A STUDY OF THE IMPACT OF THE CORRECTIVE PROGRAMME FOR THE VERY POOR MALNOURISHED PRESCHOOL CHILDREN IN KELANTAN, MALAYSIA.

BY:

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QUOTATION

TO LOOK INTO SOME ASPECTS OF THE FUTURE, WE DO NOT NEED PROJECTIONS BY SUPERCOMPUTERS. MUCH OF THE NEXT MILLENNIUM CAN BE SEEN IN HOW WE CARE FOR OUR CHILDREN TODAY.

TOMORROW'S WORLD MAY BE INFLUENCED BY SCIENCE AND TECHNOLOGY; BUT MORE THAN ANYTHING, IT IS ALREADY TAKING SHAPE IN THE BODIES AND MINDS OF OUR CHILDREN.

KOFI A. ANNAN

SECRETARY-GENERAL OF THE UNITED NATIONS

[EXCERPTED FROM THE STATE OF THE WORLD'S CHILDREN 1998]

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ABSTRACT

Introduction: The Corrective Programme for Malnourished Children (CPMC) is an ongoing national programme to combat problem of undernutrition especially among the very low socioeconomic group. It was launched by the Ministry of Health in 1989. The children will receive a basket of food every month which contain balance nutritional requirement such as rice, wheat flour, anchovy, green beans, sugar, formula milk, cooked oil, margarine, biscuits, multivitamin and iron supplement. Their weight and height were monitored every month and health education was given by the public health nurse to the parents in terms of food preparation and personal hygiene.

Objective: This historical prospective cohort study was done to examine the changes in the nutritional status of the undernourished preschool children (0-7 years) in Kelantan after receiving food baskets under the Corrective Programme of Malnourished Children (CPMC).

Methodology: Cases were selected from two districts by a cluster sampling. Samples of 166 undernourished pre school children in the programme were included. Three measurements were chosen for evaluation of the effectiveness of the programme, which were age, weight and height. These three measurements were combined to form three nutritional indices based on Z score, namely weight-for-age, height-for-age and weight-for-height.

Results: The mean z-scores for weight-for-age improved after the programme from –2.17 to –1.93 ($p=0.000$), the mean Z-scores for height-for-age improved from –1.66 to –1.36 ($p=0.002$) and the mean Z-scores for weight-for-height improved from –1.35 to –1.04 ($p=0.001$). There were significant associations between the age, duration of supplementation, birth spacing and number of family members with the changes in the z-scores.

Conclusion: This study showed that the Corrective Programme for Malnourished Children (CPMC) had a beneficial impact on the nutritional status of the very poor malnourished preschool children in Kelantan.

Recommendation: It is recommended that the Corrective Programme of Malnourished Children (CPMC) to be strengthened and integrated into the rapid progress of the socioeconomic development in this country.

ABSTRAK

Pengenalan: Program Pemulihan Kanak-Kanak Kekurangan Zat Makanan (PPKKZM) ini adalah merupakan program kebangsaan bagi menangani masalah kekurangan zat makanan di kalangan kanak-kanak pra sekolah yang mempunyai taraf ekonomi yang rendah. Ianya telah dilancarkan oleh Kementerian Kesihatan Malaysia pada tahun 1989. Kanak-kanak ini akan menerima sebakul makanan setiap bulan yang mengandungi keperluan pemakanan yang seimbang seperti beras, gandum, ikan bilis, kacang hijau, gula, susu berformula, minyak masak, marjerin, biskut, multivitamin dan zat besi. Ukuran berat dan tinggi di ambil setiap bulan dan pendidikan kesihatan diberikan kepada ibubapa oleh jururawat kesihatan awan tentang cara penyediaan makanan yang dibekalkan, kebersihan diri dan lain-lain.

Objektif: Kajian *historical prospective cohort* ini dilakukan untuk menilai perubahan taraf pemakanan kanak-kanak pra sekolah (0-7 tahun) termiskin di Kelantan selepas menerima bakul makanan di dalam program Pemulihan Kanak-Kanak Kekurangan Zat Makanan (PPKKZM).

