Clinical nutrition in East Asia and the Pacific*

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Identifying the nutrition problems of Asia and the Pacific is made difficult by the enormous geographic, socioeconomic and cultural diversity that exists in these areas. With increasing longevity and reduced infant mortality, the more chronic diseases are becoming increasingly important. For almost 90% of the countries that keep such data in the Western Pacific Region of WHO, at least three of the five leading causes of death are noncommunicable diseases. Nevertheless undernutrition is still the most important nutritional problem in the Region. Even though there have been some encouraging declines in the proportion of malnourished under 5-year-olds, increasing populations have meant the actual numbers have not declined. Vitamin A deficiency, iodine deficiency disorders and iron deficiency anaemia remain major public health problems in many countries. There is evidence that vitamin A deficiency is appearing in countries in which it has not previously been a problem. New challenges are occurring, such as childhood obesity, the susceptibility of undernourished populations to the human immunodeficiency virus and the increase in noncommunicable diseases. The three arms of clinical nutrition: therapeutic, research and public health will need to work closely to meet the considerable and continuing threat posed by the nutrition-related diseases.

Introduction

Clinical nutrition has been defined as a discipline that aims 'to identify and develop areas of nutrition that have to do with the prevention and management of human disease'[1]. To do this in the Asia-Pacific context requires the identification of the major nutrition-related causes of morbidity and mortality.

This paper will use the above definition in identifying the differing nutrition problems, their underlying causes and their distribution within the Western Pacific Region of WHO. Clinical nutrition activities including therapeutic, research and preventive approaches will be described, along with some future directions.

There are enormous socioeconomic, cultural and environmental differences in the countries that make up the Western Pacific Region of the World Health Organization Region and this is reflected in the diversity of the nutritional problems seen. The Region is effectively comprised of eastern Asia and Oceania and stretches from Singapore and Malaysia in the west to French Polynesia in the east (Fig. 1).

Nutrition-related diseases

The paper will address clinical nutrition by approaching it through the commonest nutritional diseases; first the deficiency diseases, as these still have the highest priority in the Region, and secondly the diseases of affluence. Other aspects such as food quality and food safety, although important aspects of food and disease, will not be discussed in any detail. Food safety is however an important emerging issue in the Region in the context of natural hazards, such as ciguatera and aflatoxin, and man-made through poor hygiene or contamination and in times of disaster and civil unrest.

Deficiency diseases

Protein-energy malnutrition

There has been some encouraging progress in much of the Region in terms of the proportion of children under 5 years of age who are malnourished[2]. However the continuing growth in populations has meant that the actual numbers continue to increase in at least some countries. Whereas the first report on the world nutrition situation by the ACC/SCN in 1987 showed that, between 1975 and 1985, in South-East Asia as a whole the number of underweight children increased, in China, for example, during the same period the actual numbers decreased[2]. Where this improvement has happened, it appears to have been largely a matter of improving socioeconomic conditions, although undoubtedly public health and other factors, eg women's education, have also played a significant role. A broad picture of the current situation can be seen in Fig. 2.

Malnutrition of the young or multiparous mother continues to be a widespread problem and is to a large extent reflected in the levels of low birth-weight-infants (LBW) born in the Region. This is not a problem in much of the Pacific where infants are on average slightly

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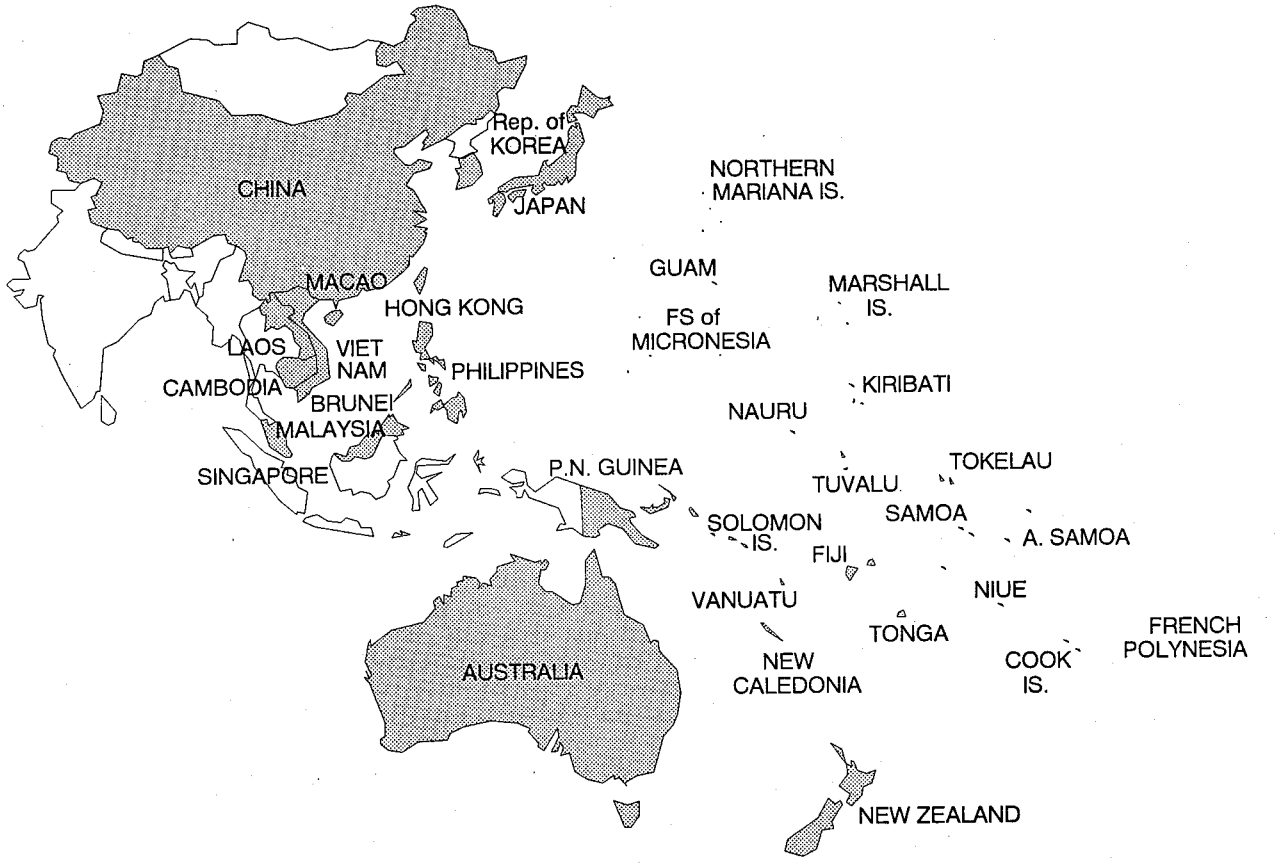

