seven years old and the possible aetiological factors such as socioeconomic characteristics, cultural practices, immunization, morbidity and feeding patterns. The nutritional status of 28 male and 32 female children under seven years old in from three longhouses in Debak was assessed. The length/height and body weight of the children were recorded and the mothers were interviewed using questionnaires. The results show that 25% of the children were stunted, 10% were wasted and 30% were underweight. There were no significant associations between the various anthropometric indicators with factors such as gender, mothers' educational level and income per capita. The only exception of statistical significance is between stunting and the mothers' educational level. The overall knowledge of the respondents on infant and toddler feeding is fair and 53% were found to have adequate knowledge. The only factor found to affect the adequacy of this knowledge is the mothers' educational level.

ABSTRAK

Kurang zat makanan menyebabkan lebih daripada separuh daripada kematian kanak-kanak di seluruh dunia. Kebanyakan daripada kanak-kanak yang kurang zat makanan berasal dari negara-negara membangun dan dua pertiga daripadanya tinggal di Asia Tenggara. Satu kajian keratan rentas tentang status nutrisi kanak-kanak di bawah umur tujuh tahun dan factor-faktor yang mungkin mempengaruhinya seperti factor sosio-ekonomi, kebudayaan, imunisasi, penyakit dan cara pemakanan kanak-kanak. Status nutrisi 28 kanak-kanak lelaki dan 32 kanak-kanak perempuan di bawah umur tujuh tahun dari tiga rumah panjang di Debak telah dikaji. Data telah diperolehi secara pengukuran berat badan dan tinggi kanak-kanak dan temubual berpandu menggunakan borang soalselidik dengan ibu kanak-kanak. Keputusan menunjukkan bahawa 25% daripada kanak-kanak kebantutan, 10% kesusutan dan 30% kurang berat badan. Faktor-faktor seperti jantina, taraf pendidikan ibu dan pendapatan per kapita didapati tidak mempunyai kaitan yang bererti dengan ukuran-ukuran antropometri. Pengecualian diberikan kepada kaitan di antara kurang tinggi kanak-kanak dengan taraf pendidikan ibu. Secara umum, pengetahuan responden tentang pemakanan bayi dan kanak-kanak baru berjalan adalah memuaskan dengan 53% daripada mereka didapati mempunyai pengetahuan yang mencukupi. Hanya satu factor sahaja yang didapati mempengaruhi kecukupan pengetahuan iaitu taraf pendidikan ibu.

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CHAPTER I

INTRODUCTION

1.1 Study Topic

Food is among the basic necessities of human life. It is in fact the most important requirement for the continued well-being of any life form. Food in this context does not only cover what we eat but also encompasses whatever we drink.

Despite this knowledge, many people and even medical practitioners, seldom stop to think how blessed they are to have food before eating. And many a times, excess food is simply thrown away into the garbage bin without a second thought. Ironically, there are many other people in other communities that are literally scavenging for food from garbage bins in order for them to survive. Many at the more privileged side of the world have never encountered the problem of starvation. For them food is always on the table whenever they want it because its price and availability are never a problem for them. On the other hand, many more disadvantaged people from poor countries and communities across the world have to think of how to bring back food to their tables and also for their families everyday.

When the breadwinner of the family is unable to bring home food to his family, the problem of starvation arises. If this problem is allowed to continue, undernutrition leading to protein-energy malnutrition (PEM) will ensue. PEM covers a spectrum of manifestations of symptoms from mild cases with some deficits in weight to more severe cases presenting as marasmus or kwashiorkor. Children are the main victims of this disease because of their increased needs during growth at the younger age. If these needs are not satisfied, their health will be affected and manifested in their nutritional status.

'*It is implicated in more than half of all the child deaths worldwide – a proportion unmatched by any infectious disease since the Black Death. Yet it is not an infectious disease. Its ravages extend to the millions of survivors who are left crippled, chronically vulnerable to illness – and intellectually*

disabled. It imperils women, families and, ultimately, the viability of whole societies. It undermines the struggle of the United Nations for peace, equity and justice. It is an egregious violation of child rights that undermines virtually every aspect of UNICEF's work for the survival, protection and full development of the world's children.' This description was used by UNICEF (1998) to describe the worldwide crisis of malnutrition.

Many have seen pictures of malnourished children in the African continent on television or newspapers. The most vivid ones are the potbellied children with very thin limbs suffering from marasmus. These children with severely affected nutritional status remind us of the reality of our world.

'*Many children do not get enough of the right foods to eat. They do not grow well, they become ill, many die or they do not grow up as clever, as healthy, or as tall as they should be.*' These famous words introduced the first edition of the book *Nutrition for Developing Countries* by King and Burgess (1992).

We in Malaysia are fortunate not to have so many of such severe cases of malnutrition amounting to marasmus, kwashiorkor or both. However, based on reports by other researchers (Chen et al, 1981; Ismail et al, 1988; Khor & Tee, 1987; Soon & Khor, 1995; Yap, 1985) in Malaysia, there is still a fraction of malnutrition cases found especially among children in the rural areas. These cases of undernourished children oftentimes escape the attention of city folks.

This research conducted in Debak, Betong Division of Sarawak will bring our attention and hopefully the attention of other authorities to the nutritional status of children below the age of seven years. This study will therefore look into the nutritional status of the children and also the factors that could possibly play a role in influencing their nutritional status.