Metodologi: Kes-kes telah dipilih menggunakan sampel kelompok (*cluster sampling*). Seramai 166 kanak-kanak kekurangan zat makanan yang terlibat di dalam program ini telah dipilih sebagai sampel. Tiga ukuran telah dipilih bagi menilai kesan program ke atas taraf pemakan kanak-kanak tersebut iaitu umur, berat dan tinggi. Ketiga-tiga ukuran ini telah di satukan berdasarkan Z score untuk membentuk tiga indikator taraf pemakanan, iaitu berat kepada umur, tinggi kepada umur dan berat kepada tinggi.

Keputusan: Jumlah purata *Z-scores* selepas program bertambah baik iaitu berat kepada umur, - 2.17 kepada – 1.93 (p=0.000), tinggi kepada umur, - 1.66 kepada – 1.36 (p=0.002) dan berat kepada tinggi, - 1.35 kepada –1.04 (p=0.001). Didapati juga umur, lama masa menerima bakul, jarak kelahiran dan jumlah ahli keluarga mempunyai kaitan yang bermakna dengan perubahan berat kepada umur, tinggi kepada umur dan berat kepada tinggi.

Kesimpulan: Kajian ini menunjukkan program Pemulihan Kanak-Kanak Kekurangan Zat Makanan ini telah memberi kesan yang baik kepada taraf pemakanan kanak-kanak pra sekolah termiskin di Kelantan.

Cadangan: Adalah dicadangkan supaya program ini diperkukuhkan dan diintegrasikan ke dalam perkembangan sosio ekonomi yang pesat di negara ini.

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CHAPTER 1: INTRODUCTION

1.1 MALNUTRITION – IN THIS NEW MILLENIUM?

Dramatic changes are taking place in the world as we enter a new millennium. The ease with which resources—people, assets, goods, and information—can move within and across national boundaries increased dramatically in the 1990s. This globalization poses tremendous challenges for the nutrition community. It also provides tremendous opportunities for securing increased resources to reduce malnutrition.

The World Resources Institute (WRI) stated in their 1998-1999 reports that although overall trends are positive, with the proportion of people with malnutrition declining, many remain at risk, and some regions are hit especially hard (WRI, 2000).

The International Conference in Nutrition (ICN) in Rome in December 1992 called for the concerted efforts of all nations to eliminate or reduce substantially starvation, widespread undernutrition and micronutrient deficiencies which hinders progress in human and social development around the world (UNICEF, 1998).

Malaysia was one of the 159 nations that signed the World Declaration on Nutrition and Plan of Action. Malaysia's commitment towards the declaration and to achieve the goals of the conference is shown by the development of a National Plan of Action for Nutrition in 1994 (NSM, 2000).

The National Plan of Action for Nutrition Malaysia (NPANM) has several objectives, strategies and activities that have been developed to specifically address these issues. They have been developed based on nine thrust areas as proposed at the ICN in Rome. These include:

- Incorporating nutritional objectives, considerations and components into national developmental policies and programs.
- Improving household food security.
- Protecting consumers through improved food quality and safety.
- Preventing and managing infectious diseases.
- Promote breast-feeding.
- Caring for the socio-economically disadvantaged and nutritionally vulnerable.
- Prevent and controlling specific micronutrient deficiencies.
- Promoting appropriate diet and healthy lifestyles.
- Assessing, analyzing and monitoring nutrition situations.

The World Food Summit has taken an effort to refocus international attention on the need to tackle the problems of both food insecurity and malnutrition. It was organized by the Food and Agricultural Organization of the United Nations (FAO) in November 1996 and participated by 186 countries (UNICEF, 1998). The Summit's Plan of Action called for an enabling social and economic environment to achieve food security and drew attention to the special contribution that women can make to ensuring

family and child nutrition, the importance of breast feeding and the particular importance of giving priority to children, especially girls.

Other objectives relate on the need to reduce inequality and poverty and the need for participatory and sustainable rural development policies and for the trade policies conducive to the achievement of food security for all.