Fig. 1. WHO Western Pacific Region.

above the standard[3]. The percentages of LBW infants born in countries of the Region range from 39% in the Lao People's Democratic Republic (Lao PDR), 25% in Papua New Guinea (PNG) through 9% in China and the Republic of Korea, to 5-7% in Australia, Singapore, New Zealand and Japan[4]. In Malaysia, the preliminary results of the 1982-86 Nutrition Surveillance Programme show the average prevalence to be 7%, ie similar to that

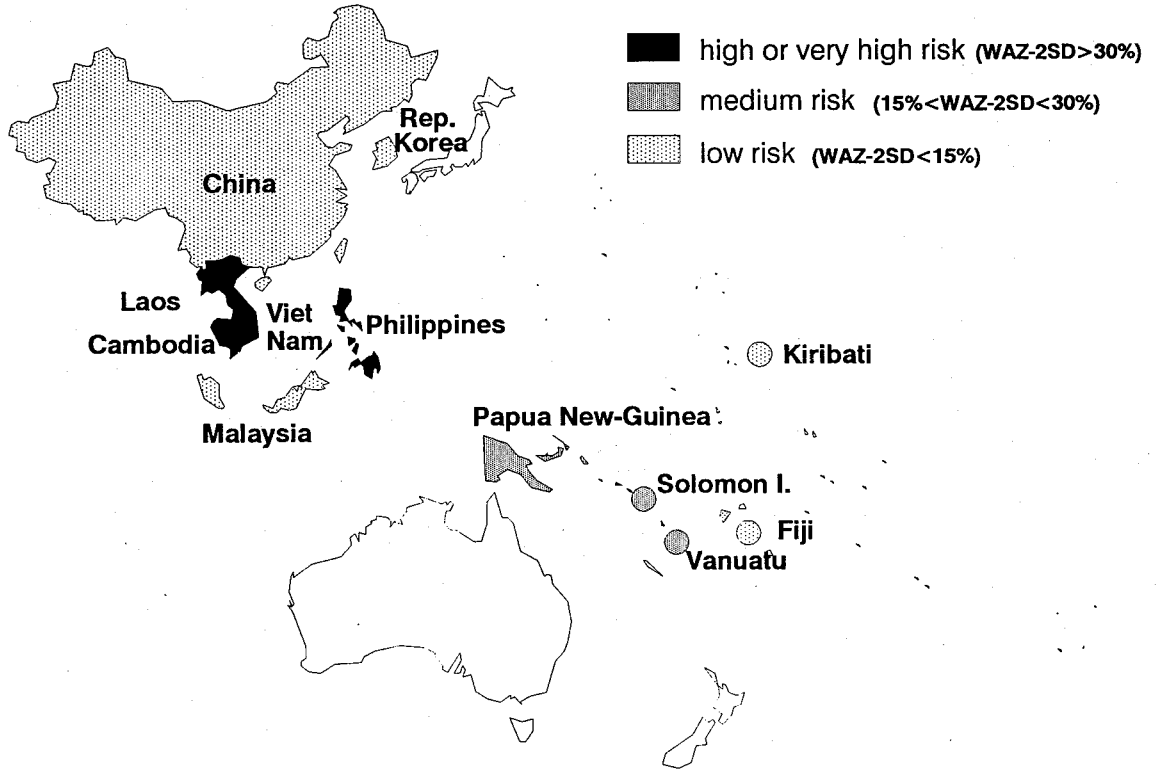

Fig. 2. PEM in Western Pacific Region based on surveys in 1980s.

of historically richer countries. Some recent studies however, show considerable differences in the prevalence of LBW among the different Malaysian States and among ethnic groups and particularly in the least developed communities, such as urban squatters. This unequal pattern is also seen in most other societies in the Region, to a greater or lesser extent.

Vitamin A deficiency

One earlier estimate suggested that at least 5 million children in Asia develop some degree of xerophthalmia every year, of whom 250 000 go blind[5]. A half to three-quarters will subsequently die within weeks of the blinding episode[6]. There appears to be increasingly strong evidence that mortality due to respiratory and gastrointestinal infections are greater in vitamin A deficient children, even those mildly so[7]. An advisory group of the ACN/SCN concluded in 1986 that programmes for the control of xerophthalmia could be expected to result in a reduction of mortality of around 30%[8].