1.2 Study Area

The setting of our research is in a small town known as Debak. It is located midway between Sri Aman and Sarikei. Debak also happens to be the name of the district, which is one of the three districts under the new Betong Division. It stretches over an area width of 292 km^2. According to the figures given by the Police Department in Debak, the estimated total population of the district is about 11,084 for the year 1999. The main ethnic group is the Iban with 57 long houses in the district. Many are involved in wet rice farming as well as logging while the younger people work in towns.

The research is conducted at three selected Iban longhouses: Rumah Albert, Sengalang; Rumah Raman, Ulu Dit and Rumah Rajau, Terai. Rumah Raman has a total of 41 rooms or '*bilik*' with majority of the residents working as farmers. It is the longest longhouse and also the oldest in our research. It is situated about 8km from the Debak Health Clinic.

Rumah Sengalang has 33 '*bilik*'. Most of the villagers are either farmers or working in the government sector. It is a fairly modernized longhouse made of bricks and wood. It is located about 2 km from the Debak Health Centre and it is just within walking distance from the town of Debak.

Rumah Terai with 33 '*bilik*' is situated about 4 km away from the Debak Health Clinic. Their main means of living is by farming. It is a good example of what a typical longhouse is like. All three longhouses are equipped with proper electricity supply. Rumah Sengalang has piped water supply while both Rumah Raman and Rumah Terai still use rainwater collected in plastic tanks for their daily activities. All three longhouses are also accessible by road and quite a few residents own motor vehicles like motorcycles and vans.