1.2 Malnutrition – An Overview

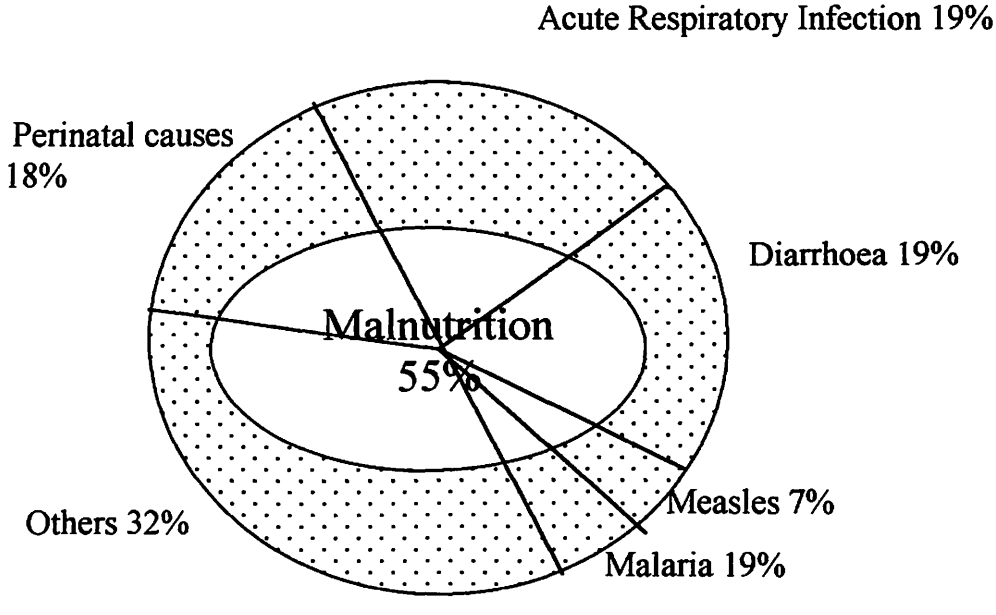
Malnutrition is defined as a condition caused by inadequate intake or inadequate digestion of nutrients. It may result from eating an unbalanced diet, digestive problems or absorption problems.

In children, malnutrition is synonymous with growth failure – malnourished children are shorter and lighter than they should be for their age. It can take a variety of forms that often appear in combination and contribute to each other, such as protein-energy malnutrition, iodine deficiency disorders and deficiencies of iron and vitamin A and others. Each type of malnutrition is the result of a complex interplay of factors involving such diverse elements as household access to food, child and maternal care, safe water and sanitation and access to basic health services (UNICEF, 1998; WHO, 2000a).

Many children suffer from multiple types of malnutrition, so numbers tend to overlap. In 2000, it is estimated that 32.5% of children under five in developing countries are stunted. It is reliably estimated that globally, 226 million children are stunted – shorter than they should be for their age. Stunting is associated with a long-term reduction in dietary intake, most often closely related to repeated episodes of illness and poor-quality diets. 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 (underweight) (UNICEF, 1998).

Malnutrition is a silent emergency. But the crisis is real, and its persistence has profound and frightening implication for the children, society and the future mankind. It is now recognized that some 50% of child deaths in developing countries are attributable to malnutrition's potentiating effects and 83 % of these are attributable to mild to moderate malnutrition (WHO, 2000a). Of the nearly 12 million children under five who die each year mainly from preventable causes, the deaths of over 6 million, or 55% are either directly or indirectly attributable to malnutrition (WRI, 1998) (Figure 1)



Adopted from: UNICEF, 1998

Figure 1.1 Malnutrition and Child Mortality

1.3 Global malnutrition

The estimated global prevalence of underweight preschool-age children in developing countries is 35.8%. Most countries in Asia have high or very high prevalence of underweight children, while in Latin America, most countries have low or moderate prevalence of such children (de Onis *et al.*, 1999). Underweight, due to chronic under-nutrition or wasting or both affects fewer children globally than stunting (WHO, 2000b).

