
4. Recommendations/Guidelines and Policy on Nutrition

Revisiting Protein Recommendations

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4.1 Microbial Synthesis of Essential Amino Acids in the Human Colon - an Unsolved Problem

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Forty years ago Australian nutritionists observed that the highlanders of Papua-New Guinea were apparently able to maintain activity and health on a diet consisting mainly of sweet potatoes, which did not by any standard fulfil the requirement for protein. This observation was confirmed in later surveys, but nothing was done to explain it. Then Oomen [1] suggested that perhaps the highlanders were able to synthesize essential amino acids from nitrogen fixed by microbial action in the large intestine. Ten years passed and then a Japanese group took up the challenge of testing this hypothesis [2] (Tanaka et al 1980). They gave [¹⁵N] urea to Papua-New Guinea highlanders, both adults and children, as well as to Japanese on a normal diet, and showed that whereas, after 5-10 days, only 10% of the ¹⁵N was retained by the Japanese controls, nearly 50% was retained by the PNG children. It had long been accepted that urea-N could contribute to the body's need for non-essential N; the crucial question was whether it could be used for synthesis of the essential amino acids. The only way of answering this question was to show that [¹⁵N] was incorporated into lysine or threonine, because they are not transaminated. Incorporation of [¹⁵N] into these amino acids would be very strong presumptive evidence of de novo synthesis. Tanaka's group did in fact find some labelling of lysine-N in the hydrolysate of plasma proteins, but the level was low and very variable. However, most of us working on protein and amino acid metabolism paid no attention, in part perhaps because the results were published in a Japanese rather than an international journal.

In the years since then two influences stimulated renewed interest in the subject. The first influence was the extensive work of Jackson [3,4] demonstrating the importance of urea 'salvage' in the gut. 'Salvage' means the passage of urea into the colon, where it is hydrolysed by urease to ammonia. It accounts for a significant proportion of the urea produced, particularly in subjects on low protein diets and in growing children. Indeed, it became apparent that the process of salvage must play an important part in the regulation of nitrogen balance [5].

The second influence has been the immensely impressive studies by Young and his colleagues at MIT with a new method of estimating the requirements for essential amino acids, by measuring the carbon balance of amino acids labelled with ¹³C, the stable isotope of carbon [6,7]. This approach produced

Reference	11	15	12	13	14
Species	Rat	Pig	Human	Human	Human
Test amino acid	lysine	lysine	threonine	lysine	lysine
Source of ¹⁵ N	NH ₄ Cl	NH ₄ Cl	NH ₄ Cl urea	NH ₄ Cl urea	lactose-ureide
Site of measurement	Whole body protein	whole body protein	plasma free a.a	plasma free a.a	urine free a.a
Microbial precursor	faeces	ileum	faeces	faeces	faeces
Amount of amino acid synthesized mg kg body wt ⁻¹ d ⁻¹	62	43	urea 12 NH ₄ Cl 29	urea 22 NH ₄ Cl 44	32

Table 1. Summary of studies on the contribution of microbes in the bowel to the production of essential amino acids.

estimates of essential AA requirements that were some two or three times greater than the traditional ones based on nitrogen balance. It suggested that the large populations of the world subsisting on cereal-based diets low in lysine might be at risk of lysine deficiency [8]. No serious technical fault could be found with the method [9], so the question immediately became of great importance: could the gap between the conventional and new estimates be filled by microbial synthesis of essential amino acids in the gut?

There is plenty of ammonia available for the synthesis of amino acids, since the flux of NH₃ in the large intestine was found to be many times greater than that derived from urea alone [10]. Presumably this flux comes from the synthesis and breakdown of microbial and endogenous protein, with catabolism of the amino acids released so that there is continuous cycling of amino acids as well as of ammonia.

The next step was the confirmation of Tanaka's work. This has been accomplished by three groups working together: the Rowett Research Institute in Scotland, the German Institute of Nutrition, and the Massachusetts Institute of Technology in the USA - a truly international effort [11,12,13]. The results are summarized in the table. They show clearly that when ¹⁵N-urea or ammonia is fed, the label turns up in lysine and threonine of the body. Since these two amino acids are not transaminated, that is surely strong evidence of de novo synthesis. I am inclined to think that urea is a more physiological precursor than ammonia. Jackson and co-workers gave the label as lactose-¹⁵N ureide, because this substance is not digested in the small intestine, but is hydrolysed by the microflora of the colon [14]. In this way the label is delivered directly to the site of synthesis, avoiding the possible complication of absorption and return through endogenous secretion. They also assumed that enrichment of the amino acid in plasma would be the same as that in urine.

That, however, is not the end of the story. Synthesis of essential amino acids occurs, but the important question is whether it makes a significant contribution to the requirement. In order to quantify the synthesis it is necessary to know the isotopic enrichment of the precursor from which the amino acid is synthesized.

The amount of amino acid synthesized is calculated from the relation: enrichment in plasma x amino acid flux/enrichment of amino acid in microbial protein at the site of synthesis and absorption. Not much is known of the extent, if any, to which amino acids are absorbed in the colon. It may be that both synthesis and absorption are occurring in the ileum. The results shown in the table were calculated on the assumption that the precursor enrichment is that of the amino acid in microbial protein of the faeces, but the rectum is unlikely to be site of absorption. In Totrallardona's pig the enrichment of lysine in microbial protein increased progressively from the ileum to the rectum, being 20 times as high in the faeces as in the ileum [15]. Similarly, Metges et al studied some subjects with ileostomies; the lysine enrichment was 5 times higher in the faeces of the normal subjects than in the ileal digesta of these patients [14]. If the ileal figures are used, they lead to absurdly high estimates of the amounts of lysine synthesised. It has been suggested that perhaps the synthesis of lysine takes place specifically in microbes adhering to the mucosa of the lower ileum, which would also be the site of absorption; hence the lysine synthesised and absorbed might have a much higher enrichment than that of the microbial flora as a whole. But this is only speculation.

Therefore the problem is still not resolved and the challenge is still to be met.

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Examples and New Aspects of Nutrient - Based Recommendations

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4.2 On the Recommended Nutrient and Energy Intakes for the European Community

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Guidelines for "Nutrient and Energy Intake" currently used in the European Community were published in the 1992 by the Scientific Committee on Food (SCF) of the European Commission. Experts of almost all countries of the European Community developed, on the basis of physiological requirements, a set of nutrient based recommendations that could be used across the Community.

The SCF considers a single recommended daily allowance (RDA) as potentially misleading which is often inappropriately used as the lowest acceptable intake. The committee calls the nutrient intake which meets the needs of virtually all healthy people in a group the Population Reference Intake (PRI); this corresponds consequently with the traditional RDA. The PRI is derived from the Average Requirement (AR) for a group, according to the criterion chosen plus safety factors (often two standard deviations; for most nutrients a coefficient

of variation of 15% of the AR is considered); the PRI is thought to cover at least 97.5% of the population. A nutrient intake below which almost all individuals will be unlikely to maintain metabolic integrity according to a specific criterion is considered the Lowest Threshold Intake (LTI). The nutrient requirements are supposed to have a normal Gaussian distribution (Figure 1) [1].

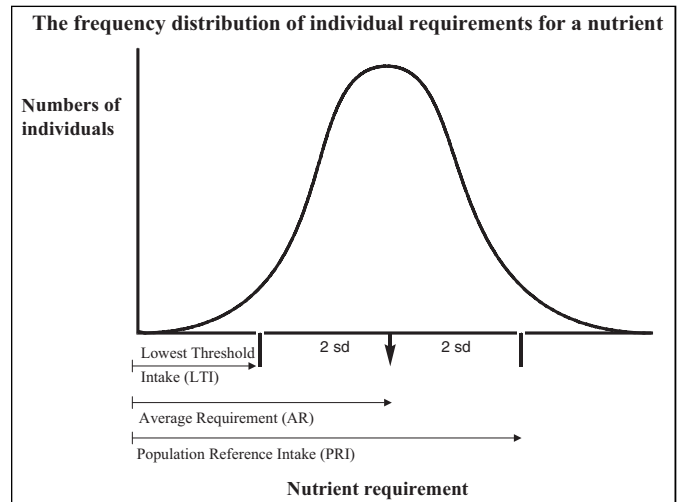


Figure 1. The guidelines are based on the physiological requirements (avoidance of nutrient deficiency, maintenance of specific biochemical functions and metabolic balance). For many essential nutrients – calcium, vitamin C, iodine – they are lower than corresponding values set up by national European expert groups, although both are derived based on the same published scientific reports. The derivation of the European guidelines on these three nutrients and their efficacy will be discussed.

Calcium is important for bone integrity. Therefore, an adequate calcium intake is necessary especially in children and adolescents. The calcium need of these young population groups is enhanced and the rate of absorption and retention is relatively high, while the calcium excretion is low [2]. The SCF considers the calcium retention needed for children between 1 and 10 years of age to be between 70 and 150 mg/d [3].

Derived from these values the PRI is calculated based on the supposition of an absorption rate of 35% and the addition of the safety charge of 2SD (30%). PRIs for adolescent exceed those for adults because of the increased requirement for bone development. Per day boys do have a mean retention need of 250 mg, girls of 300 mg. Table 1 shows that the average daily calcium retention needed for skeletal growth in newborn, children, adolescents and young adults is too low when the intake follows SCF recommendation. Also the PRIs of 700 mg/d of adults seem to be too low; the result will be calcium demineralisation of bone.

Vitamin C is involved in numerous metabolic reactions. To establish physiological requirements signs of clinical deficiency such as follicular hyperkeratosis, swollen or bleeding gums can be evaluated. To prevent the most important vitamin C deficiency, scurvy, a daily amount of 6.5 to 10 mg ascorbic acid is sufficient (4, 5). Another method to establish the vitamin C need is to determine its concentration in plasma, blood or leukocytes. Plasma concentrations above 0.2 mg/dl prevent classical signs of scurvy, plasma concentra-

Intake (mg)	Retention (mg)			
	newborn	children	adolescent	young adults
450	35	20	-61	-125
800	270	130	140	-60
1200	370-470	175	310	40
1600		260	320	30

Table 1. Retention of Calcium: Intake minus calcium in urine, faeces and dermis based on data from [2].

tions above 0.5 mg/dl are indicating an acceptable supply [6]. Such levels are reached at vitamin C intakes of about 30 mg per day [7].

The appropriate intake would be that needed to replace losses and thus maintain the body pool. This can be evaluated by isotopic studies of body stores.

The average vitamin C pool of healthy adults amounts to about 1500 mg (20 mg/kg body weight) [8]. Clinical signs of scurvy appear in adult males when the total body pool of vitamin C is below 300 mg [9]. A total body pool of 600 mg vitamin C is adequate and a total body pool of 900 mg would provide reserves for periods of low intake or high need [10, 11].

The body pool is catabolized at a rate of about 2.9% (4). The daily turnover rate is 45 mg when the body pool amounts 1500 mg.

The average requirement of vitamin C can be calculated as follows:

$$900 \times 2.9/100 \times 100/85 = 30.7 \text{ mg/d}$$

Under consideration of a safety charge of 40% the PRI can be evaluated:

$$900 \times (2.9+1.2)/100 \times 100/85 = 43.4 \text{ mg/d} \approx 45 \text{ mg/d} (1)$$

To confirm the relation between higher vitamin C intakes and lower incidence of some diseases more studies are necessary.

Indicators of *iodine* needs are: Loss of iodine by thyroid functions (40-100 µg/d) [12], need of iodine to prevent goitre (50-75 µg/d) [13], iodine need under consideration of stool excretion (120 µg/d) [14], iodine need for plasma iodine concentrations above 1µg/l (120 µg/d) [15], daily excretion in urine and daily intake of iodine (100-150 µg) [16]. Iodine balance and thyroid function can be sustained with intakes of 40 to 100 mg iodine/d [17].

- In the last two decades there has been a growing body of evidence for the health promoting and disease preventing effects of foods and nutrition. For many nutrients (vitamin E, beta-carotene, calcium, vitamin K, dietary folate) it was found that they could have further effects than the mere avoidance of deficiency disorders.
- Reasons for increased nutrient requirements are for example infectious diseases (vitamin A), wound healing (vitamin A, C, carotenoids), increased bone turnover (vitamin D), increased lipid peroxidation (vitamin E, C), increased energy expenditure (B-vitamins), alcohol consumption/contraceptives (vitamin B6 and others).
- The recommendations don't take into account the peculiarities of regions and/or the national dimension.
- The recommended levels of intake are also lower than those considered sufficient for the prevention of nutrition associated chronic degenerative diseases.

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4.3 New Reference Values for Nutrient Intake in Germany, Austria and Switzerland (DACH-Reference Values)

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In accordance to their very good collaboration through decades the Nutrition Societies of Germany, Austria and Switzerland (D,A,CH) decided to prepare new reference values for nutrient intake as a joint edition in the year 2000.

The new Reference Values [1] are an amplification (25 out of 39 nutrient values were changed) of earlier recommendations published in Germany in 1991 [2]. The nutrient data and energy values serve as the basis for a guide to a wholesome diet and thus are similar to those of equivalent scientific bodies in other countries and to those of FAO/WHO. Both the determination of the requirements and the derivation of recommendations correspond to international procedures such as used for the Dietary Reference Intakes (DRI) of 1998 [3] and add an important step forward towards international harmonization of reference values. Argumentations and deviations from recommendations made by other authorities have been explained elsewhere [4].

The "Reference Values" consist of two parts: Part I - Nutritive Aspects of Nutrients. Part II - Preventive Aspects of Nutrients and Food Components.

I. Nutritive Aspects of Nutrients

Objectives of the Reference Values

Excepting the guidelines for energy intake, recommended values should protect almost all (~98%) individuals of the respective group against potential damage to health from their diet and provide a basis for full functional capacity. Certain amounts must be added for additional requirements during pregnancy and lactation. It was not intended to consider special dietetic needs, associated with chronic use of drugs or high levels of consumption of coffee, tea, alcohol, etc. with the exception of tobacco and Vitamin C. These matters must be left to the decision of the individual physician.

Recommendations, estimated values and guideline values

Energy and nutrient requirements vary from person to person and from day to day; they are determined by individual factors and depend on a multitude of

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internal and external influences. Experimentally, they can be determined only in defined and small population groups. The values established are subject to a statistical distribution. In case of a normal distribution (Gaussian curve), the "average requirement" of the group will cover the needs of 50% of all persons studied while the requirements of remaining 50% of the group will be above the "average requirement".

Assuming a normal distribution of the average requirements, the levels of the average need for essential nutrients have to be raised by twice the standard deviation to end up with **recommendations**. In this way, amounts were calculated the intake of which would cover the requirements of nearly 98% of a population and protect them against health risks from their diet. Except for protein, nutrient requirements do *not* show a normal statistical distribution. Furthermore, the frequency distribution of the requirements is known only for a few nutrients and for very small population groups. In some cases, data from long-term inquiries into the intake of population groups have to be used. Since the data on the average requirements of the individual nutrients were thus determined by different criteria, the double standard deviation is usually replaced by a safety margin corresponding to 20-30% of the average requirement whose magnitude is close to that of a hypothetical double standard deviation. The figures determined in this way are given as recommendations. Such recommendations are made for nutrients listed in table 1. Unless stated otherwise, the safety margins added to the average requirements take into account any individual physiological variation and ensure the availability of adequate nutrient stores in the body. Since in many cases, corresponding figures are not available for all age groups, missing data for certain age groups had to be derived by extrapolation.

The human requirements of some nutrients (i. E. biotin, pantothenic acid and a number of trace elements) cannot yet be determined with the required precision. In such cases, **estimates** were made (Table 1), which means that the values used were established experimentally but lack adequate confirmation, because, the ranges of the available measurements may have been very large for methodological reasons or too few suitable data in humans were available. Where possible, specific figures were given as estimates instead of ranges though for some trace elements (copper, manganese, selenium, chromium, molybdenum) on the basis of available findings, estimates could only be given as ranges.

With regard to the energy supply, the *average* requirement of the respective population group was chosen as the **guideline value** because, in central Europe, a warning against overfeeding is given preference over a concern about inadequate energy intake. The guideline values for energy intake cannot be applied directly to individuals since, in addition to sex and body mass, it is predominantly physical activity that has an influence on the energy re-

quirements of individuals. The true energy requirements of individuals can only be established by continuous weight monitoring. Thus, the data given on the energy requirements constitute average values which can be used only as variables, eg for calculation of nutrient density or for menu planning in mass catering establishments. They are based on the basal metabolic rate and take into account the known increments to be added for physiological reasons as physical activity levels (PAL-Values).