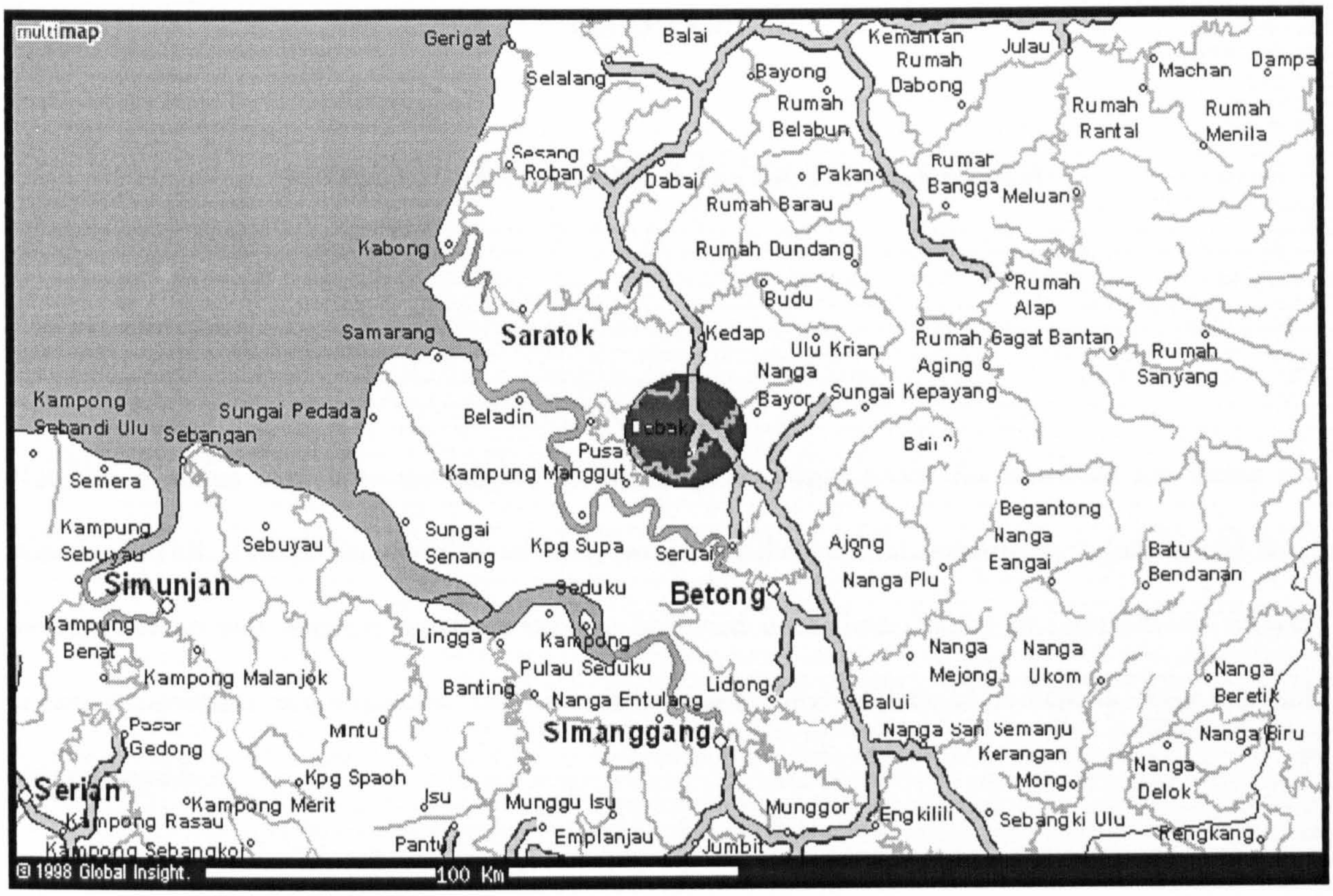

Fig. 1.1 Map of Debak

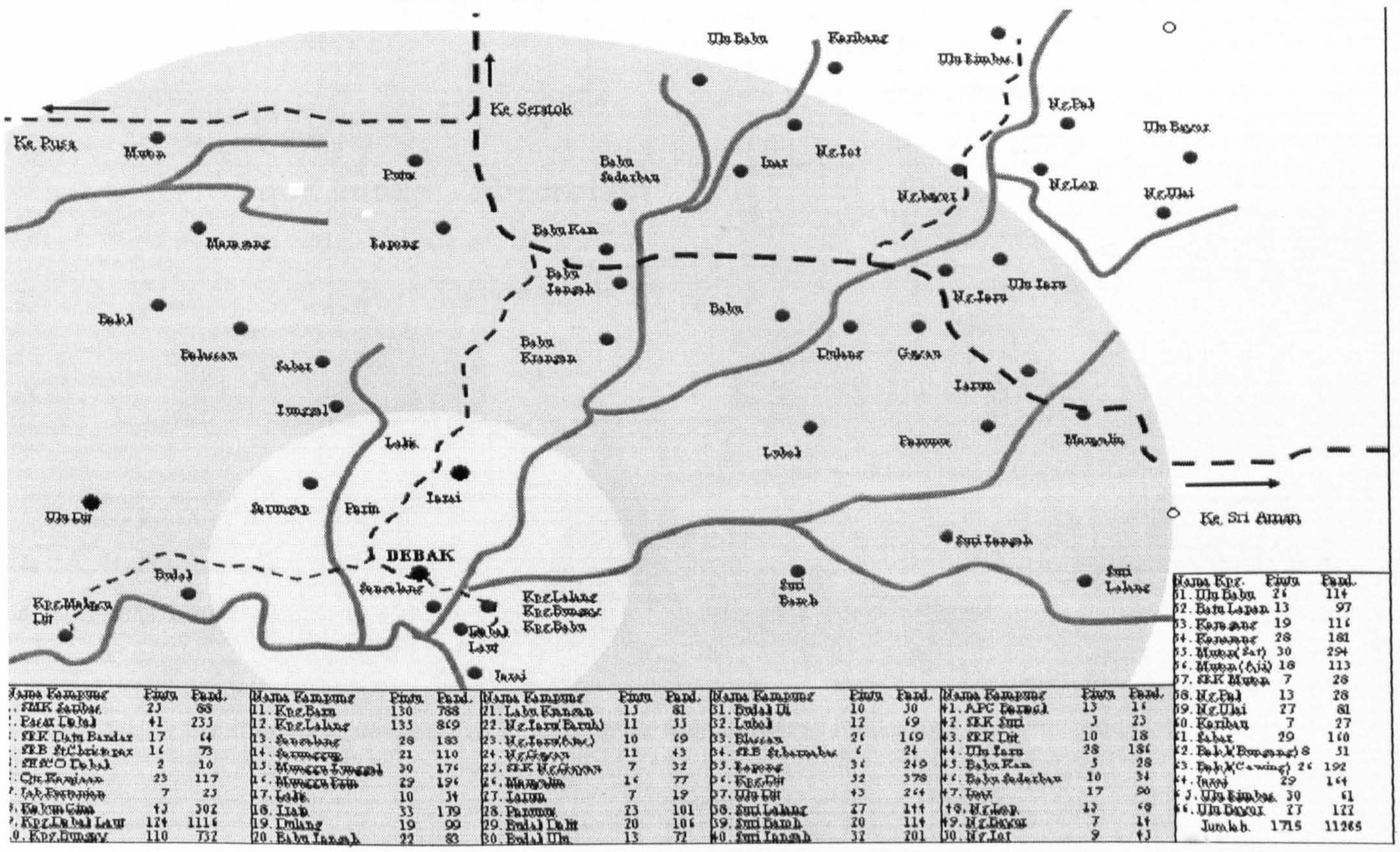

Fig. 1.2 Location of the longhouses in Debak

CHAPTER II

PROBLEM STATEMENT & LITERATURE REVIEW

2.1 Introduction

Nutritional status expresses the degree to which physiologic needs for nutrients are being met (Czajka-Narins, 1992). The stability of body weight at the optimal nutritional status is seen when nutrient intake and nutrient requirements are balanced over time. Eating is intermittent, whereas energy expenditure is continuous. Therefore it is vital for this balance to be kept in order to ensure optimal health.