Vitamin A deficiency is still a major public health problem in countries in the Region such as the Philippines, Lao PDR, Viet Nam and probably Cambodia. An emerging problem in the Region appears to be in the Micronesian island nations where these are becoming overcrowded and urbanized, such as Truk in the Federated States of Micronesia[9] and Kiribati[10]. There appears to be a special risk for atoll islands with limited soil capacity and which already import a lot of food of sometimes doubtful nutritional benefit. Table 1 indicates those countries in the Region in which there strongly suspected or known to be a problem, measured against the WHO cut-off points for the various clinical signs above which levels indicate a public health problem[5].

In the Philippines the prevalence has apparently decreased from 1.1% in 1982 to 0.8% in 1987 for nightblindness and from 1.7% to 0.3% respectively for Bitot's spots[11]. However recent localized studies have shown there is still a very considerable problem in poor areas[12]. The Viet Nam figures are of interest in that the milder forms do not appear to show a problem of public health proportions but active corneal lesions and scarring are far in excess of the WHO cut-off[13].

Table 1. Vitamin A deficiency prevalence in countries of the Western Pacific Region of WHO against the minimum prevalence indicating a public health problem (WHO 1982).

Country (ref.)	Signs			
	Night blindness (XN) (>1.0%)	Bitot's spots (X1B) (>0.5%)	Corneal xerosis &/or ulceration /keratomalacia (X2/X3A/X3B) (>0.01%)	Corneal scar (XS) (>0.05%)
Cambodia[a]	'a problem of public health significance'			
China[b]	mainly dietary reports suggesting predominantly subclinical problem			
Lao PDR[c]	3.8% [1.3%[d]]	[0.4%[d]]	0.011%	
Micronesia				
Kiribati[10]	3.5%	10.9%	0.34%	
Truk (FSM)				
Hospital[9]	12.0%			
National[10]	9.5%	2.0%		
Marshall Is[e]	anecdotal cases in Majuro Hospital			
Philippines				
National[11]	0.8% [1.1%[f]]	0.3% 1.7%[f]]		0.2%
Localized[12]	2.5%	6.9%		
Viet Nam[13]	0.45%	0.14%	0.07%	0.12%

[a] Cohen N. Report to World Vision International-Cambodia 1990.

[b] Anonymous. Impact of large doses of vitamin A supplementation on childhood diarrhoea and respiratory disease. Unpublished paper. In Li county of Hebei Province showed 5–10% prevalence of serum retinol levels of <10μg/dl (WHO cutoff >5%).

Ji Di Chen. Some nutrition policies in China. Am J Clin Nutr 1989;49:1060–2. Based on findings from the 1982 Nationwide Nutrition Survey vitamin A and carotene intake 60% and 80% of RDI respectively. The article concluded that 'Insufficiencies of vitamin A and riboflavin were the main nutritional problems of the Chinese', and that the incidence of vitamin A insufficiency was 0.9%'

[c] Bloem M. Country Mission report: vitamin A deficiency in Lao People's Democratic Republic. Helen Keller International/ World health Organization. Western pacific region of WHO. 1991.

[d] Figures taken from adjacent and similar northeastern Thailand. Bloem MW, Wedel M, Egger RJ et al. Am J Clin Epidemiol 1989;129:1095–1103.

[e] Johnson G. 'Junk diet spreads child malnutrition in Pacific Islands'. Manila Bulletin. Sat., May 25 1991:p20.

[f] Prevalence figures from 1982 national nutrition survey.

In the more industrialized countries the problem of vitamin A deficiency is generally only seen with associated pathology such as cirrhosis[14].

There is of course considerable interest in the possible protective effects of the vitamin A-rich foods against some cancers. It is not however still completely clear which of the components of fruits and vegetables have the protective association that has been found for cancers of the lung, colon, bladder, rectum, oral cavity, stomach, cervix and oesophagus[15]. Fibre is also thought to have a role, especially in cancer of the colon[15].

Iodine deficiency disorders

The insidious subclinical effects have been increasingly recognized in recent years and this has given impetus to a fresh interest in controlling this disease[16]. Many countries in the Region are affected including China, Malaysia, the Indochinese countries, Philippines, and in the Pacific, Fiji and Papua New Guinea. Figure 3 summarizes the prevalence of the affected countries. As IDD are by nature localized, the prevalence rates shown actually represent localized rather than national data but do give an indication of the severity of the problem in the countries concerned.

Both Australia and New Zealand previously had a significant problem. Salt iodization programmes which began during the first half of this century, and other sources of dietary iodine, have effectively abolished this problem[16].

Viet Nam has had a control and prevention programme since 1970, managed by the Central Hospital for Endocrinology and currently estimated to cover 11 northern provinces and 3 million of the estimated 12 million at risk (Le My, personal communication). China has had a national programme since 1958[17]. By 1987 87.3% of the estimated 330 million population at risk was reported to be covered[18]. The subtle forms by which this deficiency can manifest itself can be seen in the story told by Hetzel of a village in an endemic part of China where the success of the IDD programme was partly measured by the in-marrying into a village where previously this had not been done as the young men had been thought to be idiots[16].