Under-nutrition is still very common among preschool-age children, resulting in small (stunted) rather than thin (wasted) children. 43% of under-5-year-olds in developing countries have low heights-for-age (WRI, 1998).

The National Nutrition Monitoring Bureau (NNMB) and the National Institute of Nutrition (NIN), Hyderabad has carried out extensive diet and nutrition surveys in 12 states of the country. About 60% of the preschool children are underweight (<median - 2SD weight for age of NCHS) and 62% are stunted (long duration malnutrition). About 15% of the children of 1-5 years of age suffer from short duration malnutrition (wasting) (Vijayaraghavan & Hanumantha Rao, 1998)

A low prevalence of both stunting and wasting — is commonly found in Latin America. Malnutrition in Latin America decreased from an estimated 21% in 1970 to 7.2% in 1997. Despite slight fluctuation in income level, the gains in reducing malnutrition are attributed at the underlying level to good care practices and basic health services such as family planning and water/sanitation services; and at the basic level to women's education and the cash resources they control (WRI, 1998)

A combination of high wasting with low stunting, which indicates a predominance of acute over chronic malnutrition, is quite common in Africa, particularly western Africa. The highest prevalence of stunting is found in Eastern Africa, where, on average, 48% of preschool children are currently affected. For Western Africa the estimated prevalence of stunting in 2000 is 34.9%. In Northern Africa about 20% of preschool children are currently stunted (de Onis *et al.*, 2000).

A survey done on the nutritional status of preschool children in South Africa undertaken in 1994, anthropometric findings were that 23% of children were stunted and 9% were underweight. In practical terms this means that approximately 660 000 preschool children in South Africa are underweight, and that 1 520 000 are stunted owing to chronic under-nutrition (Steyn, 2000)

The opposite pattern, which suggests a predominance of chronic over acute malnutrition, occurs in China and in some countries in Latin America and Africa (de Onis *et al.*, 2000).

The prevalence of under-weight, stunting and wasting of children in Sichuan rural area of China were still very high. The highest prevalence is for stunting, followed by underweight, and then by wasting. There are about 12 million moderately or severely underweight (weight-for-age), 24 million stunted (length-for-age), and 1.1 million wasted children in terms of weight-for-length (Meng *et al.*, 1997). By 1997, the number of people living in poverty in China had fallen to about 58 million, and the goal is to eradicate poverty by the year 2000. Many of these people live in remote and mountainous areas with poor transport and limited access to health services. Health education and preventive health services still need strengthening in these areas (WHO, 2000a).

About 20% of children in the Western Pacific region are underweight (weight-for-age below normal) and about 30% are stunted (height-for-age below normal) (WHO/WPR, 1999).

In recent years economic growth has been very rapid in many Southeast Asian countries. For example, in Indonesia and the Philippines the average gross national product per capita has approximately doubled in the past decade. However, over two thirds (79%) of world's malnourished children live in southeast region (WHO, 2000a).

In Philippines, the National Nutritional Survey estimates that among the preschool children, 9.2% are at least moderately underweight and 5.4% are stunted, meanwhile, the incidence of wasting is common in about 7 out of every 100 (7.2%) children (MIMAP, 2000).

On the other side, Thailand has achieved stunning improvements in the nutrition of millions of its children through a program of accelerated action than focus on nutrition, with four critical elements (UNICEF, 1998):

- Protein energy malnutrition was identified as the most important nutritional problem and the National Economic and Social Development Plan included separate plan for food and nutrition with goals to eradicated all severe PEM in pre-school children and to reduce moderate PEM by 50% and mild by 25%.
- Comprehensive nutritional surveillance was instituted through growth monitoring. All preschool children were weighed and checked every three months at community weighing posts.

- A program of nutrition education and communication encouraged breast feeding, timely introduction of supplementary foods and proper hygiene and spread correct information about food beliefs and taboos.
- Household and community food security was strengthened by promoting home gardening, fruit trees, fishponds and prevention of epidemic diseases in poultry. School lunch programs were established in 5,000 schools in poor areas, and food fortification was introduced to iodize salt.