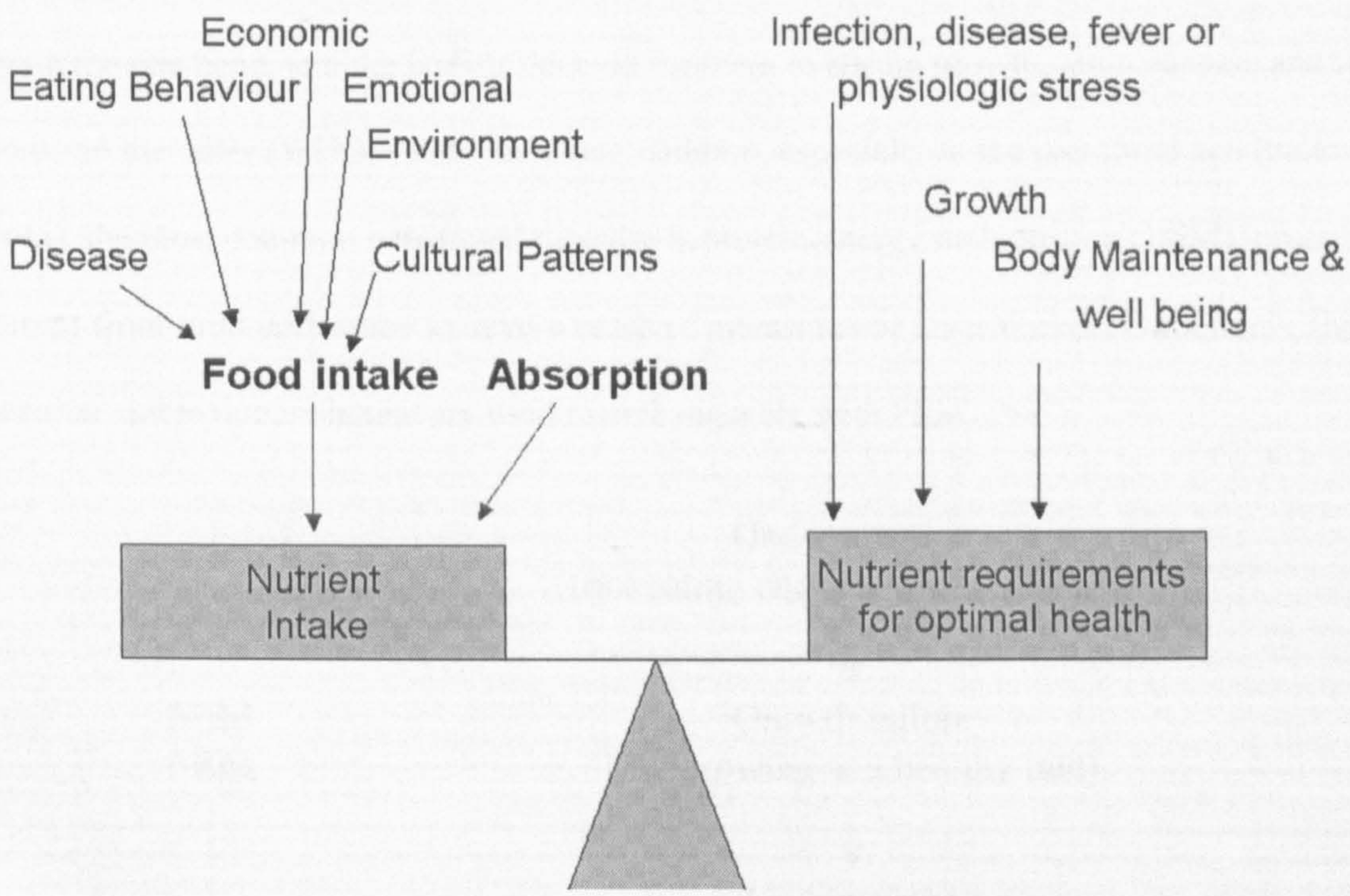

Fig. 2.1 Optimal nutritional status as a balance between nutrient intake and nutrient requirement

The balance between nutrient intake and requirements is influenced by many factors. Deficits in nutrition can occur either due to decreased dietary intake, increased requirements or increased nutrient losses. This will tip the balance towards the nutrient requirements side and if prolonged, will lead to undernutrition or nutritional deficiency. Surplus in nutrition occurs when the opposite happens. This will then lead to overnutrition or nutritional overload. This is also another form of malnutrition.

Malnutrition should be regarded as not a single disease, but a range of conditions, many life threatening or irreversible disabling, resulting from an imbalanced in availability or use of nutrients. In our study, we will be covering both ends of the spectrum of malnutrition but our main concern is on nutritional deficiency because it causes more severe complications, especially to growing children. Nutritional deficiency is not, as many think, a simple matter of whether a child can satisfy her appetite. A child who eats enough to satisfy immediate hunger can still be malnourished.

Nutritional deficiency refers to a number of diseases, each with a specific cause related to one or more nutrients and each characterized by cellular imbalance between the supply of nutrients and energy on the one hand, and the body's demand for them to ensure growth, maintenance, and specific functions, on the other (WHO, 1996). In young children, especially in the preschool age (below seven years old), the most common nutritional disorder is protein-energy malnutrition (PEM), presenting as a spectrum from mild deficiency to severe cases of marasmus or kwashiorkor. Oftentimes, the terms malnutrition and malnourishment are used interchangeably with PEM.