In addition *guideline values* for orientation purposes are given for the intake of energy and several other nutrients (Table1). Estimated minimum requirements are given for water, fluoride and fiber. The intake of fat, cholesterol, alcohol and common salt should be controlled below certain limits.

How to use the Reference Values

The reference values are dealing with the *average* needs of groups within the population, to provide reference values for evaluation of the nutrient intake in specific *population groups* including individuals at different stages of their life and to plan a diet that fulfills the necessary nutritional requirements. In addition the recommendations will help to detect excessive or insufficient intake in risk groups in the population. But most important, the actual status of an individual's nutrient supply should be examined by other methods. The recommendations are not designed to be complied within one day or to act as a strict model for the intake of individual nutrients in a single meal. Since the absorption rate of certain nutrients decreases at very high doses, the recommended intake should be as uniform as possible and not be fulfilled by high doses at long intervals.

Nutrient density

Considering the dietary situation in Germany (low energy requirements owing to low physical activity), special attention has been given to the ratio between essential nutrients and energy. This problem has been taken into account by the concept of *nutrient density*, the amount of nutrient per 1 MJ.

Nutrient losses

The amounts of nutrients recommended refer to the amount still present in the food at the time of consumption. For some nutrients, the average losses by cooking and other methods of preparation in the household or in large catering facilities are stated in the explanations. Losses caused by preparation and treatment in the food industries must also be considered.

Undesirable Effects of Nutrients

All nutrients including water may be detrimental to health if their intake exceeds certain amounts. In this connection, the fat-soluble vitamins A and D are particularly critical because, at high dosage, they will accumulate in the body and produce characteristic signs of intoxication. Likewise, very high doses of water-soluble vitamins (eg vitamin B 6, folic acid) or minerals (common salt, selenium, fluoride etc.) may result in undesirable effects. This should be borne in mind when over-the-counter vitamin and mineral preparations are used for self-medication. Possible toxicological effects of every nutrient are mentioned and discussed.

Reference Values

Energy

The guideline values for energy are calculated according to doubly-labelled water measurements. They are valid for individuals with normal body weight and adequate physical activity. In practice to the calculated basal metabolic rate adequate physical activity levels (PAL-Values) are to be added. The energy requirement of an individual must be controlled by following body weight.

Protein

The recommended intake of protein did not change. The definition of essential and indispensable amino acids is stressed and the protein digestibility corrected amino acid score mentioned. As new indispensable amino acid Histidin is introduced.

Recommendations	Estimated Values	Guideline Values
Protein	59 g	Energy 2500 kcal
Linoleic acid	2.5%	Fat 30% of energy
Vitamin A	1.0 mg	Cholesterol 300 mg
Vitamin D	5 µg	Carbohydrates > 50%
Thiamin	1.3 mg	Fiber > 30 g
Riboflavin	1.5 mg	Alcohol 20 g
Niacin	17 mg	Water 2700 ml
Vitamin B ₆	1.5 mg	Fluoride 3.8 mg
Folic acid	400 µg	
Vitamin B ₁₂	3.0 µg	
Vitamin C	100 mg	
Calcium	1000 mg	
Phosphorus	700 mg	
Magnesium	400 mg	
Iron	10 mg	
Iodine	200 µg	
Zinc	10 mg	

Table 1. Recommendations, Estimated Values and Guideline Values for Men, 19-25 years old (amounts per day) [1]

Fat

Total fat intake should not exceed 30% of energy in sedentary individuals and can reach 35% of energy in physically active individuals. This goal for dietary fat is especially important for primary prevention of obesity [5]. Saturated fatty acids should provide no more than 10% of energy, polyunsaturated fatty acids can reach 7% of energy and even 10% of energy, when intakes of saturated fatty acids and/or cholesterol are high. The ratio of linoleic (n-6) to α -linolenic acid (n-3) should reach 5:1. Monounsaturated fatty acids may provide the difference to the recommended amount of total fat. Trans fatty acids should be below 1% of energy. Dietary cholesterol should not exceed 300 mg per day.

Reference Values for essential fatty acids should be: 2,5% of energy for linoleic acid (n-6) and 0,5% of energy for α -linolenic acid (n-3).

Carbohydrates and Dietary Fibers

Carbohydrates should exceed 50% of energy. The decrease of nutrient density by a high sucrose intake is discussed. The guideline value of dietary fiber is unchanged at 30 g per day at least.

Alcohol

The first time a guideline value for alcohol of 20 g ethanol per day for the healthy man and of 10 g ethanol per day for the healthy women is stated. Several negative effects of an higher ethanol intake are mentioned.

Vitamins

Within the vitamins the reference values for Vitamin E, Folic Acid, and Vitamin C are increased, for Vitamin B₁, B₂, B₆ and Niacin are decreased and for Vitamin A, D, K, Pantothenic Acid, Biotin and Vitamin B₁₂ are unchanged with respect to the older reference values [2].

Minerals and Trace Elements

The reference values for calcium and magnesium are increased. The reference values for Iron and Iodine are unchanged and for some other trace elements are precised.

II. Preventive Aspects of Nutrients and Food Components

Reference values for nutrient intake are also guided by health aspects in the sense of the prevention of nutrition-related diseases. The avoidance of excessive intake (particularly detrimental in the case of energy, fat, alcohol, cholesterol, purines and common salt) is already a very important preventive measure. For detailed figures, one is referred to the Nutrition Reports of the German Nutrition Society and the Institute of Nutrition Science in Vienna and the Swiss Nutrition Report (6, 7, 8).

At present, special attention is paid to the antioxidative effects of vitamins C and E and of carotenoids in the prevention of diseases. However the present state of knowledge does not justify specific recommendations. At the international level, comprehensive work has been done on the influence of the vitamins E, C and β -carotene on health, performance and life expectancy. As a result there is no evidence for preventive effects of single vitamin E, C or β -carotene supplements against myocardial infarction or cancer, but there are several studies showing the protective effect of a wholesome nutrition. The detrimental effect of high supplements of β -carotene in smokers needs special attention. The beneficial effects of folic acid against neural tube defect and hyperhomocysteinemia and of vitamin K against osteoporosis are discussed. Based on this material, effective strategies have been developed for prevention, intervention and therapy. The essence of these has been incorporated into the present reference values and their transformation into dietary guidelines and the campaign "5 a day". By ensuring a wholesome diet, full implementation of the present reference values on nutrient intake may effectively contribute to the prevention of diseases.

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4.4 Genomic Stability: A New Paradigm for Recommended Dietary Allowances (RDAs)

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The field of mutation research is founded on the original observations that specific physical and chemical agents, man-made or natural, can produce significant critical alterations to the genome in both somatic and germ cells and that these events are a cause of accelerated ageing, cancer and developmental defects [1-4]. In addition much has been learned about the great complexity of the cells' capacity to repair such DNA lesions [1]. Numerous studies have been performed on the genotoxic effect of in vivo exposure to carcinogens on gene mutation in human populations but it is only recently that the important effect of dietary imbalance on DNA damage rate in humans has been taken into consideration [2-4]. Spontaneous DNA mutation rates (> one cell in a thousand exhibiting a major chromosomal mutation) are very high in humans even in the absence of overt exposure to known carcinogens and there is a wide variation in rates of mutation even among individuals of the same age [3] (Figure 1). One therefore has to consider whether genetic factors and diet may be the main determinants of variation in background mutation rate.

The focus on diet as a key factor in determining genomic stability is more important than previously imagined because we now know that it impacts on all relevant pathways i.e. exposure to dietary carcinogens, activation/detoxification of carcinogens, DNA repair, DNA synthesis and apoptosis [2-4]. This is because all of these critical pathways are dependent not only on enzymes but also on the provision of substrate and co-factors some of which are only available at the right concentration when dietary intake of key minerals and vitamins is adequate. Effectively this means that dietary deficiency in key micronutrients required for DNA maintenance may produce similar effects as inherited genetic disorders that impair activity of enzymes required for genomic stability [4-7] and may damage DNA to similar extents as significant exposure to known carcinogens such as ionising radiation [2].

Current recommended dietary allowances for vitamins and minerals are based

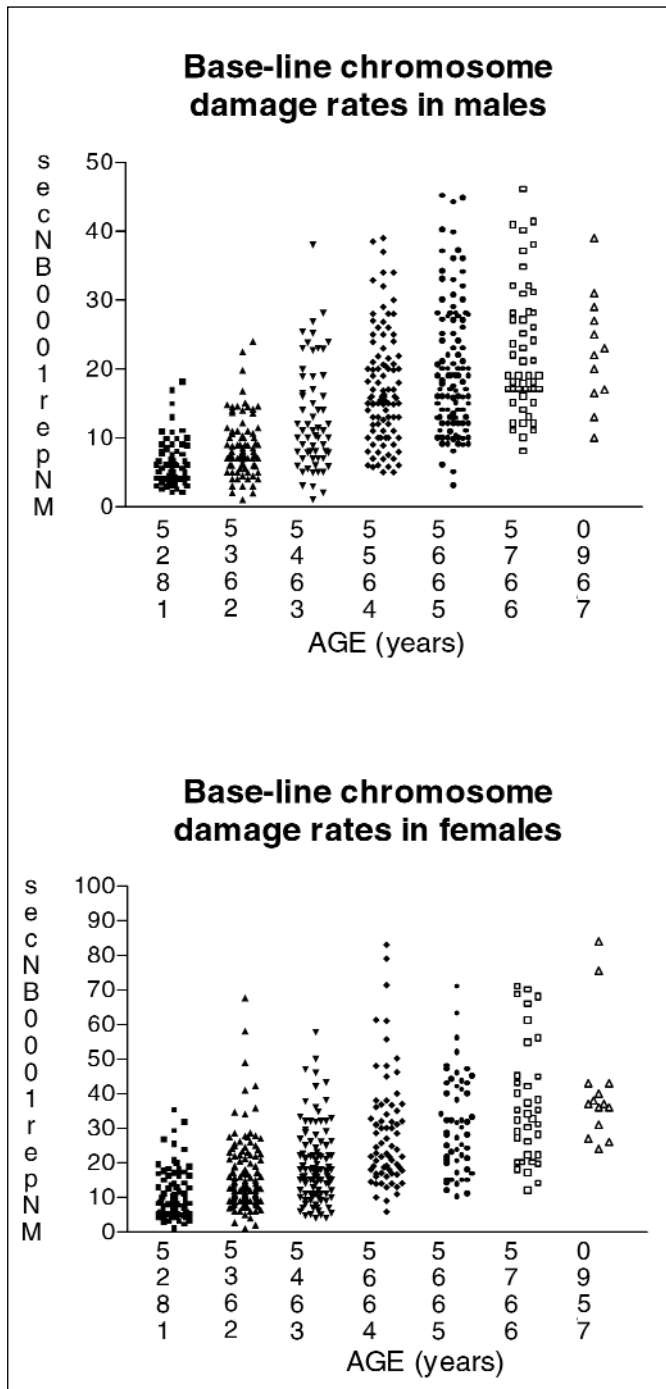


Figure 1. Variation in chromosome DNA damage rates of healthy non-smoking males (N = 495) and females (N = 511) within and between age groups measured using the cytokinesis-block micronucleus assay [3, 14, 15, 22]. MN = micronuclei, BN = binucleated cells.

largely on the prevention of diseases of deficiency such as scurvy in the case of vitamin C, anemia in the case of folic acid and pellagra in the case of niacin. However, these diseases of deficiency are rare in the developed world but degenerative disease and developmental disease are very important. Recently the dietary allowance for folic acid for the prevention of neural tube defects has been revised to more than double the original RDA [8]. There is a strong international awareness that it is also necessary to re-define RDAs for the prevention of degenerative disease (such as cancer, cardiovascular disease and Alzheimer's disease) and compression of the morbidity phase during old age. Because diseases of development, degenerative disease and ageing itself

Micronutrient/s	Role in genomic stability	Consequence of deficiency
Carotenoids, Vitamin C, Vitamin E	Prevention of oxidation to DNA and lipid oxidation [25, 26].	Increased base-line level of DNA strand breaks, chromosome breaks and oxidative DNA lesions and lipid peroxide adducts on DNA [25, 26].
Folate and Vitamin B12	Maintenance methylation of DNA; synthesis of dTMP from dUMP and efficient recycling of folate [27].	Uracil misincorporation in DNA, increased chromosome breaks and DNA hypomethylation [27].
Niacin	Required as substrate for poly(ADP-ribose) polymerase (PARP) which is involved in cleavage and re-joining of DNA and telomere length maintenance [28].	Increased level of unrepaired nicks in DNA, increased chromosome breaks and sensitivity to mutagens. [28]
Zinc	Required as a co-factor for Cu/Zn superoxide dismutase, endonuclease IV, function of p53, Fapy glycosylase and in Zn finger proteins such as PARP [29].	Increased DNA oxidation, DNA breaks and elevated chromosome damage rate [29].

Table 1. Examples of the role and the effect of deficiency of specific micronutrients on genomic stability

are partly caused by damage to DNA [2, 9] it seems logical that we should focus better our attention on defining optimal requirements of key minerals and vitamins for preventing damage to both nuclear and mitochondrial DNA. To date our knowledge on optimal micronutrient levels for genomic stability is scanty and disorganised. Table 1 lists some of the most important minerals and vitamins required for DNA maintenance and prevention of DNA damage and the DNA lesions that could be induced by inadequate intake of these anti-mutagenic vitamins.

Supplementation of diet with appropriate minerals and vitamins could, in some cases, help overcome inherited metabolic blocks in key DNA maintenance pathways. The interaction between genotype and diet in modulating risk is emerging as an exciting area of research as regards micronutrient effects on DNA. This is illustrated by recent research on the common mutations in the methylene tetrahydrofolate reductase (MTHFR) gene. The product of this gene determines the availability of folate for the synthesis of thymidylic acid (TMP) from deoxyuridylic acid (dUMP) and is predicted to minimise uracil misincorporation into DNA whilst making less methylfolate available for synthesis of S-adenosyl methionine, the common methyl donor [3]. Epidemiological studies have suggested that individuals with this genotype may be protected against colorectal cancer and acute lymphocytic leukaemia [10, 11].

Both in vitro and in vivo studies with human cells clearly show that folate deficiency, vitamin B12 deficiency and elevated plasma homocysteine are asso-

Genomic instability biomarker	Concentration in culture medium - in vitro	Concentration in RBCs - in vivo	Concentration in plasma - in vivo	Daily dietary intake of folic acid via supplementation
SSB/DSB - Comet assay	• 100ng/ml [12]			
Micronuclei	• 80ng/ml* [13]	• 15 ng/ml [21]	• 600 ng/ml [21]	• 5,000 ug/d [21]
	• 53ng/ml [15]	• 7.4 ng/ml [16]		• 228 ug/d [16]
			• 313 ng/ml [22]	• 700 ug/d** [22]
Uracil in DNA	• 53ng/ml [14]	• 53 ng/ml [17, 18]	• 480 ng/ml [17, 18]	• 5,000 ug/d [17, 18]
CpG hypo-methylation		• 23.7ng/ml [19]		• 10,000 ug/d [19]
		• 7.3ng/ml [20]		• 516 ug/d [20]

* in the presence of thymidine (4.0mg/L). ** together with 7ug/d vitamin B12. 1ng/ml of folic acid = 2.26 nmol/L.

Table 2. Concentration and dietary intake of folic acid that minimises genomic instability in human tissue

ciated with expression of chromosomal fragile sites, chromosome breaks, excessive uracil in DNA, micronucleus formation and DNA hypomethylation (Table 2) [3, 12-19, 20, 25, 26]. It is notable that four of eight known human glycosylases are dedicated to the removal of uracil from DNA, the mutation caused by folate deficiency [1]. In vitro experiments indicate that DNA breaks in human cells are minimised when folic acid concentration in culture medium is greater than 180 nmol/L (80 ng/ml) [12, 13]. Recently we have shown that uracil in DNA, chromosome breakage, chromosome rearrangement and gene amplification in human lymphocytes cultured for 9 days is minimised at a folic acid concentration of 120 nmol/L [14, 15] (Figure 2). Intervention studies in humans taking folate and/or vitamin B12 supplements show that DNA hypomethylation, chromosome breaks, uracil misincorporation and micronucleus formation are minimised when plasma concentration of vitamin B12 is greater than 300 pmol/L, plasma folate concentration is greater than 34 nmol/L, red cell folate concentration is greater than 700 nmol/L folate and plasma homocysteine is less than 7.5 μ mol/L [16-22]. These concentrations are only achievable at intake levels in excess of current RDAs ie more than 400 μ g folic acid per day and more than 2 μ g vitamin B12 per day. Dietary intakes above the current RDA may be particularly important in those with defects in the absorption and metabolism of these vitamins, for which aging is a contributing factor. For example it has recently been shown that vitamin B12 (active corrinoid) bioavailability is significantly reduced in Alzheimer patients suggesting a higher requirement for vitamin B12 in these individuals [30]. The defect in utilising vitamin B12 could explain the significantly elevated DNA damage rate (micronucleus frequency) observed in both sporadic and familial Alzheimer patients [31] because micronucleus frequency is significantly related to vitamin B12 status [22, 25].