Iron deficiency anaemia

This most widespread and intractable of the micronutrient deficiencies in the Region is another disease in which the effects can be quite subtle, influencing reproductive performance and work performance to an unknown degree. Nevertheless it is a problem of serious public health and clinical significance affecting more than 700 million persons in the world today[19], and exerts an impact on psychological and physical development, behaviour and work[20]. Women of child-bearing age, especially when pregnant, are at greatest risk of developing iron-deficiency anaemia, followed by infants, preschool children and adolescents. Adult males may also be at risk where there is inadequate food intake or endemic parasitic infestation[20].

Iron deficiency anaemia affects all countries to a greater or lesser degree and is the most prevalent nutritional problem in the world today, although considerably more prevalent in the developing world than in the industrialized world (around 36% cf 8%). In East Asia, prevalence ranges from an estimated 11% in adult males

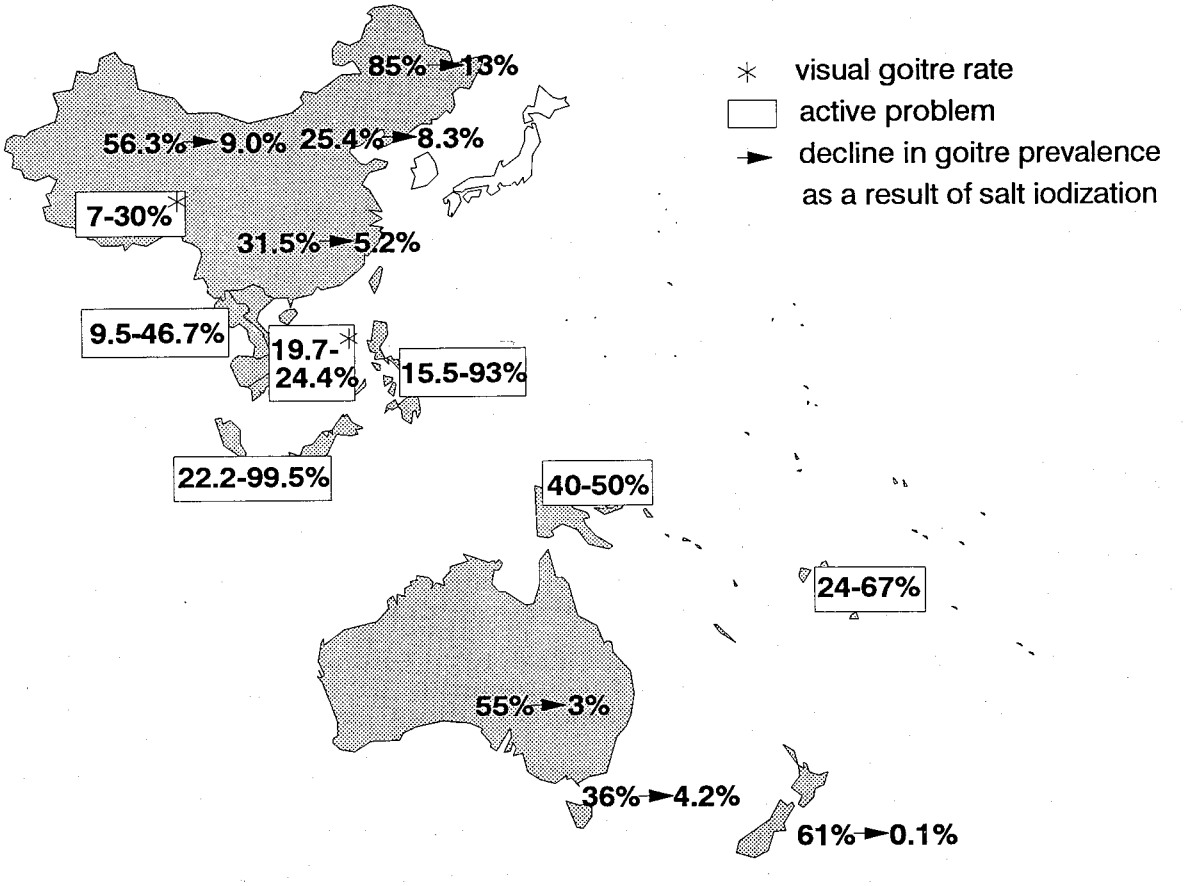

Fig. 3. Available prevalences of goitre in endemic areas in Western Pacific Region.