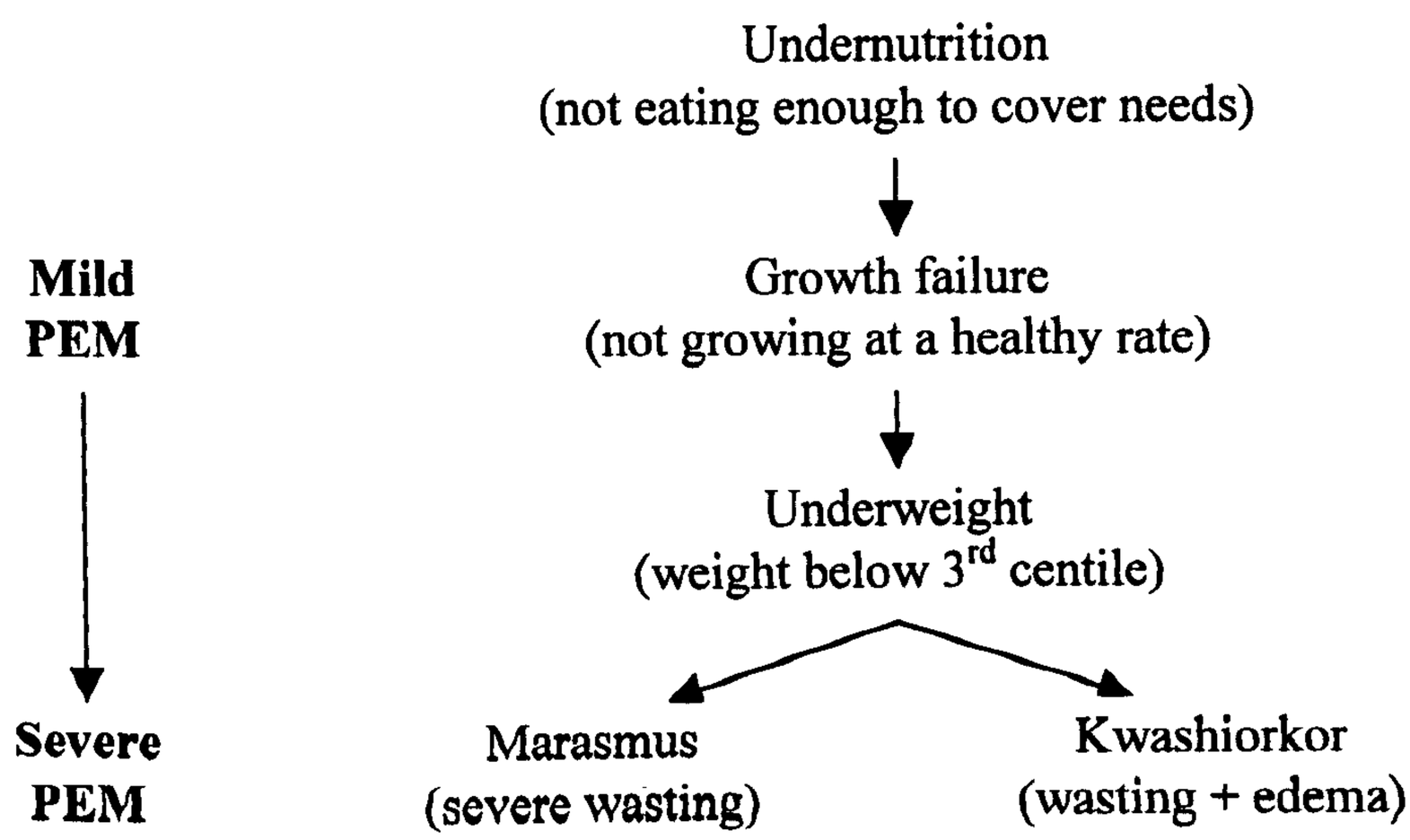

Fig. 2.2 Different stages of protein-energy malnutrition (PEM)

A child with PEM may be failing to grow, underweight or stunted. In mild to moderate cases of malnutrition, the child may appear to be normal and betray no outward signs of problem to the casual observer. However, three quarters of the children who die worldwide of causes related to malnutrition are categorized as having mild to moderate malnutrition. This has caused UNICEF to regard malnutrition as an invisible silent emergency (UNICEF, 1998).

Mortality rates in children under 5 are 2.5 times higher in those that are moderately underweight, and 5 times higher in the severely underweight, as compared to children with normal body weight for age (WHO Regional Office for South East-Asia, 2000).

By the time malnourished children catches our attention, most are already suffering from severe malnutrition. They will look thin, severely wasted as in marasmus or edematous as in kwashiorkor. Death is almost inevitable by then. In one study, children who were severely underweight were found to be 2 to 8 times more likely to die within the following year as children of normal weight for their age (UNICEF, 1998). Thus early detection of nutritional deficits and timely and adequate nutritional interventions can help in reducing the majority of toddler deaths.

2.2 Global Malnutrition

Global data show no change in the overall prevalence of PEM in children less than five years of age from 1990 to 1995. WHO estimated that in 1995, 38% of all children under five, or 168 million, were underweight. In developing countries, about 206 million children (38%) were stunted, and about 49 million (9%) wasted. About 50% of deaths in these children are estimated to be associated with malnutrition.

According to WHO (1996), an estimated 174 million children under the age of five in the developing world are malnourished as indicated by low weight for age, and 230 million are stunted. It is now recognized that 6.6 million out of 12.2 million deaths among children under five or 54% of toddler mortality in developing countries is associated with malnutrition.

UNICEF (1998) estimated that globally, 226 million children are stunted – shorter than they should be for their age, and shorter than could be accounted for by any genetic variation. Some 67 million children are estimated to be wasted, which means they are below the weight they should be for their height – the result of reduced dietary intake, illness, or both. About 183 million children weigh less than they should for their age (UNICEF, 1998).

In most regions of the developing world, malnutrition rates have been falling over the last two decades, but at different paces. The exception is sub-Saharan Africa, where malnutrition rates began increasing in most countries during the early 1990s, following the regional economic decline that began in the late 1980s (UNICEF, 1998). Despite this decline in malnutrition rates generally, we still experience an increase in the incidence of malnutrition cases due to the ever-expanding population of the world.