The above suggests that both controlled in vitro experiments and placebo-controlled in vivo interventions are informative in determining optimal micronutrient intake for prevention of genomic stability. However, a more useful approach would also take into consideration the genotype of individuals with a focus on specific common genetic polymorphisms that alter the bioavailability of specific micronutrients, their metabolism and the affinity of specific key enzymes involved in DNA metabolism for their micronutrient co-factor. Other common polymorphisms, such as the manganese superoxide dismutase alanine to valine change in the -9 position, may increase susceptibility to oxidative stress and therefore may necessitate a higher requirement for vitamin C and vitamin E [21]. In the past considerable attention has been given to gene-environment interaction as it relates to mutagen/carcinogen exposure and genotoxic and cancer risk. Figure 3 illustrates the concept that perhaps gene-diet interaction as it relates to efficacy of DNA repair/DNA metabolism and micronutrient deficiency may be equally important in determining genomic stability and its consequent impact on fertility, development, cancer risk and the rate of ageing [2, 3, 10, 11, 22].

Our current stage of knowledge on the role of micronutrients in maintenance of genomic stability has been recently reviewed in a special issue of Mutation Research [4]. These reviews identify the current gaps in our knowledge and provide the basic information for appropriate design of placebo controlled trials that are required to define appropriate RDAs for genomic stability. In the future clinical trials with a wide array of DNA damage end-points would be necessary including measures of mitochondrial DNA deletions and point mutations, nuclear microdeletions and point mutations, telomere shortening, balanced chromosomal translocations, chromosome non-disjunction or aneu-

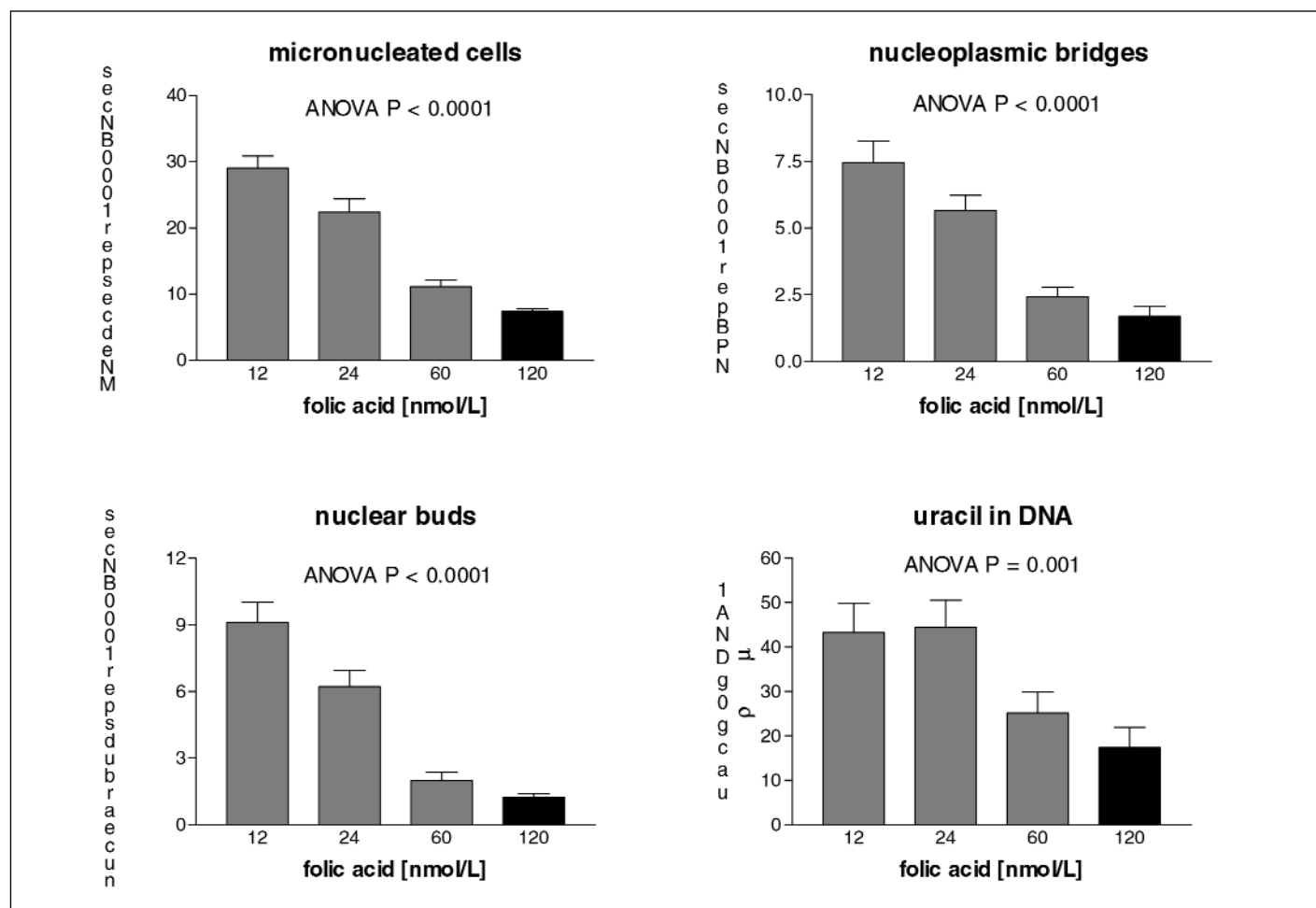


Figure 2. Relationship between folic acid concentration and four different biomarkers of DNA damage. MNed = micronucleated cells, a biomarker for chromosome breakage and loss, NPB = nucleoplasmic bridges, a biomarker of chromosome rearrangement, nuclear buds = a biomarker for gene amplification. Results from long-term primary lymphocyte cultures of 20 different subjects (ie N = 20). Data from Crott et al. [15].

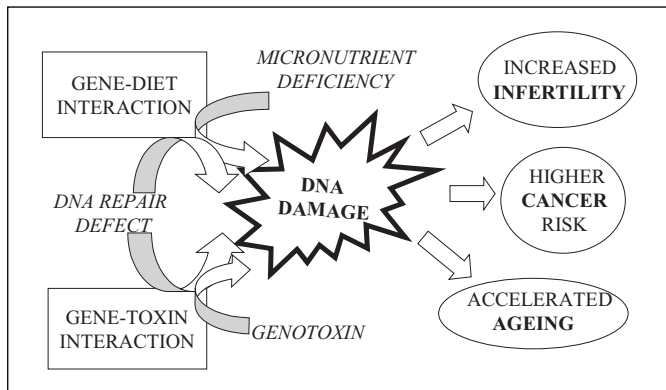


Figure 3. The concepts of gene-diet and gene-toxin interaction and their impact on various health outcomes.

ploidy, micronucleus formation, single and double strand breaks in DNA, DNA adducts and microsatellite instability. It is clear that this objective requires multiple expertise. That there is a need for an international collaborative effort to establish RDAs for genomic stability is evident.

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Diet, Nutrition and Life-Styles in Health Promotion

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4.5 Healthy Lifestyles and Health Promotion: A Challenge and an Opportunity for Nutrition Science

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Epidemiology of cardiovascular disease and related conditions

Diabetes and coronary heart disease (CHD) are rare or unknown in traditional societies (hunter-gatherer, subsistence agriculture). Such societies are characterised by high levels of physical activity, relatively low energy diets, and leanness throughout life. However, when such populations westernise they

undergo a very predictable and consistent pattern of lifestyle changes, involving *inter alia* a move to a more energy dense diet (which is frequently of poor nutritional quality) and an increasingly sedentary lifestyle. This results in steadily increasing population mean body mass index (BMI), and increasing prevalence of obesity over time and increases the prevalence of a range of obesity-related conditions including type 2 diabetes, hypertension and other manifestations of cardiovascular diseases (CVD).

Prevalence of the major chronic diseases and conditions such as cardiovascular diseases, type 2 diabetes, obesity and certain cancers exhibit wide variations between countries and within countries over time [1]. In terms of trends over time in CVD mortality, two distinct patterns have emerged. Impressive reductions in a number of affluent western countries such as Finland, the US, Canada and Australia where the epidemic peaked in the 1960's and became the target of intensive primary and secondary prevention interventions (diet, lifestyle and clinical care). In North Karelia (Finland) CVD mortality fell by more than half between the early 1970's and the early 1990's [2]. In Poland mortality from CHD and related conditions rose steadily from 1970 to peak in the late 1980's, and fall quite sharply by the mid 1990's [3]. The reasons for this positive change are not well understood but it was speculated that they may be related to recent improvements in dietary quality.

The second pattern of change is a distinct worsening of CVD mortality in a number of less affluent countries as they become more economically developed and adopt a more westernised lifestyle [4]. India, China and certain countries from the former communist block of Eastern Europe fit into this category. The trend with type 2 diabetes (and its major risk factor, obesity) is, unfortunately, only in one direction – worsening in all countries for which data exists. For example, over the last 20 years as in other developed societies, diabetes prevalence in Australia has doubled in association with greatly increased rates of obesity [5]. Even sharper increases in prevalence have been documented in high-risk populations such as Australian Aborigines [6]. Unless the escalating epidemic of obesity can be stemmed, there seems little chance of attenuating this worrying trend.

Understanding the reasons for these different and changing patterns of chronic disease is essential to developing rationally based approaches to health promotion. Coronary heart disease and type 2 diabetes are particularly interesting examples of non-communicable diseases closely linked to diet and other aspects of lifestyle.

The pathophysiology of atherosclerotic vascular disease

Knowledge of the pathogenesis of atherosclerotic vascular disease has burgeoned over the past decade [7, 8]. The health of the *vascular* endothelium is central to genesis of vascular disease. Reactive oxygen species, oxidised lipoproteins, cigarette smoking and flow-mediated shear stress all impair endothelial function. *It is now recognised that inflammatory processes are also intimately involved* [8].

Atherosclerosis in large arteries is initiated following oxidative damage to the vascular endothelium and progresses with the deposition of oxidised low-density lipoprotein (LDL) in the artery wall [9]. Oxidised LDL is taken up by macrophages, which in turn are converted to the lipid-laden foam cells characteristic of the atherosclerotic lesion. Binding and transendothelial migration of leucocytes is mediated by cell adhesion molecules, the expression of which is up-regulated following endothelial damage. Hyperhomocysteinemia, arising from inadequate dietary folate, is likely to contribute to oxidative stress and endothelial damage. The dyslipidemia of the insulin resistance syndrome and type 2 diabetes is characterised by elevated triglycerides, a preponderance of small dense LDL particles that are more susceptible to oxidative modification and low HDL cholesterol. Removal of oxidised lipids from circulation is probably effected in part by paraoxonase, a HDL-associated enzyme able to hydrolyse lipid peroxides *in vitro* [10]. Thus a greater susceptibility of circulating lipids to oxidation, possibly coupled with a lower antioxidant capacity from HDL, could contribute to the greater risk of CVD in insulin resistance and type 2 diabetes. Antioxidants such as vitamins E and C and carotenoids appear to interact to protect the LDL particle from oxidation and also have direct protective effects on endothelial function [9, 11]. Paraoxonase activity also appears to be modulated by dietary factors and smoking [12].

Endothelial dysfunction in the capillary and resistance beds is associated with insulin resistance, increased levels of PAI-1 and microalbuminuria. Hyperinsulinaemia and hyperglycaemia associated with glucose intolerance contribute to endothelial dysfunction, and the macro- and micro-vascular complications of diabetes. It has recently been proposed that insulin resistance arises as a consequence of endothelial dysfunction via impairment of vasodilatory function in resistance vessels, resulting in reduced blood flow to skeletal muscle and thus lower glucose uptake [13]. This may partly explain how the insulin resistance syndrome is associated with increased risk of CVD.

There appears to be positive feedback between inflammation and lipid accumulation in the vessel wall in atherosclerosis. The macrophage, with its scavenging and immunological functions, may be the link between intracellular cholesterol accumulation and activation of inflammatory [14]. Mediators of the inflammatory response (CRP, IL-1, IL-6, TNF- α) all increase the binding of LDL to the endothelium and smooth muscle to further up-regulate the inflammatory response [8]. This in turn stimulates increased production of macrophages in the lesion, and increased production of cytokines and growth factors. Platelets are also involved, as they can adhere to injured endothelium and release growth factors and cytokines. Activated platelets also produce thromboxane and leukotrienes, amplifying the inflammatory response. As the plaque grows it is covered by a fibrous cap. When this cap is dense, the lesion is usually stable. When the fibrous cap thins, the lesion can become unstable and more easily rupture. Plaque rupture triggers the release of acute phase reactants and stimulates thrombosis. If this occurs in a coronary artery it can precipitate a myocardial infarction.

There is growing interest in the role of inflammatory cytokines, such as C-reactive protein (CRP), as risk markers for atherosclerotic vascular disease. CRP is produced in the liver in response to injury, including infection. An analysis of the third NHANES data indicated elevated circulating concentrations of CRP among individuals who are obese or have diabetes [15]. TNF- α and IL-6 are released from adipose tissue and stimulate hepatic production of CRP.

Interventions

As the pathogenesis of atherosclerosis is more fully elucidated, the complexity of the interactions that can modify risk (both positively and negatively) is becoming clearer. Preventive and therapeutic interventions need to be designed to address this complexity. Most interventions focus on a single pathway or risk marker (cholesterol or blood pressure lowering, oxidation). The more effective therapeutic agents appear to act on more than one component of the atherosclerotic process. For example, while statins were designed to lower cholesterol by inhibiting the activity of the rate-limiting enzyme for cholesterol synthesis, HMGCoA reductase, the magnitude of their benefit can only be partially attributed to this activity. Some statins also have anti-inflammatory actions, which may enhance their efficacy in protecting against CVD [16].

Lipid-lowering and antihypertensive drugs: The most common approach to reduce the risk of cardiovascular disease is to intervene with a variety of drugs targeted at two major risk factors: elevated cholesterol, and elevated blood pressure. This reflects a disease-oriented model of health care, "with highest priority given to the prevention of death and acute illness" [17]. Intervening much earlier in the disease process (health promotion and disease prevention) is lower priority despite the prevailing rhetoric. Drug treatments are seen as easier, from the perspective of both the patient and the practitioner. The body of evidence is much greater for drugs than for non-drug interventions: paralleling the funds available for trials and the potential for profit. There is no doubt that for individuals identified as being at high risk, antihypertensive drugs reduce the risk of CVD, especially stroke, as do cholesterol lowering drugs reduce the risk particularly of CHD. However the situation with respect to primary and secondary prevention at the population level is very different. The greatest reductions in CVD at the population level have come with non-pharmacological interventions. Even in the unlikely event that societies could afford mass medication of large numbers of relatively low risk people (in whom most of the cases occur), the potential for harm may outweigh the potential for benefit, even with something as apparently benign as aspirin [18].

Single nutrients: The classic reductionist approach to diet in the prevention or treatment of disease is to attempt to isolate the 'active agents' from the diet and promote them like drugs. This has been applied to antioxidants such as vitamin E and beta-carotene with little success. Indeed in the case of beta-carotene, a trial had to be cut short when an early analysis indicated higher mortality from cancer in the sub-group of smokers in the intervention group [19]. The single nutrient approach continues with a range of dietary supplements being promoted with little or no supporting evidence. Common foods (such as breakfast cereals, breads) are being fortified with the latest popular nutrients (fibre, antioxidants, folate, various other vitamins and minerals). "Nutriceuticals" (food as pharmacology) are being developed and heavily promoted on the basis of variable evidence (phytoestrogens, flavanoids, n-3 fatty acids). In a variation on this theme, there has also been a focus on the beneficial (or harmful) impact of increased consumption of individual foods: fish, nuts, different types of fat.