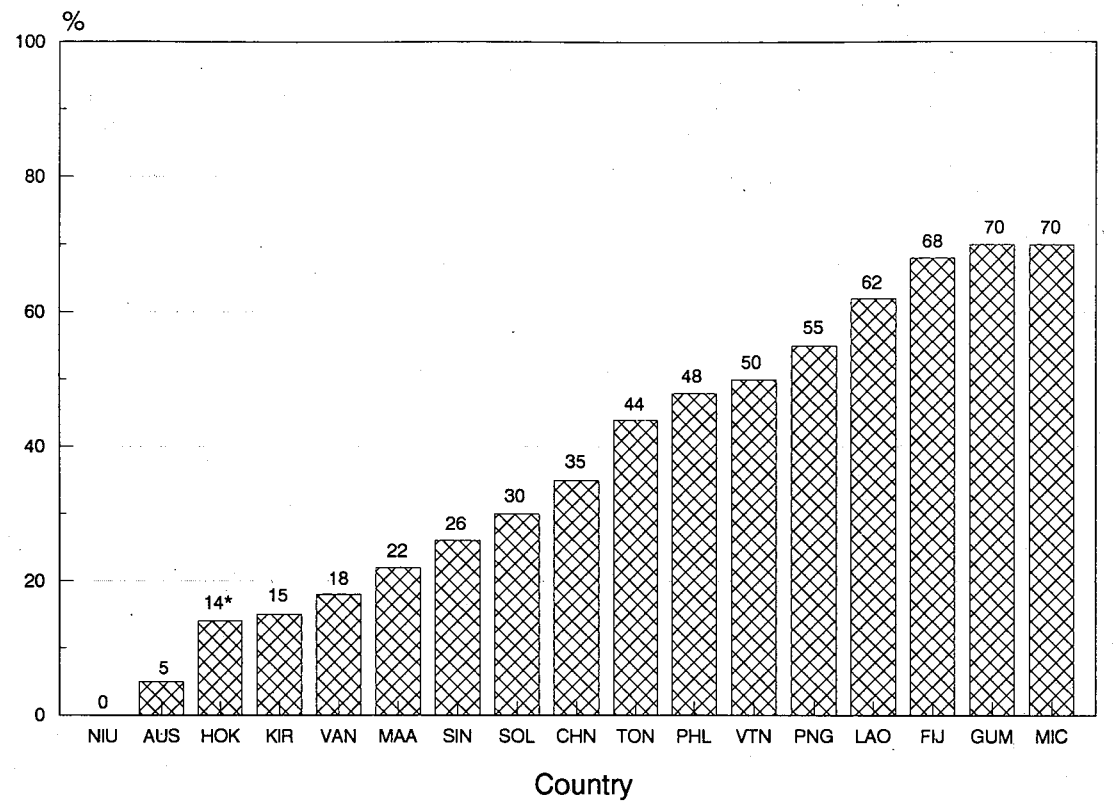

Fig. 4. Currently available prevalences of anaemia (< 1 lg/dl) in pregnant women. *<10g/dl.

to 22% in children of school age[20], although large areas have considerably higher prevalences than these, especially in pregnant women.

For simplicity and because of a shortage of other data, Fig. 4 shows prevalences of nutritional anaemia in pregnant women in countries of the Region. The data are based on those of Royston[21] and updated wherever more recent local information was available. Showing only these data should not however detract from the importance of the high prevalences found in children (sometimes up to 90% in limited areas) and even in adult males in the Region[19].

Anaemia may be caused not only by a deficiency of iron or, less often, of other nutrients such as folic acid or even ascorbic acid, vitamin A or protein, but also by other conditions. Seasonality can influence the diet and nutrient intake and be a factor in iron status. Multiparity affects the nutritional status of the mother and child, and not breast-feeding, and prolonged breast-feeding without adequate supplementary diet (after 4-6 months) can also contribute to anaemia.

Malaria, hookworm disease (whether by Ancylostoma or Necator), schistosomiasis and other infections, as well as congenital haemolytic diseases such as sickle-cell anaemia and thalassaemia may all play an important role[20]. In some Asian countires, eg Lao PDR, Viet Nam[20] and in parts of the Pacific[21], high prevalences of thalassaemia should be taken into account. As the data in Figure 4 used the WHO cut-off point for haemoglobin levels for pregnant women (<llg/dl) the apparent prevalences will also include women with megaloblastic anaemia (up to 36% for women of north Indian origin in Malaysia) and women who have some form of thalassaemia[21].

Other deficiencies

Other deficiencies not infrequently reported include thiamin deficiency which has recently reemerged as a problem in parts of rural Philippines. This is also frequently reported in some groups in Australia such as alcoholics and homeless men[14] and to a lesser extent in the Aboriginal minority.

Riboflavin deficiency has been reported in Lao PDR and other countries in which it has been looked for, but remains less of a priority.

A recent study has confirmed earlier findings in China that anaemia and rickets continue to be the major nutrition-related diseases of childhood in China[23]. In a rural community during the weaning phase, rickets was found in 34.4% of children.

Interaction of deficiencies and disease

As many prevention and control programmes tend to be vertically administered (eg vitamin A programmes), the important effects of nutrient interactions may be overlooked. There are important interactions between vitamin A deficiency and iron-deficiency anaemia[24]; vitamin A deficiency and protein energy malnutrition, zinc[6,25], and possibly even iodine deficiency[26].

Combined marginal deficiencies of iron, vitamin C and the B-group vitamins may, although less severe than those causing the lesions of classical clinical deficiency, seriously reduce work performance[27]. Vitamin C and riboflavin appear to be particularly important in their interaction with iron, the former in much enhancing the bioavailability of non-haem iron in the diet and the latter by acting synergistically with iron in maintaining the efficiency of work performance[27].

Diseases of over- and inappropriate nutrition

A demographic transition has taken place in countries where effective programmes of disease control have allowed increased survival during the early years of childhood and adolescence. This has resulted in an increase in life expectancy and larger proportions of the population moving into the age range in which chronic degenerative diseases become the major determinants of health status.

At the same time, an epidemiological transition in diseases has also come about by shifts in social and economic behaviour and patterns which favour detrimental changes in the prevalence of risk factors for the chronic degenerative diseases. Such changes have included health-related behaviours which have led to increases in dietary consumption of fats and alcohol, increases in obesity, in smoking, and decreases in physical activity[28,29]. The transition has been well described by Taylor and others in the Pacific[30]. For almost 90% of the countries that keep such data in the Western Pacific Region of WHO, at least three of the five leading causes of death are noncommunicable diseases[31].