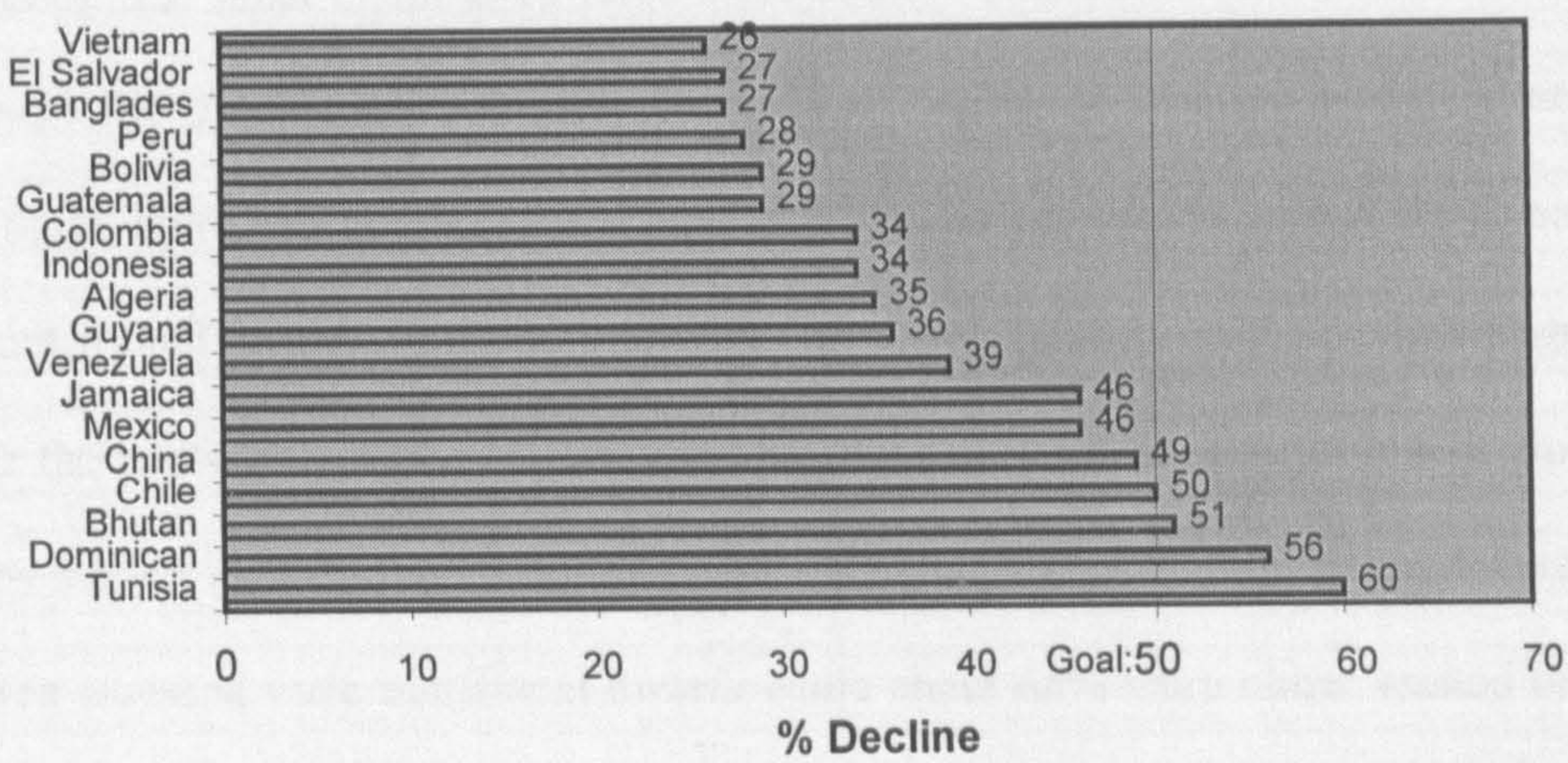

Fig. 2.3 Countries where underweight prevalence declined by 25 per cent or more (UNICEF, 2001)

It is estimated that more than half of the young children in south Asia suffer from PEM, which is about five times the prevalence in the Western hemisphere, at least three times the prevalence in the Middle East and more than twice that of east Asia. Estimates for sub-Saharan Africa indicate that the prevalence is approximately 30% (WHO, 1996).

The prevalence of PEM in South-East Asia is the highest in the world. This high prevalence and the large population of the region imply that more than half of all malnourished children are found in this region. Currently, over two-thirds of the world's malnourished children live in Asia (especially south Asia), followed by Africa and Latin America (WHO Regional Office for South-east Asia, 2000).

2.3 Child Nutrition in Malaysia

The findings from earlier studies in various regions of Malaysia are shown in **Table 2.1**. One of the earlier nutrition studies done in East Malaysia (Kudat Division, Sabah) by Chen et al in 1981 revealed that 27.3% of children examined were significantly malnourished with 4.5% of them suffering from severe malnutrition. 22% of the children were wasted, with highest prevalence in the under five's age group, indicating that most of these children were acutely malnourished, as were the school going group, although the prevalence is slightly lower. The degree of stunting in the latter age group, however, is much more severe with 62.1% among the males and 46.8% among the females, most of them being nutritional dwarfs. Thus, malnutrition appears to be fairly extensive in all age groups but especially in the pre-school age groups where the brunt of acute malnutrition falls upon. Another study done by Yap in 1985 on Iban preschool children in the Sixth Division, Sarawak showed that 7% of the children assessed were nutritional dwarfs while about 68% were either wasted or wasted and stunted.

Table 2.1 Findings of other researchers in Malaysia

Author/ year	Target population	Sample size	Prevalence
Yap S.B. (1985)	Iban preschool children in Sarawak	140	Stunted and wasted 18% Acute malnutrition 50% Nutritional dwarf 7% Normal 25%
Yap S.B., Teoh S.T. (1989)	Children aged 12 years and below in urban squatter area in Kuala Lumpur	309	Infant and toddlers 40% wasted Older children 34% stunted
Soon S.D, Khor G.L. (1995)	Children aged 1-6 years in Sg. Kayan FELDA, Pahang	105	14.3% wasted 10.5% stunted 2.9% nutritional dwarfs

Recent reviews of nutrition research (Ismail et al, 1988; Khor and Tee, 1997) have already pointed out that mild and moderate malnutrition still exist to a considerable extent in rural and urban poor communities, although severe PEM is not frequently reported. This is manifested in widespread growth retardation, specifically in underweight and stunting of children.