Diet: The foregoing brief overview of the atherosclerotic process has highlighted the complex interplay between oxidant stress, inflammation, insulin resistance and endothelial dysfunction in the aetiology of vascular disease. Many dietary and other lifestyle factors can be linked directly to CVD risk through their impact on one or more of these processes. It follows that, because of this complexity, a focus on a single nutrient or food is unlikely to be effective. This is supported by the scientific evidence in favour of beneficial effects of consumption of a wide variety of fruits and vegetables, but a dearth of evidence for beneficial effects of interventions based on single nutrients such as vitamin E and β -carotene. The potential synergistic interactions between the myriad dietary components probably underpin the strongly beneficial effects of certain diets [20]. The challenge of developing a measure of dietary quality and variety to rate different diets has recently been taken up by Gerber and co-workers who compared American and Mediterranean diets using a Diet Quality Index based on a range of biochemical indicators [20].

A number of dietary patterns have been identified as protecting against CVD and the major cancers.

- Rich in a wide range of vegetables and plant foods generally, and pulses, nuts, herbs and wild greens in particular;
- High intake of fresh fruit
- Low intake of red meat, moderate intake of chicken
- Low intake of saturated fat
- Regular intake of fish and other seafood
- High ratio of n-3/n-6 polyunsaturated fat

Mediterranean diets, in particular the diet of Crete as documented in the 1950-60's in the Seven Countries Study [21, 22], encompass these characteristics. The Lyon Diet Heart Study was a randomised secondary prevention trial testing whether a Mediterranean-type diet would reduce the rate of recurrence after a first myocardial infarction [23, 24]. Subjects on the intervention diet were asked to make the following changes to their eating patterns: replace butter and cream with a Canola-based margarine and olive oil, consume increased quantities of fruit, vegetables, legumes, bread, chicken and fish, and avoid beef, lamb and pork. Saturated fat intake fell, as did n-6 polyunsaturated fat, while monounsaturated fat and n-3 polyunsaturated fat consumption rose. The diet was maintained for the 4 years of follow up, highlighting its acceptability and sustainability. The comparison arm was a prudent western diet, comparable to the American Heart Association Step 1 diet.

An intermediate analysis after 27 months indicated a 70% reduction in mortality and all serious cardiovascular end points. This benefit was maintained up to 4 years after the first infarction. Among the traditional risk factors, plasma cholesterol, systolic blood pressure, leucocyte count, female sex, and aspirin usage were all significantly and independently associated with recurrence. This most dramatic reduction in CVD risk is much greater than for any pharmacological intervention. However, in contrast to many drug interventions total mortality also fell markedly.

One of the most profound changes in diet was in the profile of polyunsaturated fatty acids. The ratio of 18:2n-6/18:3n-3 was 18.3 in the control subjects on a prudent diet was 18.6, and 3.6 in the subjects consuming the Mediterranean-type diet. The n-3 fatty acids influence CVD through a number of different mechanisms including alterations in eicosanoid, cytokine or nitric ox-

ide levels, changes in the production of platelet derived growth factors, direct effects on calcium ion channels or via alterations in receptor activities. Through such mechanisms they could influence multiple processes implicated in the pathogenesis of CVD, including atherosclerotic lesion regression, and reductions in ventricular arrhythmia, blood pressure, plasma triglyceride levels, platelet aggregation and inflammation [25, 26].

In addition to having a beneficial fatty acid profile, Mediterranean-type diets are also a rich source of a wide range of antioxidants and other bio-active phytochemicals, including folate [22]. There are many pathways by which these diets could modify risk of chronic diseases. The great advantage of comprehensive dietary interventions is that they have the potential to impact on other chronic diseases including major cancers [27], chronic obstructive airways diseases, and diabetes and its complications.

Other dietary secondary prevention trials which have also achieved impressive results include the Diet And Reinfarction Trial [28, 29] which focussed on changing fat, fish and fibre intakes, and a 12 month trial in India focusing on greatly increasing fruit and vegetable intakes from a very low base [30].

The evidence for efficacy of increasing vegetable and fruit consumption with respect to prevention of CVD and other major chronic diseases is relatively clear [31]. The research questions requiring urgent attention relate to ways of achieving this in populations, particularly those at high risk such as socioeconomically disadvantaged groups. Given the indisputable role of obesity as a risk factor for diabetes, and emerging evidence for obesity as a chronic inflammatory state with an attendant risk of vascular disease, dietary quality (in particular, energy density) and physical activity also require urgent attention. These questions go beyond (but are not independent of) issues of clinical care, biochemical mechanisms and efficacy that are addressed in randomised controlled trials. They relate to social phenomena, including education, food supply and individual and collective self-efficacy in communities. Hence interventions designed to achieve chronic disease prevention, and their evaluation, require a multidisciplinary approach reflecting the complexity of the underlying causes of disease.

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4.6 The EURODIET Initiative and Health Promotion Prospects: the Case of Greece

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The development of European guidelines for healthy diets and lifestyles has been a primary objective of the EURODIET initiative. This project, formally

titled "Nutrition and Diet for Healthy Lifestyles in Europe", was funded by the European Commission* and the Greek Ministry of Health, and coordinated by the University of Crete. EURODIET began in late 1998 and was completed earlier this year with the publication of the reports and evidence base [1, 2]. The project was commissioned in recognition that the considerable body of scientific evidence on healthy nutrition and lifestyles needs to inform health policy, and the timing is significant in view of recent developments on the European policy scene – notably the Commission's White Paper on Food Safety [3] and the Council Resolution on health and nutrition [4].

Eurodiet set out to define practical European guidelines for diet-related disease prevention and health promotion. To realize this, the Eurodiet steering committee adopted an integrated approach. Four working parties were created to evaluate the state of the art in terms of:

- (1) the relationships between health and nutrients;
 - (2) translating nutrient targets into effective food-based dietary guidelines (FBDG);
 - (3) effective ways of encouraging health promoting changes in eating and physical activity patterns and
 - (4) the opportunities and barriers posed by the broader policy framework.
- Each working party also considered what needs to be done and how – in terms of actions required to take the scientific recommendations forward and the added value of EU level policy and structures.

Realization of the project entailed a 2-year process (1998-2000) of scientific evaluation, consultation and debate beginning with the formation of working parties composed of academic scientists to examine the evidence and culminating with a European conference held in Crete, Greece in May 2000 to debate the science and policy implications. Stakeholders' representatives from agriculture, the food industry, consumer groups and other bodies, were consulted throughout. The outcomes are briefly reviewed here.

Under the title "European Diet and Public Health: the continuing challenge", Working Party 1 (Chair Anna Ferro Luzzi, Italy; Rapporteur WPT James, UK) set out to evaluate what is known about nutrient/health associations and the principal public health problems in Europe. The remit covers the most serious and/or prevalent health conditions, including cardiovascular diseases, cancer, obesity, osteoporosis, iron deficiency disorders, iodine deficiency disorders, and dental caries. Scientists associated with this working party also examined population genetic variations; specific population subgroups, such as infants, the elderly, pregnant woman and immigrants; lifestyle factors including breastfeeding and physical activity; and the multiple roles played by two particular nutrients (selenium and folate) in human health. One end result of these analyses, shown in Table 1, was the specification of population goals for nutrients and features of lifestyle consistent with the prevention of major public health problems in Europe.

Within the EU, intakes of nutrients and levels of physical activity often differ markedly from the optimum. In developing food-based dietary guidelines (FBDG) for individuals there is therefore a need to recognize the difficulty of achieving these goals in the short term. Intermediate targets may be developed as a pragmatic step to improve health.

Nutrient goals require translation into relevant, quantitative guidelines for specific food choices. Working Party 2 (chair Michael Gibney, Ireland; rapporteur BrittMarie Sandstrom, Denmark), examined current dietary intakes and the development of food-based dietary guidelines (FBDG). The Working Party set out how best to develop a step-by-step approach to FBDG following the original FAO/WHO consultation on this topic [5]. Methodological issues and their influence on the interpretation of data for the development of FBDG which are realistic, attainable and culturally acceptable were examined and rational approaches for the formulation of evidence-based and hence effective FBDG are proposed. Given that foods, eg fats, differ markedly in their contribution to diets across Europe, Working Party 2 concluded (a) that appropriate dietary guidelines are best generated on a national/ regional basis and (b) that it was

* The Eurodiet project has been financially supported by the EC Directorate General of Health and Consumer Protection (Unit G/3, formerly DGV F/3), under the Community Action Program on health promotion, information and training. However, neither the European Commission nor any person acting on its behalf is liable for any use made of the information available through this project.

Component	Population goals	Levels of evidence ²
Physical Activity Levels (PAL)	PAL > 1.75 ³	++
Adult Body Weight as BMI	BMI 21-22	++
Dietary Fat% E	< 30 ³	++
Fatty Acids% total E		
Saturated	< 10	++++
Trans	< 2	++
Polyunsaturated (PUFA)		
n-6	4-8	+++
n-3	2 g linolenic + 200 mg very long chain	++
Carbohydrates Total% E	> 55	+++
Sugary food consumption, occasions per day ⁴	≤ 4	++
Fruit and Vegetables (g.d ⁻¹)	> 400	++
Folate from food (µg.d ⁻¹)	> 400	+++
Dietary Fibre (g.d ⁻¹)	> 25 (or 3g/MJ)	++
Sodium (expressed as sodium chloride) (g.d ⁻¹)	< 6	+++
Iodine (µg/d)	150 (infants - 50) (pregnancy - 200)	+++
Exclusive Breast Feeding	About 6 months	+++

Table 1. Population goals for nutrients and features of lifestyle consistent with the prevention of major public health problems in Europe¹
Source: Eurodiet Core Report [1].

- Other nutrient goals, e.g. on iron, calcium, alcohol, water and vitamin D are important and are included in the text.
- Levels of evidence are based on those used in several guideline systems, e.g. the Cochrane System, the US Academy of Science scheme and the systems used in the assessment of diet in relation to cancer by WCRF (1997) and member state expert bodies. These other systems are included because it is often difficult to undertake dietary studies in a double blind placebo controlled manner as for drug trials. Thus the best evidence is considered as convincing by these expert groups when integrating meta-analyses of different types of study but are nevertheless classified as either ++ or only +.
++++ Multiple double blind placebo controlled trials.
+++ Single study of double blind analyses or, for breast-feeding, a series of non-double blind analyses.
++ Ecological analyses compatible with non-double blind intervention and physiological studies.
+ Integration of multiple levels of evidence by expert groups.
These trials and other analyses do not prove that only the precise values in Table 1 are correct, but the evidence from dietary change or differences support these values.
- Sedentary societies will probably need to be on a lower fat intake, e.g. 20-25% to avoid excessive weight gain. The PAL value is equivalent to 60-80 min. walking daily to avoid weight gain on high fat intakes; this includes the 30 min. goal for preventing cardiovascular diseases and diabetes.
- An occasion includes any episode of food and drink consumption in the day. This limited intake is compatible with many member states' limits on total sugar intake and the Nordic concern to limit the intake of children and those adults on low energy intakes to no more than 10%.

unlikely that a clear food-based system can be developed on a pan-European basis. In this respect, the harmonization of survey methods within the EU to facilitate the development of regional and EU FBDG is recommended. As it stands, the most immediate and commonly applicable FBDG for the EU is for an increase in fruit and vegetable intake, and increased prevalence and duration of breast-feeding, accompanied by guidelines for increased physical activity.

Implementation requires the identification of public health strategies and action plans to enable healthier nutrition and lifestyle choices, and this was the task undertaken by Working Party 3 (Chair Michael Sjöström, Sweden; rapporteur Lynn Stockley, UK). Reviews carried out on the health impact effectiveness of various types of intervention to promote healthy eating and physical activity conclude that the most effective interventions.

- adopt an integrated, multidisciplinary, and comprehensive approach
 - involve a complementary range of actions, and
 - work at an individual, community, environmental and policy level.
- This is a different approach from the usual – mistaken – assumption that all

one has to do in health promotion is to provide better information and education. An easily transferable framework proposed builds on the concepts of target groups, settings and approaches, and Working Party 3 suggests strategies for key target groups (eg school age children, pregnant women, the elderly); settings (eg schools, workplaces, the commercial sector, primary health care); and approaches (eg mass media; skills training; local projects; advocacy).

These strategy proposals are not intended to be prescriptive. The aim is to provide practical suggestions for developing public health strategies which member states can tailor to the social, cultural and health needs of their populations. The Working Party does, however, point out that in order to develop and implement such strategies (co-ordinated, multisectoral and population wide) identifiable structures and mechanisms will be needed at a national level within member states, and notes the value of member states establishing or strengthening intersectoral food, nutrition and physical activity councils, or installing mechanisms to secure better co-ordination between the different national ministries.

Finally, the barriers to, and opportunities for, the desired improvements in diet and lifestyles posed by the European policy framework were examined by Working Party 4, (co-chairs Joseph Hautvast NL, Ibrahim Elmadfa, Austria; rapporteur Mike Rayner, UK). This working party evaluated the evidence through a series of meetings with academics and stakeholders and concluded with recommendations on the requisite health promotion structures and mechanisms, on policy development, and on components of nutrition policy including education, research, consumer protection and agricultural policy. In particular, the creation of a European Standing Committee on Nutrition is called for. An urgent call is also made for EU level action in terms of harmonization of monitoring and surveillance systems to enable evaluation and effective health impact assessment of Community policies and activities. This is a pre-condition for development of a comprehensive and coherent European nutrition policy.

In short – the EURODIET initiative provides guidelines for healthy nutrition and lifestyles, implementation and promotion strategies, and a significant body of scientific evidence in support of these recommendations. How these results are utilized by the Commission is currently an open question.

The case of Greece

The Eurodiet recommendations are intended as a framework to enable member states to develop and effectively implement their own food-based dietary targets. In the case of Greece, available data indicates an alarming gap between the population goals for nutrients and features of lifestyle recommended by Eurodiet and current diet and lifestyle characteristics of contemporary Greeks.

Archaeological evidence indicates that the dietary habits of the population of Greece were relatively constant for over 4000 years. The benefits of this (plant based) diet and physically active lifestyles were still apparent in the early 1960s in Crete, as indicated in the Seven Countries Study: the population studied in Crete had the best health status and ten times lower coronary heart disease rates as compared to East Finland [6]. This favorable picture has unfortunately changed. Over the last 50 years we have been witnessing rapid socio-economic developments in Greece which have profoundly affected diets and lifestyles – notably mechanization of farming, urbanization, the invasion of television and food advertising and, more recently, developments in food distribution, retailing and catering as illustrated by the growth of supermarket chains and fast food outlets. Greece now has the dubious distinction of being the only EU State where coronary heart disease rates have been increasing for both men and women for the last 3-4 decades [7]. Dramatic changes in diet and lifestyles are also reflected in increasing all cause morbidity and mortality rates [7].

Critical to the relative deterioration in the health profile of contemporary Greeks is the high prevalence of obesity and its co-morbidities. Indeed, Greek men have the highest obesity rate in the EU (17%), while 62% of the male population can be classed as obese or overweight. Only Ireland (63%) and Italy (64%) exceed this rate [8]. Obesity is a serious risk factor for coronary heart disease. As shown in Table 2, significantly increasing levels of serum lipoprotein are found for men and women as Body Mass Index (BMI) increases (unpublished data).

A high rate of smoking among adults is also to be found among the youth of Greece. A review of smoking habits among medical students at the University

	BMI levels:				p-value
	< 20	20.1-25	25.1-30	> 30	
MALES (n = 750)	4%	40%	42%	14%	
	Mean				
Total Cholesterol (mg/dl)	187	196	214	224	0.000
Triglycerides (mg/dl)	77	107	133	179	0.000
HDL-C (mg/dl)	57	48	46	42	0.000
LDL-C (mg/dl)	114	128	143	146	0.000
Total Cholesterol to HDL-C ratio	3.6	4.3	4.9	5.2	0.000
FEMALES (n = 472)	16%	54%	22%	8%	
	Mean				
Total Cholesterol (mg/dl)	187	186	191	214	0.000
Triglycerides (mg/dl)	70	71	88	123	0.000
HDL-C (mg/dl)	58	55	52	50	0.002
LDL-C (mg/dl)	116	117	123	139	0.000
Total Cholesterol to HDL-C ratio	3.2	3.4	3.7	4.3	0.001

Table 2. Serum lipids level of Cretan adults aged 19 to 99 years old related to body mass index.

ANCOVA: 1. As covariates were used age and Smoking.
2. Homogeneity was tested (Levene's test) and was used log₁₀ transformation.

of Crete (432 males and 387 females) (unpublished data) indicated that students who smoked on a daily basis had significantly higher serum triglyceride levels and lower HDL-C as compared to nonsmokers. Dietary data also indicates that these medical students had low dietary fibre intakes, and that students who smoked had much lower fibre intake as compared to nonsmokers. Smokers also had significantly higher dietary cholesterol and sodium intake, while the vitamin C intake was much lower as compared to nonsmokers. This dietary intake study of medical students also showed basic deficiencies insofar as a large percentage of male and female medical students were seen to be getting nutrients below 60% of the Recommended Dietary Allowances (RDA). Female students have very low intakes of iron, calcium, α-tocopherol and vitamin A, while males consume low vitamin A, low calcium and low α-tocopherol diets.