During the nine years from 1982 to 1991 Thailand dramatically reduced severe and moderate malnutrition, almost eradicating it. In 1982 more than half of preschool children were malnourished, 15% moderately or severe. By 1991 malnutrition had been reduced by two-thirds, with severe and moderate malnutrition virtually eradicated. More than 80% of preschoolers were nutritionally normal. Today, Thailand ranks eleventh among 78 developing countries in the human poverty index (HPI), with an HPI of 12% (UNDP, 1997).

1.4 Protein Energy Malnutrition (PEM)

Protein-energy malnutrition (PEM) is a potentially fatal body-depletion disorder. It is the leading cause of death of children in developing countries.

Protein-energy malnutrition (PEM) is by far the most lethal form of malnutrition. Children are its most visible victims (WHO, 2001). The combination of malnutrition and infectious disease can be particularly pernicious. Protein-energy malnutrition can impair the immune system, leaving malnourished children less able to battle common diseases such as measles, diarrhea, respiratory infections, tuberculosis, pertussis, and malaria (WRI, 1998).

Generally protein-energy malnutrition is used to describe both severe forms of clinical malnutrition (kwashiorkor and marasmus) and the more common forms of growth faltering or growth impairment (often termed mild or moderate malnutrition). However, the term PEM does not include specific or isolated deficiencies, such as of iron, iodine and vitamin A, which in their own rights are major public health problems (Saloojee & Pettiform, 2001).

Kwashiorkor, also called wet protein-energy malnutrition, is characterized primarily by protein deficiency. This condition usually appears at the age of about 12 months when breast feeding is discontinued, but it can develop at any time during a child's formative years. It causes fluid retention (edema); dry, peeling skin; and hair discoloration. Marasmus is characterized by stunted growth and wasting of muscle and tissue. It usually develops between the ages of six months and one year in children who have been weaned from breast milk or who suffer from weakening conditions like chronic diarrhea (Haggerty, 1995).

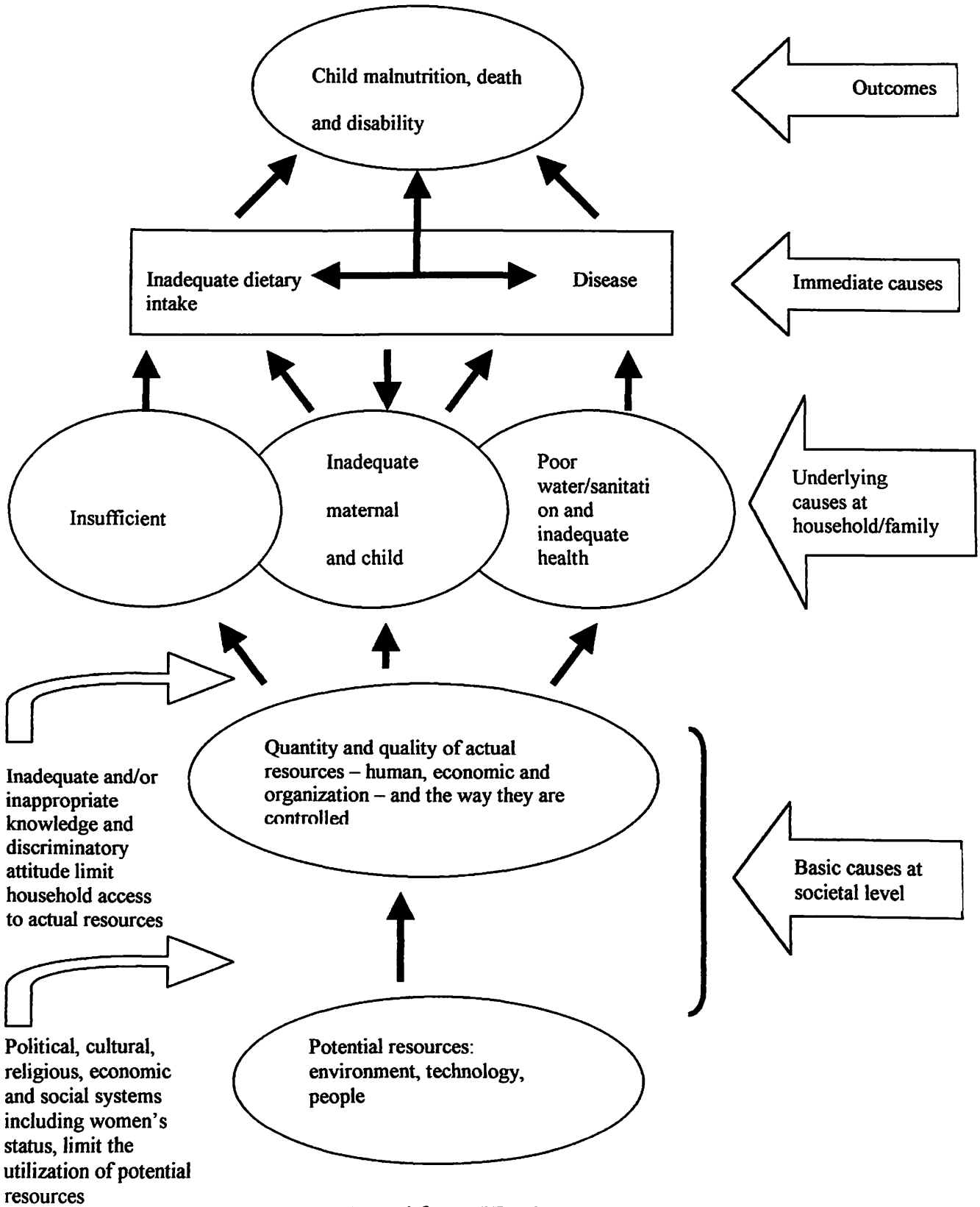
Protein-energy malnutrition (PEM) affects every fourth child worldwide: 150 million (26.7%) are underweight while 182 million (32.5%) are stunted. Geographically, more than 70% of PEM children live in Asia, 26% in Africa and 4% in Latin America and the Caribbean. Their plight may well have begun even before birth with a malnourished mother (WHO, 2001).