It is not possible from such studies to compare between regions because of **differences in study communities and localities** chosen, **anthropometric indicators** used and the **cutoff points** used. However it serves to give some indication of the magnitude of the problem.

More recent studies are more comparable because of the use of **similar anthropometric indicators** and the **same reference population**, i.e. those published by the **National Centre for Health Statistics (NCHS)**. These indicate that although, acute malnutrition is no longer a widespread problem, there are still **pockets of PEM** in certain population groups such as certain indigenous groups, urban squatters and estate populations. A study among children one to six years, in **FELDA**

schemes (Soon & Khor, 1995) showed that 14.3% of the children were underweight, 10.5% were stunted while only < 3% were wasted (Table 2.2).

A nationwide nutritional survey of rural villages and estates (Khor and Tee, 1997) revealed the persistence of underweight, stunting and wasting amongst children in the study communities. By age groups, the prevalence of underweight was lowest among the infants (16.8% for boys and 13.3% for girls), and highest among children aged one to six years with about one third of the children affected but slightly higher among the girls (32.6% and 35.9% for boys and girls respectively). The prevalence of stunting was about 28% for both sexes while wasting was seen in 10% of the study sample.

Table 2.2 Prevalence of malnutrition among children aged 1 to 6 years, in various rural communities

Indicator	Boys (n = 700)	Girls (n = 727)
Weight for age*	32.6%	35.9%
Height for age*	28.0%	28.8%
Weight for height*	10.5%	10.1%

** Using as the cut-off points - 2 SD from median of the NCHS Standards.*

Most recently a report from the **Ministry of National Unity and Social Development (2000)** indicated that the prevalence of severely underweight children was 0.6% for infants and 1.4% among toddlers. The proportion of children found to be moderately malnourished increased with age, with 11.6% for infants and 16.7% for toddlers.

Useful information can also be obtained from the **Nutritional Surveillance System** in 1997. This makes use of data obtained from growth charts incorporated with the child health cards. The latest figures for Sarawak and Betong are shown in Figures 2.4 and 2.5. However one must bear in mind that these figures are **based on growth charts** and only **underweight** and stunting are taken into consideration.