Lack of physical activity is also a characteristic of contemporary Greeks. More than 50% of the population has a Physical Activity Level (PAL) below 1.75. Some consequences are indicated in Table 3, which shows serum glucose, lipoproteins and anthropometric measurements for Cretan adults with a (PAL) below the 25th percentile and those above the 75th. HDL-C is significantly lower in adults with a low PAL level and higher BMI, waist to hip ratio and total body fat, as compared to adults with PAL over 2 (unpublished data).

The high prevalence of CHD risk factors in Cretan adults originates from childhood. Over one third of children of Crete aged 10-16 years are overweight and obese [8]. The BMI of children in Crete is higher in comparison with USA children of the same age, with exception of 12- and 15 year old girls who have identical BMIs. [9]. As with adults, BMI is strongly related to

	Physical Activity Level (PAL)		p-value
	< 25 P (1.5)	> 75 P (2.0)	
	Mean		
✓ Glucose (mg/dl)	87	82	
✓ Total Cholesterol (mg/dl)	209	206	
✓ Triglycerides (mg/dl)	111	98	
✓ HDL-C (mg/dl)	43	47	< 0.05
✓ BMI (kg/m ²)	26.4	25.0	< 0.05
✓ Waist to Hip ratio	0.90	0.86	< 0.05
✓ Percentage of total body fat	30.0	27.8	< 0.05

Table 3. Fasting blood glucose, lipoproteins and anthropometrics in 427 adults of Crete in relation to their physical activity level (PAL).

	FRUITS consumption (Portions)*					
	6-10 years old (N = 224)			11-16 years old (N = 940)		
	< 2 (47%)	≥ 2 (53%)	p	< 2 (50%)	≥ 2 (50%)	p
	Mean				Mean	
Total Fat (% of energy)	41.8	37.1	0.000	41.1	37.5	0.000
Carbohydrates	44.4	51.1	0.000	44.4	50.1	0.000
Saturated Fat	14.9	13.4	0.006	14.5	12.6	0.000
Poly-unsaturated Fat	4.9	4.1	0.006	4.9	4.6	0.021
Trans Fatty Acids	0.74	0.78	N.S.	0.92	0.74	0.000

Table 4. Nutrient intake related to vegetables consumption of Cretan children aged 6 to 16 (24-hours dietary recall).

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serum lipoproteins in young children adolescents. Dietary intake data for Cretan adolescents (14-16 years old) with high BMI is significantly different from those in the middle and lower percentiles. The dietary fiber intake, the ω-3 fatty acids, calcium, iron, vitamin A, vitamin E and vitamin C are all significantly lower in the children with BMI above the 90th percentile in comparison with those in the middle and lower percentiles. These data have been derived from the 24 hour dietary recall but they have also been validated by the three day weighed food record in a subsample of children [9].

Fruit and vegetable consumption among many Greek children appears to be below recommended levels. Table 4 shows the macronutrient intake by those children getting less than two portions of vegetables per day in comparison with those getting more than two portions. Most children (75% and 76%) in both age groups (6-10 years old and 11-16 years old) take less than two portions of vegetables daily. The percentage of energy from fat is significantly lower for those children who have less than two portions of vegetables daily as compared to those having two or more. The children who get more vegetables daily get significantly less saturated fatty acids and more monounsaturated fatty acids apparently most derived from olive oil. The trans fatty acid intake is also significantly less for children 11-16 years old who have two or more portions of vegetables daily. Table 5 shows similar relationships for fruit intake. Children in both age groups getting two or more portions of fruit daily receive lower percentage of energy from total fat as compared to children with less than two fruits daily. Half the children have less than two fruits daily in a country with a great variety of fruit, large production and low prices. The carbohydrate intake is significantly higher but the saturated, the polyunsaturated and the trans fatty acids intake are all significantly lower in the children with two or more fruits per day as compared to those getting less

	VEGETABLES consumption (Portions)*					
	6-10 years old (N = 224)			11-16 years old (N = 940)		
	< 2 (75%)	≥ 2 (25%)	p	< 2 (76%)	≥ 2 (24%)	p
	Mean				Mean	
Total Fat (% of energy)	38.7	41.5	0.018	38.8	40.8	0.002
Saturated Fat "	14.2	14.0	N.S.	13.7	12.9	0.003
Mono-unsaturated Fat"	15.4	18.2	0.000	15.8	18.4	0.000
Trans Fatty Acids "	0.80	0.64	N.S.	0.86	0.72	0.017

Table 5. Nutrient intake related to fruit consumption of Cretan children aged 6 to 16 (24-hours dietary recall).

ANCOVA: 2. As covariates were used sex, age and BMI.
3. Homogeneity was tested (Levene's test) and was used log₁₀ transformation.
* 1 portion = 100 g of greens, asparagus, lettuce, cabbage, tomato, pepper, okras etc.

than two (unpublished data). As with the medical students at the University of Crete, studies indicate that vitamin and mineral intake for a large percentage of school children are below 60% of the RDA, particularly for calcium, iron, vitamin A, E, B6, Niacin and B12 (unpublished data).

The high prevalence of CHD risk factors, inadequate dietary intake, lack of physical activity and high smoking rates among teenagers, medical students and adults in Greece are alarming signs indicating the urgent need for co-ordinated, population wide health promotion and disease prevention strategies. Unfortunately up to date there is no national policy on nutrition and health promotion in Greece. There have, however, been a number of initiatives which point to the benefits of interventions. Training of future doctors and health professionals is one area. Medical schools are traditionally oriented towards disease diagnosis and treatment, but in at least one of the 5 medical schools in Greece, at the University of Crete, a compulsory course on Clinical Nutrition is well established.

The University of Crete school of medicine has also initiated a health and nutrition program in Crete which included a cohort of 6000 children (all born the same year) who are followed prospectively. The 10-year follow-up is currently underway. A teacher-delivered health and nutrition intervention program was undertaken for the majority of those children (4500) through each of the 6 years in primary school, with the remaining 1500 children comprised the control group. Anthropometric measurements at baseline (at the age of 6) and at the 6th year of follow-up when the children graduated from the elementary school showed that both the intervention and control group had increased their weight, but the increase in BMI was significantly less in the intervention group [9]. It was also found that total cholesterol decreased in the intervention group and was unchanged in the control group, and that this change was significant for LDL-C and the total cholesterol /HDL ratio [9].

These data demonstrate the need for nation wide strategy on health promotion and disease prevention. The Greeks used to enjoy the best health status and the lowest morbidity and mortality from chronic diseases as has been shown by the Seven Countries Study. In recent decades, the dramatic deterioration of dietary habits and changes in life style have made the younger generations sensitive to chronic diseases epidemic. We have therefore much to gain from, and much to do to realize, the strategies for nutrition, physical activity and life style proposed through the Eurodiet initiative.

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4.7 National Food Consumption Survey in Children Aged 1-9 Years: South Africa 1999

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Introduction

In 1994, a national survey, conducted by the South African Vitamin A Consultative Group (SAVACG), on the nutritional status of preschool children in South Africa documented a high prevalence of stunting and multiple micronutrient deficiencies [1]. Against this background of undernutrition, the Directorate of Nutrition of the Department of Health as part of its strategic and operational plans within the framework of the Integrated Nutrition Programme adopted SAVACG's recommendation for a national micronutrient food fortification programme. The paucity of relevant data on which to formulate a national food fortification programme, however, necessitated the commissioning of a national survey. The objective of the survey were:

A. Primary Objectives:

1. To determine usual food consumption of children aged 1-9 years in South Africa
2. To assess the usual nutrient intake of 1-9 years old children in South Africa
3. To identify factors impacting on food consumption, and
4. To determine anthropometric status

B. Secondary Objectives:

Using the baseline data obtained from the primary objectives, propose/recommend:

1. Identification of appropriate food(s) for fortification
2. Development of appropriate nutrition education material

Methodology

This was a cross-sectional survey in children aged 1-9 years in South Africa. A nationally representative sample with provincial representation was drawn by the Central Statistical Services of the Department of Health using the Census 1996 data [2]. This initial sample was adapted by means of 50% over-sampling to accommodate for children that would not be at home at the time of the survey (25%), and for allowing an overrepresentation of the children living in high-risk areas (25%) (low socioeconomic status). A total of 3120 randomly selected children were included in the survey in 156 randomly selected Enumerator Areas (EAs), 82 of which were urban and 74 non-urban. A qualifying household (HH) was defined as any HH with at least one child aged between 1 to 9 years in it [3]. Training workshops for the survey coordinators (one per province) addressed all aspects of training and included a number of exercises/tasks in order to ensure a comprehensive understanding of the issues and expectations involved in the implementation of the survey as possible. Field workers implemented the fieldwork under the direct supervision of the coordinators and were recruited according to the prevailing circumstances and needs of each province. Questionnaires specifically designed, tested and validated were used for collection of socio-demographic, dietary [24-H-Recall (24-H-R), quantitative food frequency (QFF)], food procurement and HH inventory, anthropometry and hunger data. Quality control was implemented in a 10% random sample in each EA in every province. The SAS programme was used to do the data entry and analyses under the supervision of two statisticians using the latest edition of the Medical Research Council's Food Composition Tables [4].

Selected findings

General and Sociodemographic

Of the intended 3120 children that were to be included in the survey, data was obtained in a total of 2894 children nationally, which amounted to a 93% response. A fairly even distribution by gender and urban/rural area of residence was present in the survey sample. By age, the lowest number of children was found in the 7-9 years age group, which may probably reflect the absence of older children in the house (HHs were, in such cases, revisited once only) at the time of the interview. The information for the completion of the questionnaires was in the greatest majority provided by the mother (63%) or a grandparent (21%) of the child, who were also responsible for feeding the child, and can, therefore, be considered reasonably reliable, within the specifications of the methodology employed.

Nationally, the father was the head of the household and the wage earner in approximately half of the HHs. In 17% of the HHs the father was unemployed. In only 11% of the HHs was the mother the head and this tended to be more often the case in HHs in formal and informal urban areas. One out of five mothers nationally was a wage earner of the HH and one out of two was unemployed. On average, 13% of the mothers were housewives by choice. In the remainder of the HHs, grandparents, more commonly the grandmother, headed the HH. The grandfather's role as the head of the HH decreased among older children and in some provinces it was equally likely for either the father or the grandmother to be the head of the HH.

In just under 60% (57%) of the HHs visited, the monthly HH income was between R 100-1000. One out of two HHs had both a radio and a television set in working order, with the radio being the most common means (28%) of receiving information. In line with these findings, nearly one out of two HHs (45%) used electricity with paraffin, wood/coal and an open fire being the other main fuels used for cooking.

Anthropometric Status

At the national level, stunting remains by far the most common nutritional disorder affecting nearly one out of five children (Figure 1). This disorder was by far more prevalent in commercial farms, tribal as well as rural when

compared with urban residential areas. A similar pattern emerged for the prevalence of a child being underweight, whereas wasting was by far the least prevalent affecting less than 5% of children.

At the provincial level, the prevalence of stunting was the highest in the Northern Cape (31%), Free State (30%), Mpumalanga (26%) followed by North West (24%), Northern Province (23%) and Eastern Cape (20%). Improved maternal education was associated with a significant reduction in the prevalence of stunting, underweight and wasting in all age groups of children. This pattern was similar overall for the more severe forms of these nutritional disorders as well as for children living in formal urban areas, but less markedly so for children living in informal urban areas.

The prevalence of overweight (W/H = > + 2SDs) was higher (7.5%) in all urban areas than the national average (6%). In provincial terms, the highest prevalence of overweight was recorded in Mpumalanga (17%) with only the Eastern Cape (8%), Free State (6.2%) and KwaZulu/Natal (6.5%) as well as children living in urban areas (7.7%) exceeding the national average (6%). Interestingly, improved maternal education was also associated with an increased prevalence of a child being overweight, especially so for children living in formal urban areas.

Nutrient Intake

Macronutrient intake

At the national level, one out of five and almost one out of two children respectively had an energy intake less than half and less than two-thirds of their daily energy needs. Indeed, in the Northern Cape, Mpumalanga, Northern Province and the Free State one out of three children of all age groups had less than half of their daily energy needs met. Children of all age groups living in rural areas had a consistently and significantly lower energy intake than children living in urban areas. In terms of the energy distribution of the diet (Table 1), total fat, as a percentage of the total energy intake, was less than 30% in all Provinces with the exception of the Western Cape. On a similar basis, the protein contribution to energy intake was less than 15% in all Provinces, whereas that of carbohydrate was greater than 65% in all Provinces, with the exception of the Western Cape (59%). Sugar, as a percentage of energy intake was highest in the Western Cape (14%) and in the Northern Cape (13%) and lowest in

Nutrient	Gender		Province									RSA	Urban*	Rural*
	Boys	Girls	EC	FS	G/TENG	KZN	M/GA	NC	NP	NW	WC			
N	1381	1361	414	189	412	544	152	157	318	229	333	2757	1360	1382
Protein (% E) (SD)	12.0 2.6	12.2 2.6	11 2	11.8 3	13 2.6	11.5 2.5	12.9 3	13 3	13 3.3	12 2	12.2 2	12.1 3	12.5 3	11.8 3
Animal Protein (%E) (SD)	5.3 3.3	5.5 3.3	3.8 2.7	5.3 3.2	5.2 4	4.4 3	5.7 3.8	6.5 4	6.4 3	6 2.4	7 2.5	5.5 3	6.2 3	4.5 3.3
Plant Protein (% E) (SD)	6.6 1.7	6.5 1.7	7 1.6	6.5 1.4	7.6 1.7	7.1 1.6	1.9 7.1	6.3 1.4	5.9 1.5	6 1.1	5 1.4	6.6 2	6 1.6	7.2 1.6
Total Fat (% E)** (SD)	22.9 8.1	23.7 29	21 7	20 8	27 7	22 7	22 9	21 7.5	21 7	23 6	30 6	23 8	26.5 7.7	21 7.9
Sat. Fat (% E) (SD)	6.3 2.9	6.5 2.9	5 2.5	5 2.5	7.7 2.5	6 3	6 3.5	6 2.6	5.5 3	6 2	9 2	6 3	7.3 2.7	5.5 2.7
Mono. Fat (% E) (SD)	7.7 3.3	7.9 3.2	6 2.6	7 3	10 3	8 3	7 3.5	7 3	6.8 3.7	8 2	10.5 2.4	8 3	8.9 3	6.7 3.1
Poly. Fat (% E)**6.1 (SD)	6.4 2.5	6.5 2.8	5 2.8	6.5 3	6 2	6 3	5.5 2.6	6.2 2.3	6 3.2	7 2	6 2	6.5 2.5	6 2.4	2.8
CHO (% E)*** (SD)	61.8 8.9	60.9 8.9	65 8	65 9	58 7	62 8	62 10	63 9.5	63 10	62 6.6	55 6	62 9	58 8	64 9
Sugar (% E) (SD)	11.0 7.1	10.8 6.9	11 6	9 8	12 6	10.5 6.5	9.4 6.7	13 9	6.5 6.3	11 6	15 6	11 7	12 6.6	10 7.1
P:S Ratio (SD)	1.1 0.6	1.1 0.5	1.4 0.7	1.2 0.6	0.9 0.32	1.1 0.6	1.3 0.6	1.1 0.5	1.4 0.7	1.1 0.4	0.9 0.3	1.1 0.6	1.0 0.5	1.3 0.7

Table 1. Energy distribution of macronutrients and nutrient ratios [mean (SD)].

* Urban/rural: p < 0.0; ** Gender: Total fat p < 0.01, Carbohydrate (CHO) p < 0.01; polyunsaturated fat p < 0.001.