One of the major changes has been in the composition of diets that comes with increasing affluence. Figure 5 shows the percentage of dietery energy (calories) increasingly coming from fat, often saturated animal fats, and decreasing from carbohydrate with increasing affluence[15]. Figure 6 shows the percentage of mortality from some different diseases that also increase with affluence[15]. The effect of changing diet and lifestyles on diabetes prevalence in the Pacific has been well documented by Zimmet and others, who have also indicated a probable genetic component[32,33]. The relative magnitude of these changes between rural and urban communities, as a surrogate measure of increasing transition, can be seen in Figure 7[34].

Nevertheless increasing affluence is not necessarily the only or most important factor. Some groups or populations are receiving the disadvantages of these chronic diseases without the benefits of affluence. Among the Australian Aborigines for example cardiovascular disease is now the major cause of death for both males and females, with a mortality rate from this cause 2.5 times higher than might be expected from figures in the broader Australian community[35].

Some countries have shown declines; the percentage change in age-standardized death rates from all cardiovascular disease (30-69 years) decreased (from 1970 to 1985) by 38.9% in the USA, by 57.5% in Japan, by 53.9% in Australia and by 33.6% in New Zealand[28]. There have been even greater percentage changes in the decline in deaths from cerebrovascular disease. However, even in countries where there have been marked declines, rates can be very different eg death rates from ischaemic heart disease are five times higher in Australia than in Japan[28].

In Australia it is estimated that 52% of all deaths in females and 62% of all deaths in males are due to nutritionally-related diseases[36]. In Singapore, cardiovascular deaths came to represent 34% of all deaths, compared with 13% three decades ago, but this rise has levelled out and the number of deaths from cardiovascular causes are now declining[37]. The most recent figure is 21.5%

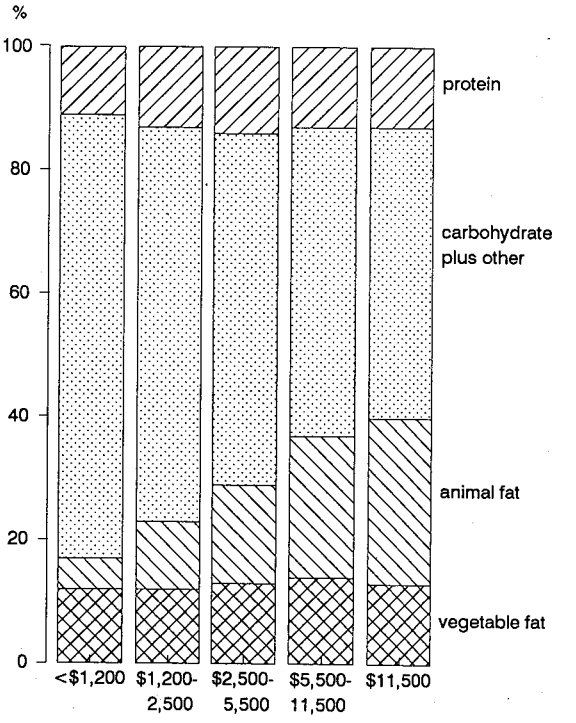

Fig. 5. Percentage of energy obtained from various dietary components according to per caput gross national product (US$).

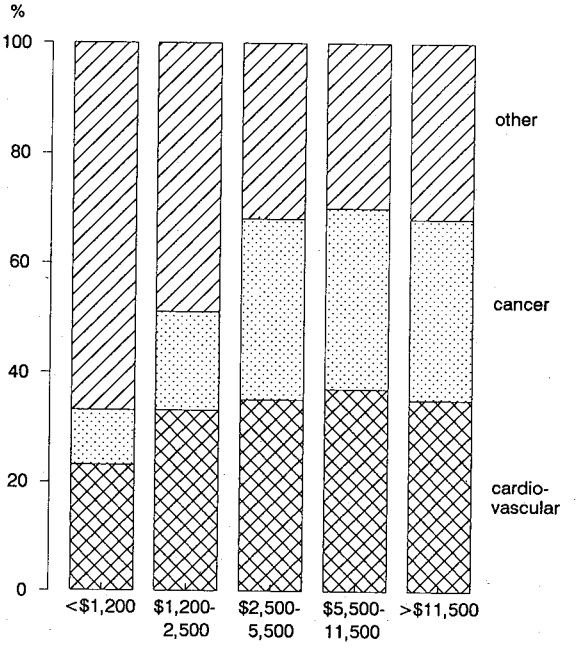

Fig. 6. Percentage of mortality (35 to 69 years, for both sexes) from cardiovascular diseases, cancer and other diseases according to per capita gross national product (US$).

(Lim Guek Nee, personal communication). Ischaemic heart disease peaked in 1984 and cerebrovascular disease in 1970 with a slow decline since then. At the same time prevalence rates of diabetes mellitus increased from 1.99% in 1975 to 4.7% in 1985[38].