Between 1975 and 1990 the average prevalence of protein-energy malnutrition (PEM) in children in Africa, Asia, the Middle East, and the Americas combined, as estimated by FAD/WHO, was reduced from 47.5% to 40.8%. Nevertheless, there were 155 million underweight children in Asia in 1990, representing 44% of children under five years of age (Tontisirin & Yamborisut, 1995).

1.5 Conceptual Framework: Causes of Malnutrition

This conceptual framework (Figure 1.4) on the causes of malnutrition was developed in 1990 as part of the UNICEF Nutrition Strategy. The framework shows that causes of malnutrition are multisectoral, embracing food, health and caring practices. They are also classified as immediate (individual level), underlying (household or family level) and basic (societal level), whereby factors at one level influence other levels. The framework is used, at national, district and local levels, to help plan effective actions to improve nutrition. It serves as a guide in assessing and analyzing the causes of the nutrition problem and helps in identifying the most appropriate mixture of actions (UNICEF, 1998).

Figure 1.2 Conceptual framework



Adopted from: UNICEF, 1998

An understanding of the complex and subtle causes of malnutrition is important to appreciate the scale and depth of the problem. Malnutrition involve multiple and interrelated determinants (UNICEF, 1998).

Poor growth is attributable to a range of factors closely linked to overall standards of living and the ability of populations to meet their basic needs, such as access to food, housing and health care (de Onis *et al.*, 2000).

UNICEF (1998) classified the causes of malnutrition into 3 main causes, namely; the immediate causes, the underlying causes and the basic causes. The two most significant immediate causes are inadequate dietary intake and illness. Both factors tends to create a vicious circle, malnutrition lowers the body's ability to resists infection by undermining the functioning of the main immune response mechanisms which leads to longer, more severe and more frequent episodes of illness.