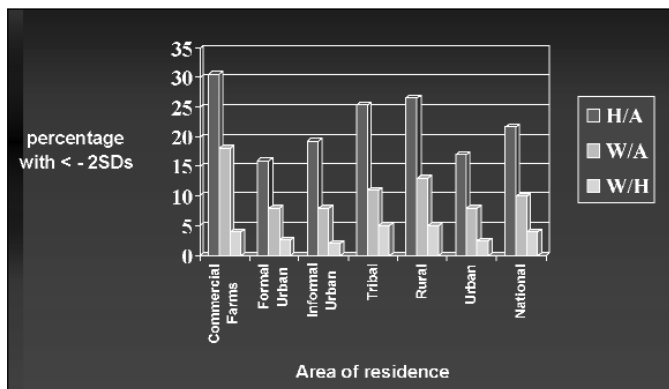


Figure 1. The anthropometric status of children 1 years of age nationally and by area of residence: South Africa 1999.

the Free State, Northern Province and Mpumalanga. The P:S ratio ranged from 1.0 in Gauteng to 1.5 in Eastern Cape and the Northern Province. Children living in rural areas had a significantly greater ($p < 0.001$) percentage of energy contribution from protein of plant origin, a pattern that tended to be also similar at the national level. In this regard, the consumption of animal products (milk and dairy products, eggs, meat, fish) was significantly ($p < 0.0001$) correlated with stunting (Spearman's $r = 0.11$) and underweight ($r = 0.12$).

Micronutrient intake

Vitamins

Vitamin A: At the national level less than one out of two (55-68%) children had a vitamin A intake that was half the recommended level for age. It should be noted, however, that the values for the median vitamin A intake were generally far lower than the mean intakes, indicating that the data is skewed and the standard deviation is very large in most instances. A large percentage of children (25-82%) of all the age groups and in all provinces had intakes less than 50% RDA for vitamin E, vitamin D, Vitamin C, riboflavin, niacin, vitamin B₆, and folate.

Minerals and trace elements

The mean calcium intake was less than half of that recommended in almost 95% of children in most Provinces. At the national level, 81-94% of children had an intake much less than half of the recommended intake. Urban-rural differences in intake were significant ($p = 0.019-0.0001$) in all age groups.

The mean intake of iron was consistently low in all age groups and all Provinces. The lowest iron intake in all age groups was reported in the Free State, Northern Cape, Eastern Cape and the Free State. At the national level, 41-63% of children had an intake less than half of the recommended level. The gender and urban-rural differences in intake were not significant. Similarly to iron, the mean intake of zinc was inadequate in all age groups and in all Provinces.

It is important to note that the findings on the nutrient intake as obtained by the QFFQ were largely very supportive of those obtained by the 24-H-RQ. However, as expected, nutrient intake in absolute values was acceptably higher when obtained by the former than the latter methodology.

In general, the great majority of children consumed a diet deficient in energy and of poor nutrient density to meet their micronutrient requirements. For South African children as a whole, the dietary intake of the following nutrients was less than 67% of the RDAs:

- Energy
- Calcium
- Iron
- Zinc
- Selenium
- Vitamin A
- Vitamin D
- Vitamin C
- Vitamin E
- Riboflavin
- Niacin
- Vitamin B₆
- Folate

Food Procurement and Household Inventory (FPHI)

From the point of view of food fortification, at the national level, the data from the 24-H-R indicated that the most commonly consumed food items were maize, sugar, tea, whole milk and brown bread. These same food items together with hard margarine were also identified as being the most commonly consumed foods by the QFF. It is equally important to note that these same six items were also the ones that were the most frequently procured and the ones that were found most frequently in the HH. Indeed, the agreement of the findings obtained by the three different (24-H-R, QFF, FPHI) methodologies is rather substantial, especially for the non-perishable food items as well as for a number of other frequently consumed food items. Maize, sugar and brown bread were consistently procured and consumed in all HHs in almost all Provinces irrespective of income. Indeed, the percentage of HHs, which did not buy any of these food items, singly or in combination was small ($< 3%$). Subsistence agriculture was not a major source of procurement of these foods in the country. Household income would appear to be a decisive factor in the consumption and procurement of foods. HHs with the lower income procured a significantly lower mean number of food items in all Provinces and all areas of residence when compared with HHs with the higher income. These findings are strongly supported by those of the HH inventory, namely HHs in the lower income group had significantly fewer food items in the house at the time of the interview. Further support, regarding the impact of income on food procurement and HH inventory, is provided by the significantly smaller average number of food items consumed by children as determined by the QFFQ and the 24-H-RQ. It is, therefore, important to note that all three methodologies employed collectively support the role of income as being decisive in the consumption and procurement of foods.

Hunger

A questionnaire-based instrument was used to determine domestic hunger using the data from the Community Childhood Hunger Identification Project (CHHIP) [5] as part of the survey. At the national level, two out of four HHs (52%) experienced hunger, one out of four (23%) were at risk of hunger, and only one out of four HHs (25%) appeared food secure. In the rural areas a significantly (Chi-square; $p < 0.001$) higher percentage (62%) of HHs experienced hunger when compared with HHs in the urban areas (41%). HHs in informal urban and tribal areas as well as on commercial farms were the worse affected.

The HSQ data was further analysed in relation to the anthropometric data as well as to selected dietary intake, food procurement and HH inventory data, and to selected parameters in the socio-demographic questionnaire (SDQ). In this regard, at the national level, a significantly ($p < 0.001$) poorer anthropometric status was found in HHs at risk of hunger and/or experiencing hunger as determined on the basis of the interviewer's response (Figure 2). This trend was significant for stunting for HHs in urban and formal urban areas as well as for HHs on commercial farms. In the case of underweight and wasting, this trend was significant for HHs in urban and formal urban areas only.

At the national level, the energy intake of children was the lowest in the HHs that experienced hunger. This was the case in all areas of residence. Children in such HHs in the rural areas had a lower energy intake, the lowest of which was recorded in children living in HHs on commercial farms. Similarly, inhabitants of HHs that experienced hunger procured a smaller number of food items and had a smaller number of such items found in the HH inventory. A similar trend in relation to hunger risk classification was seen for the intake of vitamins A, vitamin C as well as for iron and zinc. Overall, the lowest energy and micronutrient intake was recorded for children in HHs that experienced hunger, irrespective of age or Province.

Recommendations relating to food fortification

1. Maize (sifted, special, super), white and brown wheat flour and white retail sugar should be the vehicles for fortification on a mandatory basis, henceforth collectively referred to as food vehicles
2. The micronutrients that should be used for fortification should be:

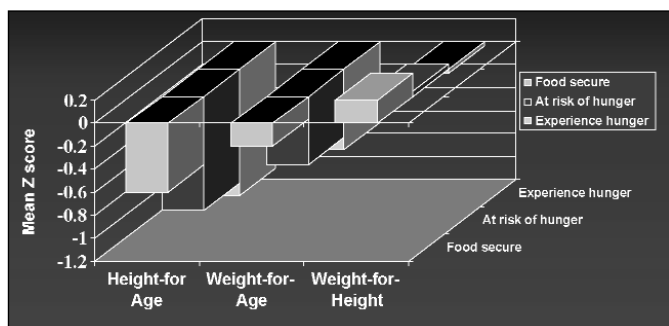


Figure 2. Hunger risk classification as related to anthropometric status nationally in children aged 1-9 years: South Africa 1999.

- Vitamin A
 - Thiamin
 - Riboflavin
 - Niacin
 - Folic acid
 - Vitamin B₆
 - Iron
 - Zinc, and
 - Calcium
3. The food vehicles should be fortified at the level designed to deliver 33% of the current RDAs per serving at the point of consumption, taking into account the inherent content of these micronutrients in the food vehicles, the anticipated losses of these micronutrients during production, distribution and food preparation as well as the limitations that may arise from organoleptic considerations of such additions, especially with regard to riboflavin, folic acid, iron, zinc and calcium
 4. Sugar should be fortified with vitamin A only at the level of 50 IU/g, and the portion size for calculation purposes for maize and wheat flours should be 200g
 5. Encompassing legislation, which must include all aspects of the necessary monitoring and evaluation of a fortification programme, should be enacted and implemented
 6. With regard to Trade considerations, negotiations should be initiated with neighboring countries with a view to achieving regional standards for fortified food items for import/export purposes

In conclusion, this has been a very successful and much needed survey in both providing base line data for future reference and also in formulating policy on a number of aspects of food fortification in the country. The Directors of the survey wish to express their sincere gratitude to all those who made the study possible and successful.

Acknowledgements

The Directors of the survey hereby express their gratitude to the Coordinators (in alphabetical order) for their excellent support and commitment in successfully implementing this survey: A De Villiers (Eastern Cape), S Howard (Northern Province), V Marsh (KwaZulu/Natal), E Nesamvuni (Gauteng), R Saitowitz (Western Cape), F Shabalala (KwaZulu/Natal), TC Tau (Gauteng), L Theron (Free State and Mpumalanga), A Van Der Walt (Northern Cape), E Wentzel (Nprth West). The expert support and commitment of all the field-workers is also acknowledged.

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4.8 Vital Statistical Implication of Nutrition in Hungary

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Demographic characteristics

Since 1981 the population of Hungary continuously decreases in consequence of low birth rate and high mortality rate, respectively (Figure 1).

The number of live birth is going down continuously from the eighties and on the contrary the total mortality increased from the sixties to 1993 and since then a slow decrease is shown. Among the causes of death the cardiovascular diseases represent 51 per cent (the diet related CVDs almost 45 per cent), the malignant tumours approximately 24 per cent. The infant mortality became considerably better [13]; (Figure 2).

The life expectancy at birth is much lower than in other European countries (1999: in men 66.32, in women 75.13 years). Since 1960 the life expectancy of men showed rather little changes, that of women is slowly growing (Figure 3).

Health status of population

In the mortality caused by cardiovascular diseases the acute myocardial infarction take the first place, followed by other ischaemic heart diseases and the cerebrovascular diseases (Figure 4).

Between 1960-1999 the mortality rate of 35-39 years old men increased 1.7 times and that of 40-49 years old subjects 2.2 times. In women the unfavourable changes are not so much distinct [12, 13]; (Figure 5 and 6). At the beginning of nineties the life expectancy of Hungarian men was shorter by 4.91 years, that of women by 2.79 years than the Eastern European average. Regarding the mortality rate of cardiovascular diseases and cancer, the CVD was responsible for 36 per cent loss (1.77 years) in men and for 38.7 per cent (1.08 years) in women. The more prominent factor of this phenomenon is undoubtedly the high cardiovascular and cancer mortality, which is surely related with the nutrition, first of all with the fat and cholesterol intake furthermore the fruit and vegetable consumption.

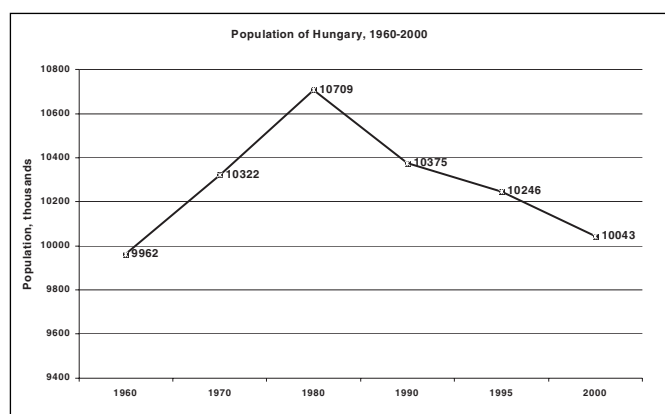


Figure 1.

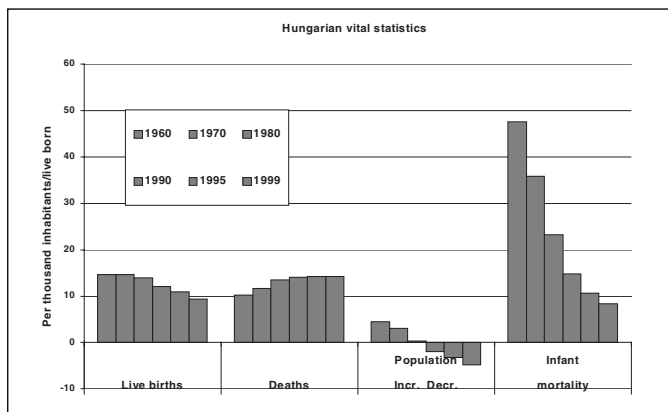


Figure 2.

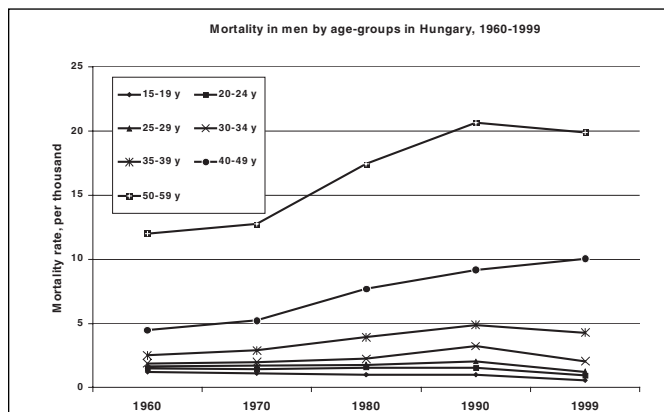


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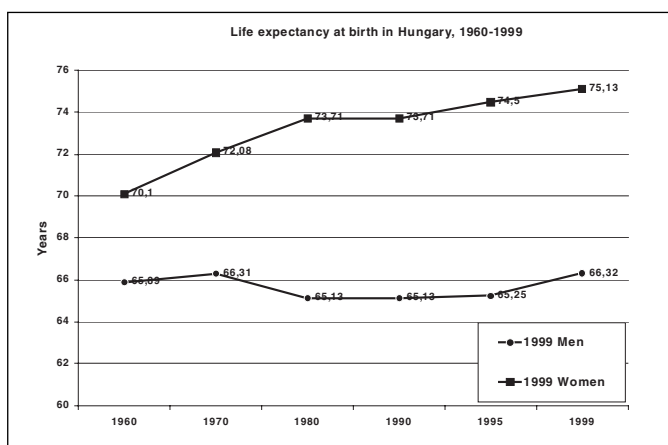


Figure 3.

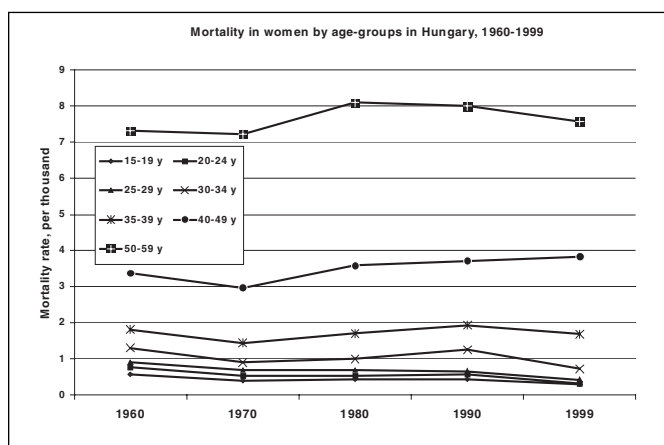


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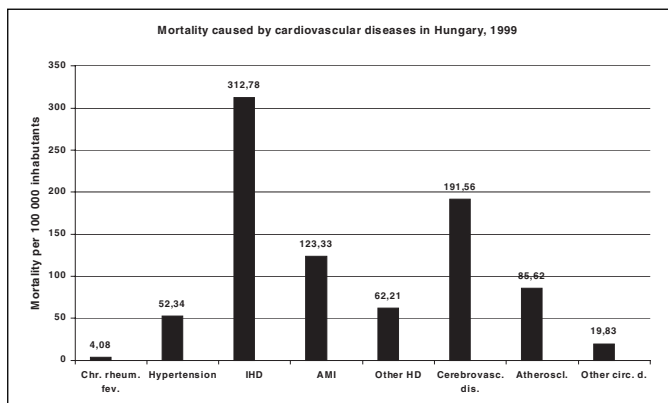


Figure 4.

In the case of malignant tumours with a strong relation to nutrition, the decreasing trend of mortality due to cancer of stomach and the increasing trend of mortality due to colon cancer are characteristic. The number of deaths caused by oesophageal, furthermore breast cancers shows an increasing trend year by year. The share of nutrition related malignant tumours in total mortality might be estimated at 7-10 per cent.

Unfortunately in Hungary, accurate statistics based on continuously recorded data in connection with morbidity of nutritionally related diseases are not available. Perhaps estimations of number of diabetics are the most precise, and this is considered to be between 300,000 and 500,000. People suffering from high blood pressure are estimated to number 900,000 to 1,000,000.

The nutritional implications

Epidemiological examinations clearly proved that nutrition has a strong correlation with cardiovascular diseases, among these especially with ischaemic heart disease, moreover with malignant tumours of different sites (4, 5, 6, 8, 9, 10, 11, 14, 15).