In Malaysia however the increase in cardiovascular and cerebrovascular diseases continues. In Japan, death rates from malignant neoplasms and diabetes continue to

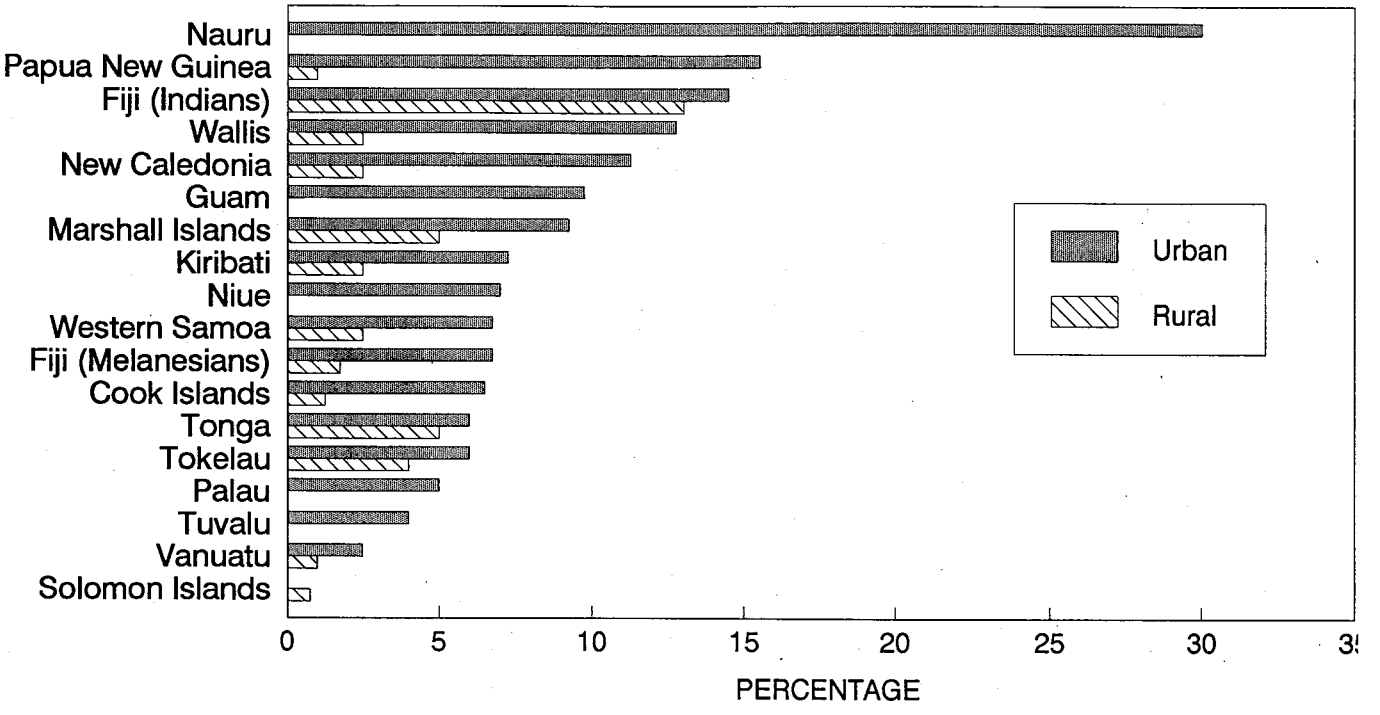

Fig. 7. Diabetes mellitus in the Pacific: urban vs rural prevalence. Source: SPC Information Circular No. 100.

increase whereas those caused by cerebrovascular disease are decreasing. In Viet Nam deaths from cardiovascular causes tripled during the 1970s. An average of 23% of adult Chinese (35-64 years) have high blood pressure[39]. Death rates from coronary heart disease (CHD) in China are about one-tenth of those in the USA and Australia[40]. Stroke is something like five times more common than acute myocardial infarction in China compared to say Australia where the order is reversed and CHD is about 2.5 times more common than stroke[41]. It is clear there are marked differences between countries[42,43].

There are also marked ethnic differences within countries. Australia shows this clearly in both its Aboriginal and migrant populations[36]. It is equally clear in multiethnic Malaysia and Singapore[37], and from the Pacific when looking at differences in Melanesian and Polynesian death rates and those in Fijian Indians and Fijian Melanesians[30]. Mortality rates for ischaemic heart disease among Indians in Singapore are 2.5 times that among Malays, despite Malays having the highest prevalence of hypertension (25.7%) and of smoking (37%)[44]. The rates of ischaemic heart disease are even less in the Chinese Singaporeans.

Alcohol consumption is increasingly of concern, especially in the Pacific countries, although some countries where it is still a major public health problem such as Australia are showing a slight decrease in average consumption figures[45].

One of the other emerging problems in the Region is obesity, not least in the children[46]. A factor here is almost certainly changing food habits, often representing a change to high-energy, high-fat, fast foods. Changing exercise patterns are also clearly a factor. In Singapore, from being virtually unknown in children, obesity now ranks as the second most common health problem among schoolchildren, affecting about 12% of the school population six to 16 years of age (Lim Guek Nee, personal communication).

In Australia, 43% of adult men and 35% of women were found to be overweight[36]. In the Federated States of Micronesia over 50% of women 40-49 years are obese and 80% are overweight. Even in 15 to 19-year-old women, 40% are overweight with a quarter of these young women being obese[47]. These sorts of figures, although extreme, are becoming less uncommon in many of the countries in the Region.

Clinical nutrition activities

Therapeutic

In many countries virtually the only activities taking place are those of the therapeutic nutrition rehabilitation wards or in paediatric wards. This is an expensive mode of treatment with a fairly high relapse rate as the child returns to the same environment or set of circumstances that caused the original episode. The exception to this being the acute malnutrition caused by man-made and natural disasters — certainly neither of them unknown events in the Region.

Increasingly, special wards and clinics for people suffering from diabetes and from hypertension are becoming a feature of all hospitals. Trained specialist staff are often a constraint.

One of the major problems with the epidemiological transition mentioned above is that countries must continue to maintain essential programmes to control infectious diseases as well as developing new programmes for noncommunicable disease control. Resource limitations will make this increasingly difficult and new initiatives will need to pay considerable attention to cost-efficiency and applicability in the current widespread adverse economic circumstances[48].