Acute and chronic infections may impair linear growth by causing micronutrient malnutrition. Micronutrient deficiencies may be produced by infectious diseases in one of the following five ways: 1) decreasing food intake (anorexia); 2) impairing nutrient absorption; 3) causing direct micronutrient losses; 4) increasing metabolic requirements or catabolic losses; and 5) impairing transport to target tissues (although this has not been demonstrated conclusively) (Stephenson, 1999).

Three clusters of underlying causes lead to inadequate dietary intake and infectious diseases; inadequate access to food in a household; insufficient health services and an unhealthful environment.

Household food security is defined as sustainable access to safe food of sufficient quality and quantity including energy, protein and micronutrients in order to ensure adequate intake and a healthy life for all members of the family. Household food security depends on access to food such as financial, physical and social and its availability (UNICEF, 1998; Steyn, 2000). For instance, there may be abundant of food available in the market, but poor families that cannot afford it are not food secure.

A curative and preventive health services that are affordable and of good quality is an essential element of good health. Immunizations have to be carried out according to a specific schedule. Sound health information needs to be available to communities, and families and those caring for children need to be supported in seeking appropriate and timely health care.

The environmental factors include economic status, food supply, nutrition, health care, sanitation, parent education, public benefits, and family planning (Meng *et al.*, 1997). The lack of ready access to a safe water supply and proper sanitation and the unhygienic conditions in and around homes, which cause most childhood diarrhea.

One good example of this situation is; poverty occurs in both South Asia and sub-Saharan Africa, but the rates of malnutrition, especially stunting are much higher in South Asia. One hypothesis to explain this difference is that it is due to a poorer sanitation and hygiene practices, the much greater population density and the degree of overcrowding in South Asia (UNICEF, 1998).

The basic causes mainly at societal level; firstly, political, cultural, religious, economic and social system at national and regional level including women's status and limitation to utilize any potential resources available and secondly, inadequate and/or inappropriate knowledge and discriminatory attitude give limitation for household accessibility to actual resources.

1.6 Growth Monitoring

Growth assessment is the single measurement that best defines the health and nutritional status of children, because disturbances in health and nutrition, regardless of their etiology, invariably affect child growth. Growth assessment thus serves as a means for evaluating the health and nutritional status of children, just as it also provides an indirect measurement of the quality of life of an entire population (de Onis *et al.*, 1993).

The technique is also useful in the prediction of morbidity and mortality, the assessment of the effects of poverty as well as in the monitoring and evaluation of intervention programs.

The anthropometric measurements can be obtained by measuring weight and height of the children. The weight and height measurements were converted into Z score of weight-for-age, height-for-age and weight-for-height for each child using NCHS standards.

All of the antropometric indices mentioned above provide a comprehensive description; weight-for-age represents a convenient synthesis of both linear growth and body proportion, height-for-age portrays performance in terms of linear growth and essentially measures long term growth faltering, and weight-for-height reflects body proportion, or the harmony of growth, and particularly sensitive to acute growth disturbances (de Onis *et al.*, 1993).

Each of the antropometric indices indicates different meaning to nutritional status; weight-for-age is an indicator of either current or past nutrition, height-for-age is an indicator of past nutrition whereas weight-for-height is a sensitive indicator of current nutrition status (Yasoda Devi & Geervani, 1994).

The 4th Report on The World Nutrition Situation, 2000 stated that stunting as low height-for-age at < 2 standard deviation (SD) of the median value of the National Center for Health Statistics/World Health Organization (NHCS/WHO) international growth reference(WHO, 2000b). High prevalence of low height-for-age is frequently associated with poor overall economic conditions and/or repeated adverse condition (Gorstein *et al.*, 1994).

Wasting refers to low weight for height at < 2 standard deviation of the median value of the NCHS/WHO international reference (WHO, 2000b). One advantage of weight-for-height is that it can be calculated without knowing age, which it useful in populations that do not record dates of birth or for whom such information is unavailable and unreliable (Gorstein *et al.*, 1994; Yasoda Devi & Geervani, 1994).