According to the food disappearance data the total fat (mainly lard) and oil consumption increased in the last decades, from 30.5 kg/capita per year in 1980 to 36.7 kg/capita in 1998 notwithstanding the quantity of lard diminished, that of vegetable oil grew up (21.2 kg→17.5 kg and 4.2 kg→10.8 kg, respectively) in the same period (Figure 7). The highest total fat and oil consumption has been registered in 1989: 39.2 kg/capita per year.

As to the hidden fat, the pork consumption decreased from 40.2 kg/capita per year to 27.0 kg/capita. (The pork is the mostly preferred meat in Hungary; the beef consumption is about 4-6 kg/capita per year, the poultry 23-27 kg/capita.) The fish consumption is extremely low. Also the total meat and meat product consumption diminished. Milk and dairy product consumption after a transient fall in 1995 rose but did not achieve the former level (Figure 8).

The consumption of vegetables slightly increased in the same period: 79.7 kg→95.8 kg/capita per year, on the other side the consumption of fruits decreased: 74.9 kg→68.5 kg/capita per year. It means that the daily average intake of vegetables and fruits (423-450 g) narrowly reaches the minimum quantity suggested by WHO experts [7]. Predominantly domestic fruits are consumed. The consumption of flour is going down for a long time (Figure 9).

Epilogue

The health condition of the Hungarian population is unfavourable compared to the developed countries in Europe and other continents. The present analysis

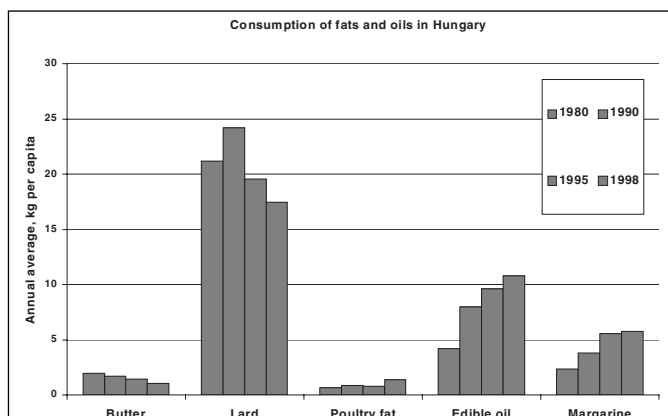


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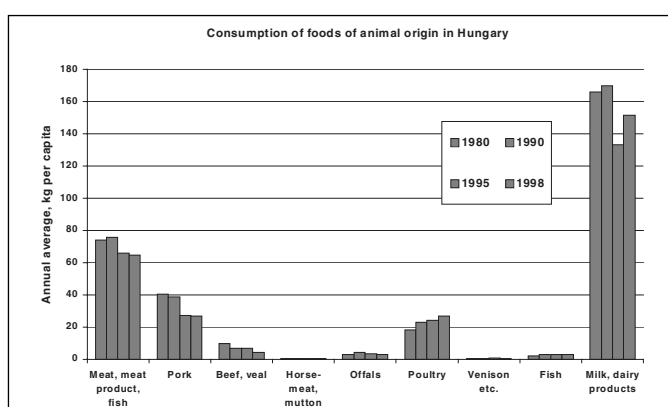


Figure 8.

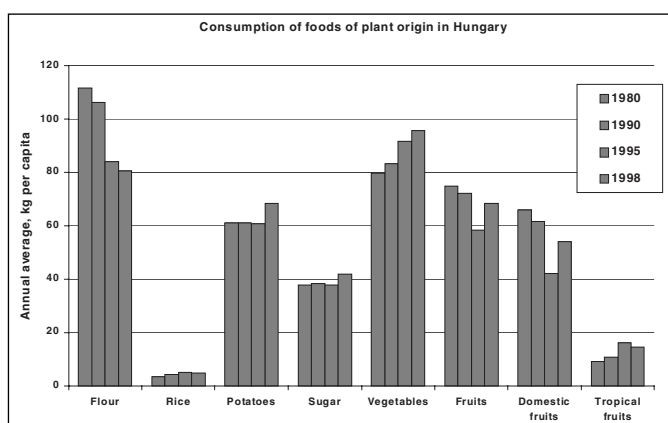


Figure 9.

confirms our former experiences (1, 2, 3). Beyond doubt the nutrition plays a significant role in this situation. We have to conclude that the performance of adequate nutritional policies (like Western European countries) looks an urgent and obligatory duty for improvement of health status of the Hungarian population.

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Recent Experiences and Lessons from Community Based Nutrition Programmes (UNICEF Workshop)

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4.9 Towards Institutionalisation of Community-Based Actions to Improve Child Nutrition. A Review of African Experience

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Introduction

The 2001 ICN offers us yet another opportunity to review lessons and best practices in community nutrition programmes. A review that one hopes will lead to a very clear call to action to realise the scale of implementation that will bring change to the lives of children and populations around communities in the world. State of the art reviews on success factors in nutrition programmes focussing very much on community based programmes have been conducted over the years. What then makes yet another review in a workshop of this nature both important and relevant? We believe that there is a heightened sense of urgency to apply the lessons given the deterioration in the nutrition situation in many countries in Africa that the new reviews have the benefit of earlier information on what worked. The period since the last ICN has also seen increased commitment to human rights approaches to programming which have focused attention on strengthening capacities of communities toward realisation of their rights not least the right to adequate nutrition. We therefore have the context and the obligation as a community to see how best the lessons can be applied to improve nutrition.

Malnutrition situation in sub-Saharan Africa

What besieges Africa? Malnutrition, a silent emergency, is implicated in the death of more than one million children under the age of five years annually in sub-Saharan Africa. While several countries in Africa had recorded a decline in malnutrition in the 1980s and early part of the 1990s, the fact remains today that more than one-third of under-five children in the region are underweight, with prevalence ranging from 9% in South Africa to 48% in Ethiopia. The prevalence of stunting is even higher, ranging from 10% in Mauritius to 51% in Ethiopia. The successes pertaining to reduction of protein-energy malnutrition are relatively few and their coverage inadequate to make an impact on regional averages. Gains of the past years are being eroded by HIV/AIDS, prolonged conflicts, decreases in social sector spending and an overall reduction in capacity of households to care for their young children and other vulnerable groups.

Limited data that is available suggests high levels of anaemia among young children and pregnant women with several countries across the region having more than 40% of pregnant mothers being anaemic. Salt iodisation has made a major contribution to the reduction of iodine deficiency in the region. It is estimated that as of 1999 about 70% of households were consuming iodised salt. Although many countries in the region have reached vitamin A supplementation coverage (at least one dose per year) of 70% to young children, it is believed that vitamin A deficiency is still a widespread problem.

While morbidity patterns in a majority of countries are dominated by diarrhoea, respiratory infections, malaria, etc., the burden of illness in children due to HIV/AIDS has increased dramatically. Countries with high HIV/AIDS prevalence and high infection rates in women attending antenatal services such as Kenya, Malawi, Zambia and Zimbabwe have reported a reduction in life expectancy, an increase in infant and under five mortality rate and in some cases increased prevalence of malnutrition.

Lessons from last decade's experience in community-based programmes

Despite this overall bleak situation, there are many examples of community-based programmes which have shown significant progress in reducing malnutrition rates. Countries where such programmes have shown significant success include Tanzania, Kenya, Madagascar, Zimbabwe, Gambia, Senegal, Mali, and Niger. In many cases these programmes have empowered local people to understand and assess the malnutrition problem and mobilise actions against it, including through improved demand for services. The cost of implementing such programmes is no higher than other public health interventions and are seen as sustainable options especially compared to the cost of inaction. The experience is relevant for addressing other health and social problems that affect African communities.

There is a large body of literature examining success factors that contribute to sustained reductions in malnutrition (1, 2, 3, 4, 5, 6, 7, 8, 9). Other presentations in this workshop which follow will elaborate upon success factors from the earlier and recent reviews of community-based programme from across many parts of the world. We would like to highlight some of the key factors that are seen particularly relevant for countries in sub-Saharan Africa.

Part of the success of community-based programmes relate to *contextual factors*, that provide an enabling or supportive environment. The following *contextual factors* are of particular relevance for countries in Africa:

- A high level of commitment by the political system and government which is reflected in a reasonable level of resource allocation for social development in general and nutrition in particular.
 - Well functioning community organizations and structures with a high level of connectedness and motivation in individuals and groups.
 - Availability of individuals who are motivated to work for the well-being of the people in the community either voluntarily or at relatively low level of remuneration.
 - A functioning infrastructure delivering basic services to children (immunization, essential drugs) and women.
 - A high level of literacy in general and girls' women's education in particular.
- Although many of the *contextual factors* can be influenced by policies and improved social sector spending, they are often beyond the influence of nutrition programme managers, at least in the short term. But there are success factors that relate to design, implementation and overall management of com-

munity-based programmes which to a large extent can be controlled and influenced by programme managers. The following *programme factors* are of particular importance for success:

- Establishment of a process catalysing community assessment, analysis and action for improved nutrition outcomes with equal importance given both to process and the outcome. In many situations, community-based growth monitoring and promotion systems have been used effectively for this purpose.
 - Continual awareness-building through communications and social mobilisation.
 - Identifying, training and supporting a sufficient number of mobilisers and facilitators to support community action. A ratio of mobiliser to households of 1:10-20 and facilitator to mobilisers of 1:10-20 (which translates to one mobiliser for a population of 50-100, and one facilitator to a population of 500-2000) is seen to be ideal.
 - A focus on pregnant and lactating women and children from birth to 24 months for preventive and promotional action. Focus on creating conditions for improved practices and use of community communication strategies relate to adequate care of women and children.
 - Acting at a reasonable scale - interventions that cover very small populations, no matter how successful, do not make a difference to country or regional prevalence.
 - Allowance for programme flexibility and adaptability as needs arise in communities.
 - Sharing and use of relevant information at all levels, especially in communities.
 - Community ownership of process concerning all stages of problem assessment and analysis, programme design, implementation and monitoring.
 - An explicit emphasis on capacity development building on already existing human, economic and organizational capacities.
 - Appropriate targeting with respect to objectives, need and responsiveness.
- In addition, there are a number of factors that relate to successes in *sustainability and expansion* of programmes. These include:
- Pre-planning of scaling up efforts and gradual consultative efforts for scaling up from pilot to expansion phases.
 - Continued involvement and commitment of community members and government.
 - Establishment of organisational and legal frameworks, including community and women's groups and creation of by-laws.
 - Certainty with regard to funding support from government and/or donors.
 - Evolution of a viable programme monitoring system and careful programme documentation.

One cross-cutting factor in almost all community-based programmes is the effort to develop local capacities. Building on the past lessons and recent work in eastern and Southern Africa, we suggest a framework for institutionalisation of community capacity development as part of community-based programming for improved nutrition of children and women in Africa.

Community capacity development (CCD) as a tool for institutionalising community-based action

Community-based nutrition programmes are intended to address the problem where they occur i.e. in households within communities. In adapting processes that strengthen the capacities of communities, such programmes contribute to fulfilment of several rights simultaneously e.g. supporting action for the right to health and nutrition (impact on outcomes) one simultaneously addresses the right to participation (i.e. a good process). The key question then is who *should*, *may* and *can* act in order to have in place effective large scale community nutrition programmes. This in essence brings us to the issue what capacities are needed and how to proceed with capacity analysis. Before identifying who should act it is important to have a shared understanding of the problem and its causes.

Over the years, knowledge on the nature of the nutrition problem has increased yet one have to ask the question on whether this problem is recognised, and its causes well understood by the very communities that should benefit from programmes and interventions. Experience from programme implementation in several countries in Africa indicate that in initial contact and discussion in communities, nutrition may not be raised as a direct concern, but many of the factors that contribute to a nutrition problem may be implied.

In a review of community-based nutrition programmes in West Africa for example, communities demanded services related to improved access to health care, improved access to portable water, access to markets [9]. We know that these are all related to the Food, Health and Care triad of underlying determinants of malnutrition. There is need to engage in negotiation with communities and make help to make the nutrition problem more visible so that it can receive the necessary attention of household and communities. Shared *assessment and analysis* of the problem is therefore an essential step in developing community-based programmes.

An important step in community capacity development is *role analysis* which captures the importance of understanding of who is acting to address nutrition problems and how different actors are connected. This may be from the household, community, district up to national level. Sometimes people who are expected to perform certain roles do not recognise themselves as having this obligation. The community and its members are key actors. They have obligations and they have rights.

The elements of capacity include motivation and leadership; authority to act; control over resources, availability and knowledge of adequate information to carry out effective triple-A (assessment, analysis, action) processes and learn from action; and the capability to communicate. All of these are encapsulated in the spectrum of lessons and success factors outlined above and have to be in place for community nutrition programmes to be implemented at large scale. A detailed analysis of these components can be found in a recent publication from UNICEF's regional office in Eastern and Southern Africa (10).

In summary, the *first step* in capacity development is the analysis of the causes of the nutrition problem. The *second step* is to identify who is expected to take action all the way from the household to sub-national and national level. The *third step* is to identify and strengthen gaps in capacities. For example, do the parents and community members have the motivation? Do they have the authority to act? Do they have sufficient financial resources? Do they have adequate information to make good decisions for improving nutrition of children and women?

The *fourth step* is to design a programme capacity development activity matrix for implementation. This planning phase is then taken to implementation with proper monitoring and evaluation. Our contention is that this type of a human rights oriented capacity development framework can be very effective in ensuring success and institutionalisation of community-based programmes addressing malnutrition problem in African countries.

We also recommend and make a call for action on the parts of governments and donor agencies to envisage and launch a multi-country initiative on community-based programmes that builds upon past successes and includes a number of countries where the potential for such an approach is high.

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4.10 Policy and Implementation of Community-Based Nutrition Program in Thailand

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Process and elements for national nutrition development in Thailand

Thailand is the third largest country in Southeast Asia, having the current population of 61 millions. Malnutrition alleviation efforts in Thailand has evolved since 1970s and progress made, particularly in 1980s, could be substantiated within a short period of time [1]. The efforts were carried out in progressive stages [2]. A large part of the program's success was contributed by the community-based, integrated nutrition program, with strong manpower mobilization and capacity building at various levels [3].

Recognizing nutrition problems and building critical mass by prime movers

The first comprehensive nutrition assessment was conducted in early 1960s, jointly by Thai and American scientists and support from the U.S. Interdepartmental Committee on Nutrition for National Defense (ICNND). The survey was conducted among Thai military and civilians. It was alarming to find that several nutritional problems existed among Thai civilians, since Thailand has been the world major food exporter. Young children, pregnant and lactating women in poor urban and rural areas have been most affected. Protein-energy malnutrition was the most severe problem. Iron deficiency anemia, iodine deficiency disorders (goiter and cretinism), and urinary bladder stone diseases were highly prevalent in the north and northeast areas. Other problems included vitamin A, thiamin, riboflavin deficiencies.

Awareness of the problems was definitely increasing among concerned researchers and public health workers. However, gaining recognition of its public health significance was a long process and required continued efforts. Critical mass of prime movers was formed among nutrition experts to influence decision makers. Advocacy was made that malnutrition was the outcome of biological and social factors impeding country's development. These scholars were also involved in community studies and programs, thus, were well aware of rural people's life and well being and disparity within Thai populations. Holistic developmental efforts were implemented at the community level and gave impetus to importance to tackle malnutrition through inter-ministerial collaboration. Support for the movement was also sought from international agencies, since the Thai government was still dependent on foreign aids.

Political and social commitment

Existence of malnutrition in Thailand was a striking advocacy but it must not be presented as an illness, which implicates national burden. Instead, malnutrition must be viewed as the developmental problem associated with social disparity. Improving people's nutrition is a country investment not a burden, and the efforts must be addressed beyond health sector. The 1970s were the time of increasing social consciousness in all strata of the society. During this

Recommendations/Guidelines and Policy on Nutrition

time, scientists expressed growing concern on malnutrition as part of the vicious cycle of malnutrition, illness and poverty. The movement of the critical mass led to the adoption of National Food and Nutrition Policy as a separate entity in the 5-year cycle of the national development plan (National Economic and Social Development Plan, NESDP, in the 4th cycle, 1977-1981).

Intersectoral collaboration and planning

Protein-energy malnutrition among infants, preschool children, pregnant and lactating women was identified as the highest priority. Due to complex nature of ecology of malnutrition, it was agreed that the problems should be tackled from many fronts. The earliest intersectoral effort was the workshop discussing and sharing nutrition and related information among ministerial representatives. Potential obstacles in implementing nutrition programs within each sector were delineated. Guidelines for multisectoral programs and ways to coordinate them were deliberated. The national planning agency (NESDB) was chosen to be coordinator for the planning and evaluation of the program. When the intersectoral integrated food and nutrition plans were formulated, each line ministry had the responsibility to include the activities in their respective sectoral action plans.