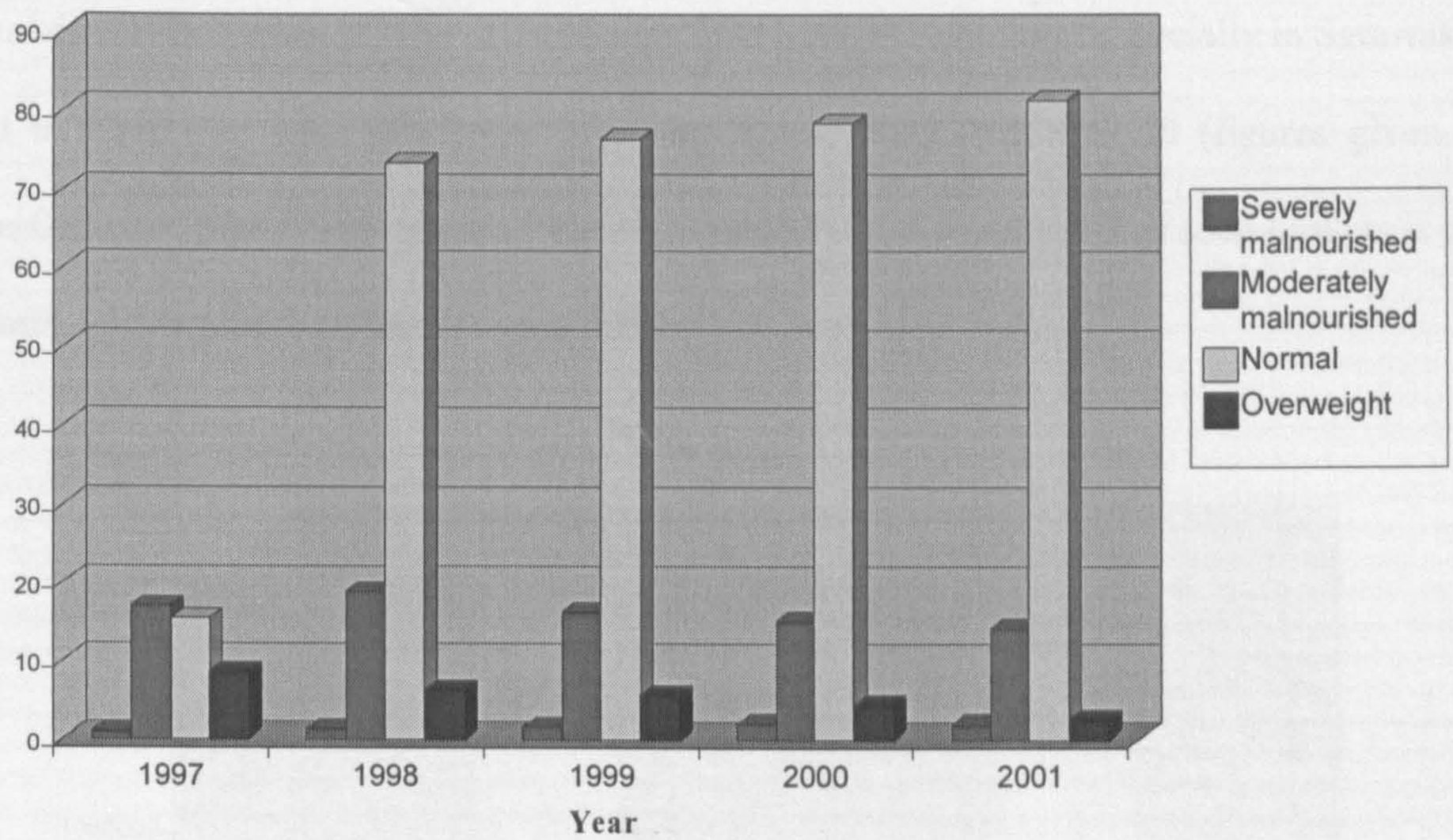

Fig. 2.4 Nutritional status of preschool children in Sarawak, 1997-2001

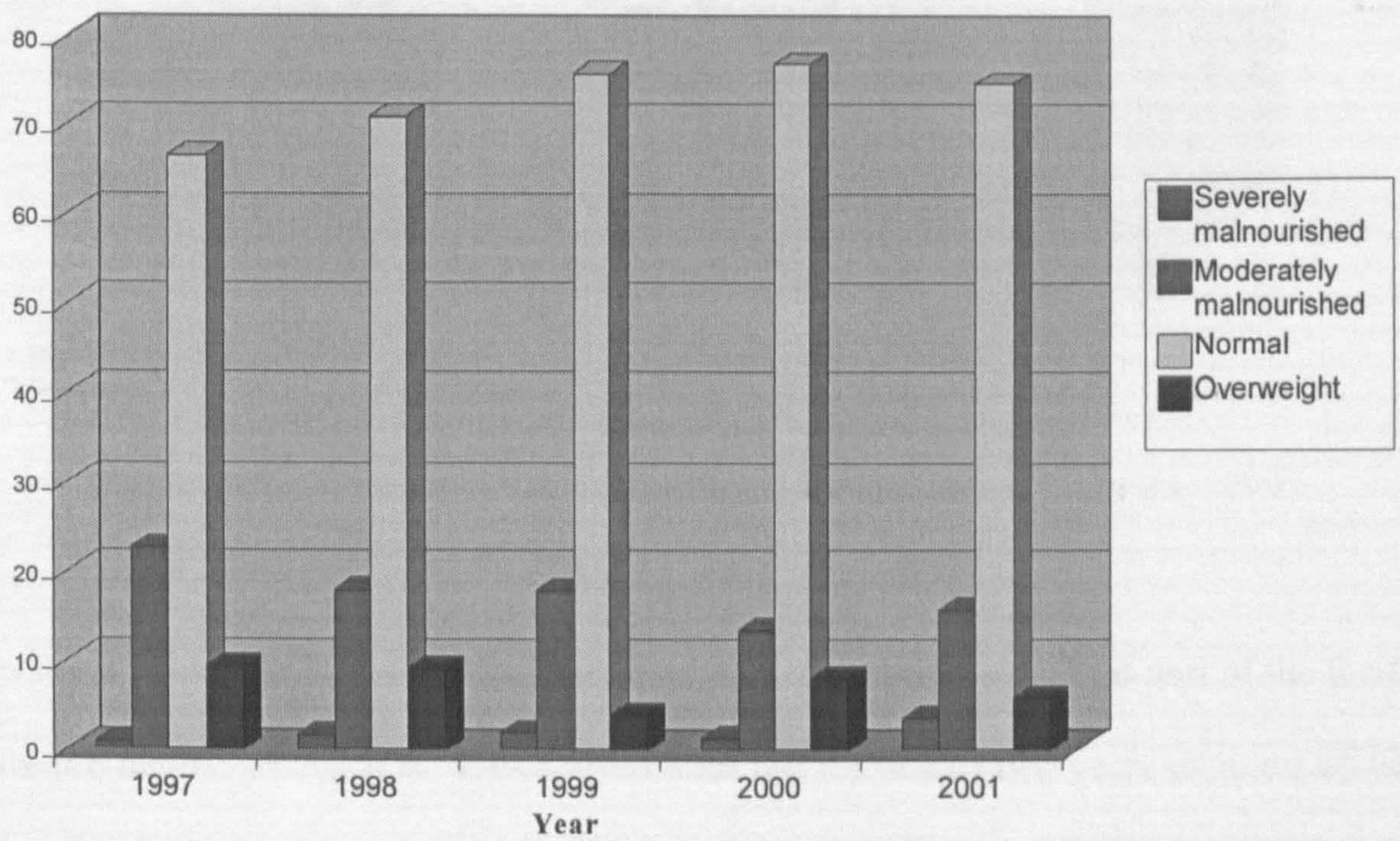

Fig. 2.5 Nutritional status of preschool children in Betong District, 1997-2001

Children who are identified as malnourished in the Child Health Clinics are investigated and according to certain criteria, they are given **Food Baskets** monthly. The contents of the food baskets are as follows: 6 kg of rice, 4 kg of wheat flour, 1 kg of anchovy, 1 kg of green peas or groundnuts, 3 kg of sugar, 2 kg of cooking oil, 2 kg of biscuits, 1 kg of full cream milk powder, 30-day supply of