Underweight refers to a deficit and is defined as low weight-for-age at < 2 standard deviation of the median value of the NCHS/WHO international reference (WHO, 2000b). Weight-for-age fails to distinguish between short children of adequate body weight and tall, thin children because the weight-for-age index ignores the child's height and at any given age, taller children tends to be heavier than their shorter counterparts (Gorstein *et al.*, 1994).

At population level, weight-for-age and height-for-age may be useful for identifying subgroups with a high prevalence of wasting or stunting for directing resources to resolve the problems (Gorstein *et al.*, 1994). For biological reasons in comparisons with other indices, the relationship of weight-for-age with socioeconomic status is expected to be weak. A child from a poor family is not expected to have adequate growth and is likely to have low weight-for-age and height-for-age but he may have adequate weight-for-height because of having low weight and height (Bairagi & Chowdhury, 1994).

The indices can be grouped into different grades of nutrition status by both Gomez's (Table 1.1) and Waterlow's classification (Table 1.2). This classification allows a distinction to be made between current and past influences on nutritional status of the children.

Grade	**Weight-for-age (% of standard)**
Normal	≥ 90%
Grade I malnutrition	75% - 89%
Grade II malnutrition	60% - 74%
Grade III malnutrition	< 60%

Table 1.1: Gomez's classification

	Weight-for-age (% of standard)	
Height-for-age (% of standard)	≥ median – 2SD	< median – 2SD
≥ median – 2SD	Normal	Wasted
< median – 2SD	Stunted	Wasted & Stunted

Table 1.2: Waterlow's classification

1.7 Supplementary Feeding Program

In many situations, food distribution programmes often do not have clearly stated objectives and, when stated, they are not specific and have no time frame. In the past, programmes have implicitly pursued an overall health and nutritional objective and the most commonly used indicator of achievement is gain in weight and height.

However, Ghassemi (1992) discussed that in general such programmes can pursue one or more of three sets of objectives: (a) increasing food intake and narrowing or closing the food/energy gap among the target population; (b) poverty reduction while using food as a resource transfer to the family; (c) control of severe and moderate malnutrition and improving mother and child feeding practices.

INDIA

In an effort to reduce chronic under-nutrition and its health hazards, food supplementation programs identified vulnerable groups such as women and children. In the Integrated Child Development Scheme an attempt was made to provide essential health and nutrition inputs to the women and children and pre-school education to children both in urban and rural areas. Food supplementation to the school children in the form of mid day meal programs were taken up in many states.

A review of the of nutritional scenario in the eighties showed that there has been a marked reduction in the severe grades of under-nutrition and mortality due to severe under-nutrition; however the existing food supplementation programs failed to achieve significant reduction in proportion and number of persons with mild and moderate degrees of chronic under-nutrition because the programs tried to provide food supplements to the identified segments of the community and not to identified person/ family of persons suffering under-nutrition (WHO, 2000a)

AFRICA

Targeted supplementary feeding programs are generally aimed at those especially vulnerable to malnutrition, usually children and women of childbearing age at low income levels. The targeting of feeding and food distribution programs is achieved through a variety of means, including the use of health and nutrition criteria. Politically and socially, feeding programs are often a more acceptable means of operating a targeted income-transfer program. Many countries operate school feeding programs, which are effective when combined with nutrition education and school gardening.

In low-income countries where school enrollment does not include the entire population of school-age children, school feeding may miss the most needy. But such programs can be highly effective in terms of increasing school enrollment, promoting school attendance, and reducing dropout rates, thus contributing to long-term nutritional effects through education, while at the same time providing a cost-effective mechanism for food-based targeted transfers (Thompson, 1996).

1.8 The Food Supplementary Program of Malnourished Children In Malaysia

1.8.1 Introduction

A National Nutritional Surveillance System was started in 1982. Data from 1982 until 1986 gave a "reasonably" collective/comprehensive picture of the undernutrition situation in Malaysia. It was found that 25.6% of the children aged 0 to 7 years belongs to the moderate to severe undernutrition category. In 1986 the figure dropped to 21.9%.

The proportion is far from acceptable and this situational analysis was presented to the Prime Minister who ordered a quick remedy and a strategy derived to be quickly implemented.