Research

Most of the clinical nutrition research centres have been based in the more affluent countries, with the research being of two main kinds. Currently the better funded is that in hospital or university-based units looking at nutrition-related noncommunicable diseases. Not surprisingly perhaps, given the way funding works, these have tended to reflect national, economic or cultural concerns, eg in Australia there has been a lot of interest in cholesterol levels and dairy and livestock foods; in Japan in fish oils; and in Malaysia blood lipids and palm oils.

The other important area has been in field trials, generally carried out in developing countries by researchers from more industrialized countries. This has in the past provoked some controversy with allegations of countries being used as human laboratories. To some extent the trend has been reversed and now a lot of the important clinical epidemiology that is being done on cancer and diet and other noncommunicable diseases and diet is being done on the urban industrialized populations of Australia, New Zealand and Japan. Due to the size of research populations possible, a great deal of epidemiological work on noncommunicable diseases and diet is currently being carried out in China where the numbers allow the testing of a wide range of otherwise difficult to test hypotheses[49].

Preventive

As health bills in all countries become ever larger, governments are looking to preventive health and health promotion to limit the damage or, in the case of some countries, to avoid what has happened in the more affluent countries. The basic principle being used is that diseases with common causes (unhealthy lifestyles including inappropriate diet and inadequacies in preventive services) should be approached with a common strategy of health promotion and provision of preventive health services[48].

In Malaysia, for example, the Ministry of Health has very recently launched a multiple stage campaign for the promotion of healthy lifestyles, which comprises six thematic campaigns to be carried out over a period of six years: prevention of coronary heart disease in 1991, sexually transmitted diseases in 1992, cancer in 1993, diabetes mellitus in 1994, childhood diseases in 1995 and food poisoning in 1996. The State of Victoria in Australia has provoked much interest in health promotion circles by enabling funds, to be used for preventive and promotive activities, to be much more freely available than is common, by using part of the tax on cigarettes for health promotion activities.

Conclusion

It is clear from the above that nutrition problems loom large in this Region. The countries in this Region can be divided into three somewhat arbitrary categories: those in which undernutrition is the prevailing form of malnutrition, such as the countries of Indochina, Vanuatu and the Solomons; those where the noncommunicable diseases are an increasing problem but at the same time undernutrition remains significant, especially in subpopulations; and those that are more affluent where the noncommunicable diseases are the primary cause of mortality.

On average the control of undernutrition is improving with an increase in numbers but not as a proportion[2], although some countries are exceptions to this. There are also increases in prevalence as a result of economic restructuring, and following man-made and natural disasters. There are some encouraging signs in most countries in the prevalence of the deficiency diseases of vitamin A and iodine deficiency disorders[50], although less so with iron deficiency anaemia.

The regional picture on noncommunicable diseases is mixed. Even in countries where mortality from coronary heart disease has peaked, it is still usually the major cause of adult mortality. In some countries the mortality from stroke is also decreasing. However, in the majority of countries this is a problem that will get worse. A real concern is that the gains in life expectancy that have been made as more children survive and live longer, will be lost as deaths from the noncommunicable diseases increase. The other concern is that these countries will need to introduce facilities and programmes to deal with the increase in noncommunicable diseases, while at the same time having to maintain curative services and public health programmes to reduce the impact of infectious diseases.

Nevertheless there are some impressive examples of success in reducing the impact of the nutrition-related diseases in the Region which may well serve as models. Changing dietary patterns in the more affluent countries seem to be moving in the right direction. Health promotion is one of the identified priorities of the Regional office.

WHO is mainly concentrating on national nutrition policies, and with UNICEF and other international agencies, has the objective of eliminating both iodine-deficiency disorders and vitamin A deficiency as public health problems by the end of the century. For iron deficiency anaemia the goal is a reduction by one third.

Clinical nutrition is being encouraged by support for research, training and most recently the appointment of a clinical nutritionist in the Institute of Medical Research (IMR) in Kuala Lumpur. The IMR intends to develop and promote research and training in clinical nutrition and, as the WHO Regional Centre for Research and Training in Tropical Diseases and Nutrition, will make its expertise and facilities available to other countries in the Region.

Going back to the definition at the beginning: there is still a need to identify more thoroughly, and to develop, areas of nutrition that have to do with the prevention and management of human disease. There is every indication that the diseases associated with malnutrition (both under- and over-), will be with us for some time to come, even though their nature may change.

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亞太地區存在地理、社會經濟和文化的巨大差異，因而認識其營養問題是有困難的。隨著壽命延長和嬰兒死亡率下降，越來越多慢性病引起關著：世界衛生組織屬下的西太地區，几乎有90% 的國家保持這樣的數据，在五種死亡率最大的疾病中，最少有三種是非傳染性疾病。不過，營養不足仍然是這個地區的最重要營養問題。五歲以下的營養不良兒童的比例雖已下降，但由于人口的增長實際營養不良患者數目未見消減。在許多國家裡維生素A缺乏，缺碘性疾病和缺鐵性貧血仍是主要的公共衛生問題。有証据顯示維生素A缺乏出現在一些以前沒有發生過的國家。新的問題正在出現，如兒童肥胖症、營養不足人群對人類免疫缺乏病毒和非傳染性疾病的易感性等。臨床營養的三件武器：治療、研究和公共衛生將需要緊密地工作在一起，面對連續的和相當大的營養有關疾病所造成的威脅。