Integrating nutrition into social and health development

The early implementation was not successful due to lack of full inter- and intra-sectoral coordination. The established government system resulted in rigidity in the infrastructure and resource allocation for implementing the plan was top down. This critical review led to re-devising the implementation strategy by integrating nutrition into broader national social and health development. Poverty Alleviation Plan was introduced in the 5th NESDP, which entails the development of backward areas and nutrition policy was embedded. A crucial aspect was the organizational change for implementing national rural development plan. A single national committee was established to oversee development policies and infrastructure. This organizational reform combined the macro and micro level structure to support both the top-down macro policy and micro level bottom-up planning allowing more effective mobilization of community and peripheral resources.

The success in implementing community-based nutrition programs was accelerated by the changing health policy that adopted primary health care with the goal of achieving health for all by the year 2000. Primary health care (PHC) emphasized community self-reliance, facilitated by manpower development, community planning and management, and community financing [4]. Volunteers were selected and trained to be village health communicators (VHC) or volunteers (VHV). These volunteers were key mobilizers in the community and work closely with community leaders. In nutrition, both volunteers were responsible for carrying out the growth monitoring and promotion, by working with mothers, and supervised by local health personnel. Weighing by simple beam balance, use of growth chart, simple technology for village complementary food production were key elements of the community-based nutrition activities during that phase. Village self-financing schemes were also tried with variable success.

Improving the quality of life by mobilizing and strengthening community participation

The marked improvement in malnutrition was realized but sustainability was the concern. Thus, it was agreed that nutrition should be promoted as fundamental requirement for good quality of life, and included as a social and community development goal. The quality of life concept was translated to action through the basic minimum needs (BMN) approach. Conceptually, BMN addressed equity issue and implemented as a community self help strategy. BMN provided a common tool for government officials and community people to identify problems, monitoring progress and evaluate accomplishments. Eight categories of simple and practical BMN indicators measurable and understood by villagers were developed [5]. The iterative process helped to increase people's participation and skills in managing their own development problems. The integration of sectoral efforts was also strengthened to meet the community demands. Local officers altered their roles from that of active change agents to facilitators. Monitoring and evaluation at all administrative levels have used

BMN indicators compiled yearly for each community. The data has since been used as a basis for planning of activities in subsequent cycles.

There are two important interfaces, between facilitator and community leaders, and facilitator and mobilizer. The interface with community leaders was to facilitate the identification of problems and making community plan. The interface between facilitator and mobilizer is on specific skills/on-the-job training, refresher and supervision. Success of volunteer system depends a great deal on specific training, regular supervision. Supervision is essential to monitor progress, provide on-spot training of additional specific skills, trouble-shoot obstacles and providing motivation.

Eighth National Food and Nutrition Plan (1997-2001)

The core principle of the current 8th NESDP was on subsistence living and self-reliance, addressing individuals, family and community needs. This provides policy level commitment to continue work of the FNP. Individuals, family and community are placed at the center of the food and nutrition security cycle. Food production has an emphasis on household food and nutrition security, rather than commercialization. Consumer education and protection are the essential integral components of the current FNP. Basic services, particularly preventive and promotive health care, have already been in place, and resulting in high coverage. Community participation continued to be the fundamental to development in all sectors, adding strength to implementing nutritional improvement activities. Despite of severe economic crisis in the country since 1997, most nutrition indicators have not been substantially affected. During the is period, decentralization is taking place, and several system reforms, namely health, education and civil services are simultaneously implemented.

Lessons learned and key success factors

The FNP was implemented in the country's social and economic developmental plans. Community participation was the key to integrate intersectoral efforts, but problem recognition, needed skills/appropriate technology had to be appreciated and provided. Awareness in local wisdom and trust in community people's ability and commitment to strong community mobilization. Program implementation rests heavily on people's participation at all stages of its development. Various components synergistically contributed to nutritional improvement measurable within a relatively short period of time. Community-based approach is a continuing process, building on the community resources and wisdom.

As a nationwide program, organizational arrangement linking the local and central level government implementation and planning agencies was crucial for harmonizing efforts for nationwide implementation. External inputs, technical or financial, from government/NGO/private sectors help to facilitate the process, but community people must be actors. Awareness of nutritional well-being has been widespread at all levels of Thai society and has been the result of continued efforts in keeping nutrition as a developmental agenda at individual, family and community levels. The evidence of small negative impact of the recent economic downturns on nutritional status of infants/young children and women were observed. This may reflect sustainability of the accumulated efforts in nutrition improvement for longer than two decades.

Continued challenges: Nutrition Trends and situation

While nutrition situation has improved in Thailand, the mild degree and hidden hunger, i.e. the micronutrient deficiencies of vitamin A, iodine and iron have remained the challenges. Moreover, Thailand has become more industrialized, resulting in increasing urbanization and changing lifestyle to sedentary one. Rural people remain agriculturists changed to mechanized farming. As a result, it has been observed that childhood obesity and diet-related chronic degenerative diseases have been on the rise. Diabetes, hypertension, hyperlipidemia and various cancers are now known to possibly relate to intrauterine growth retardation, as well as due to various risk factors related to changing lifestyle. Nutrition challenges can no longer be defined as problems of the rich and the poor and the whole spectrum of nutrition imbalance and food safety will need to be addressed simultaneously. Risk factor prevention and promotion of good nutrition will be the important working paradigm for nutrition in the coming decades.

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4.1.1 Methodological Approach to a Multidimensional Evaluation of Food and Nutrition Policies

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Abstract

Recommendations arising from global conferences and summits, expressed the need to formulate and implement public policies to improve household food security. In the context of maximizing benefits given available resources, comprehensive evaluations of the nutrition policies and programs are needed. One obstacle to overcome was a clear definition of terminology; the words efficiency, effectiveness, efficacy and impact, widely used in the context of program evaluation, are sometimes interchanged and there is no consensus about their precise definition. Another approach to health evaluation is based in the paradigm structure-process-outcome. The level structure contemplated the installations, resources, instruments (physical and discursive), as well as the technical bureaucratic organizational structures. Process encompassed the whole set of intervention activities developed, whereas the dimension of outcome comprised the effects of interventions on the health and nutrition of beneficiaries. Each of the three dimensions constitutes a continuum in the evaluation procedure: the structure only fulfills its purposes if the processes are adequate and conversely, processes cannot alone supersede structural limitations. Moreover, all the three dimensions only reach their ultimate objectives through the completion of outcomes. The methodology proposed here has been tested in the case of Bahia, Northeast Brazil, and it was found to be adequate for this type of analysis. We hope this approach of a comprehensive multidimensional evaluation, constitutes an effective contribution for program planners and program managers, in particular with regard to the obstacles detected, some of which can surely be overcome.

Introduction

Nutritional deprivation, in particular protein energy malnutrition, anemia and vitamin A deficiency, acting synergistically with infectious diseases, remain one of the major health problems hindering good quality of life among the underprivileged population of developing countries such as Brazil [1].

During the course of the last decades this concern has often been expressed on the international scenario, mostly via the recommendations arising from global conferences and summits, where the need to formulate and implement public policies to improve household food security and ensure safe and adequate diets for the people of the world, have been expressed [2-4]. Ministers and Plenipotentiaries representing 159 UN member states unanimously adopted the World Declaration and Plan of Action for Nutrition in 1992. It included as one of its lines of action 'To establish and reinforce the technical capacity and the institutional mechanisms of the corresponding ministry's and the intermediate level governments bodies, for assessing, analyzing and monitoring nutrition situations and to strengthen the planning, administration and evaluation of programs and projects that influence nutrition' [3].

In the 90's under pressure from the financial crisis, many countries promoted state reforms, adopting the route of state cutback and privatization, to conform to the prevailing theories of a minimalist state [5, 6]. A timely revision of this extreme view was published in the 1997 by the World Bank, emphasizing the need to: (a) focus the state activities to match its capabilities, concentrating on the core public activities that are vital to development, and (b) improve its capacity by re-invigorating public institutions, including mechanisms that give public officials the incentive to do their jobs better, but which also provide restraints to check arbitrary and corrupt behavior [6].

Social policies must maximize efficiency, community participation and focusing on the most vulnerable members of the population. In this context, program evaluation, particularly in developing countries, becomes a compromise as well as a challenge. This essay attempts to contribute to this field, presenting a comprehensive, multilevel methodological approach to evaluation of food and nutrition policies.

Evaluation of Food and Nutrition Programs in Latin America

Some evaluations were performed in this region and published in the early nineties [7, 8]. The latter study analyzed 104 supplementary feeding programs in 19 Latin American and Caribbean countries in mid-1990. Substantial financial resources were allocated for the implementation of these programs; however, they were considered too expensive, poorly targeted and the vast majority had never been evaluated [8]. Up until recently the available literature published on the methodological aspects of evaluation was considered insufficient and fragmented [9] and thus thwarted the efforts of countries desiring to implement the World Declaration and Plan of Action for Nutrition, from the formulation of the plan, to its evaluation. Training of local professionals to carry out food policy analysis was often considered inadequate and a revision of training programs has been proposed [10].

Many nutrition intervention strategies, in particular those concerning food donation, are subject to questioning and debate in many countries. In the particular case of Brazil, there is evidence, gathered by an official operational auditing procedure, that the supplementary feeding programs were misused by the traditional oligarchies in power, in order to maintain the *status quo* [11]. This is particularly true in areas of Brazil where basic human rights and needs are far from being respected, and citizens are not aware of their rights [12]. As an example of this, an analysis of trends in federal spending on education in Brazil, which included the School Feeding Program, revealed that the variable 'province where the Minister came from' was the one that could best explain the pattern of resource allocation in the 80's and early 90's [13]. There has been a progressive shift towards evaluation as part of program improvement, including the inquiry into the processes that take place during an intervention, no longer overemphasizing the role of expected outcome [14]. More recently the designs for evaluating public health programs were reviewed; based on the type of decisions that may be taken, the appropriate summative evaluation design should be chosen [15].

Methodological considerations

In the context of program evaluation, the initial definition of certain paradigms was felt necessary. These definitions attempted to overcome, where

possible, the frequent problems encountered in the literature about program evaluation, such as the use of unreliable information, lack of effort in the evaluation of intermediate results, isolated or inappropriate use of impact indicators (centered almost exclusively on anthropometric outcomes), insufficient information about the social and economic constraints experienced by the beneficiaries, and a tendency to observe and focus on narrow and particular aspects of the programs.

One of the first obstacles to overcome was a clear definition of terminology. The words efficiency, efficacy, effectiveness and impact, widely used in the context of program evaluation, are sometimes interchanged and there is no consensus about their precise definition [16, 17]. Usually in the field of health management, efficacy is defined as the potential outcomes obtained as a result of interventions in controlled, quasi-ideal situations, whereas effectiveness and impact are more commonly used to describe the actual effects in operational systems [17]. Despite insufficient convincing evidence, a subtle difference has been established between the concepts of effectiveness and impact. The first is used more frequently to express the effect of a certain service on a given population, while the second is more appropriate for the measurement of a broader system of health services on the entire population. On a time scale, in the short term we would measure the effectiveness, and in the long term the impact. Among these concepts efficiency is the one that most authors would agree upon, defining it (usually) as the relation between the costs and results obtained, or between the inputs and outputs [17, 18].

Another approach to health evaluation is based in the paradigm structure-process-outcome [18]. The often difficult to define concepts of efficacy and effectiveness are contemplated as convergent tendencies, intimately inserted into these 3 identified dimensions. As regards structure, this concept is defined as the relatively stable characteristics of the provider, such as instruments and resources, as well as physical and organizational structures. The process would correspond to all activities and procedures carried out by the professionals involved in the care of beneficiaries and outcome as the changes in health status verified as a consequence of the health intervention. The latter dimension also encompasses changes in health behavior and knowledge, as well as the satisfaction of the beneficiary [18]. This proposal, while originating from the framework of quality assessment of medical care, has established certain basic approaches to monitoring and evaluation.

The multilevel approach proposed here contemplated three dimensions of analysis, in an attempt to avoid one of the commonest problems of ex-post type of evaluations: the isolated evaluation of outcomes, long time after the program was finished. On the contrary, the purpose here was to propose a methodology to monitor and evaluate ongoing programs and to integrate the analysis of structure, process and outcomes, in order to suggest changes and alterations to improve current and future program performance.

It is imperative to explain how the concepts of these three dimensions were interpreted, or re-interpreted, in the context of evaluating food and nutrition programs. Within the scope of this proposal, the level structure contemplated the installations, resources, instruments (physical and discursive), as well as the technical bureaucratic organizational structures at federal, state and municipal levels, responsible for the implementation of food and nutrition programs. The potential organizational, physical, technical and financial resources at each level were analyzed and considered as an asset to the evaluation of the other dimensions proposed. The evaluation of structure was therefore performed within the framework of the potential means to reach, or to hinder, the program objectives.

Process encompassed the whole set of intervention activities developed, and the relationship of the agencies responsible, at federal or state levels with the local agencies and beneficiaries. To a certain extent, this dimension attempted to evaluate what the analysis of structure showed as a 'potential', what in the program description was 'rhetoric' and what, at this level, should have been translated into 'actions'. The traditional indicators of operational efficiency are analyzed at this level, as the means to reach optimal or ideal effectiveness. For both the dimensions of structure and process, it is important to combine the analysis of adequacy of organizational design and procedures used to deal with the proposed problems, and the costs of such structures and processes.

The dimension of outcome, on the other hand, comprised the effects of interventions on the health and nutrition of beneficiaries. The evaluation of primary outcomes is based on the general objectives stated in the program formulation, and is linked, necessarily, to the evaluation of both structure

and process, as facilitating or hindering factors to the attainability of outcomes.

Each of the three dimensions discussed constitute a continuum in the evaluation procedure, despite the fact that sometimes, during the development and selection of indicators, it may be necessary to look for the specific aspects of each one. The structure only fulfills its purposes if the processes are adequate and conversely, processes cannot alone supersede structural limitations. Moreover, all the three dimensions only reach their ultimate objectives through the completion of outcomes.

Targeting, or program focalization on strategic groups or areas, is another fundamental aspect of evaluation. Focalization refers to the ability of interventions to concentrate the available resources to the population of potential beneficiaries, clearly identified, with the purpose of solving a certain problem or fulfilling a perceived need, taking into consideration the characteristics of this population in order to maximize the potential *per capita* benefit [19]. The limitations of focalization include the costs and the administrative procedures inherent to the process itself. It is always necessary to balance the increased administrative costs involved in finding and focusing on the target beneficiaries, against the savings on the direct costs of the interventions to meet the needs of that population [19].

A discussion of program evaluation would not be complete without considering some of the political and structural aspects of public administration. The decision making process by policy makers is an issue which is often not adequately addressed, perhaps because it is, intrinsically, very difficult to study. The motivations behind decisions in the area of social welfare, where food and nutrition policies are included, can vary from the most noble and legitimate political concerns, to the most selfish fulfillment of interests for power or for profits, in what has been denominated by some as the "Nutribusiness" [20]. Many countries have adopted decentralized administration models for most of its social policies. In such circumstance social control plays a very important role to avoid or minimize embezzlement, corruption and political misuse of funds.

Methodology of a multidimensional evaluation of food and nutrition policies in Brazil

This approach was applied to evaluate six food and nutrition programs implemented in the state of Bahia, Northeast Brazil, from 1995-98 [21]. The objective was to analyze the extent to which they were responding to the needs of the population with the lowest income, as well as to point out the critical problems that could be impairing their success. To assure objectivity throughout the evaluation process, matrices for each of the programs were built, to serve as guidelines (see as an example, MATRIX 1, built for the "Milk for Health" (PLS) program). The construction of matrices has been proposed before [14] and, if based on this multidimensional approach, they can be instrumental in the design and elaboration of the research questions and interview guides.

The evaluation methodology included the following retrospective documental research: (a) reports, documents and records about the six programs were investigated, to analyze their objectives and some aspects about structure; (b) detailed data from the institutions responsible for implementation, at the municipal and federal levels were gathered, to evaluate certain aspects of structures and processes; (c) when applicable, anthropometric data was obtained from programs records to study outcomes.

Parallel to that, an extensive field survey was conducted in 1,750 families from 44 municipalities, to evaluate coverage, focalization, social control, opinion and social awareness of the beneficiaries, etc. The municipalities were chosen among the ones with the worst indices for child survival [22], included in the federal social agenda "Comunidade Solidária" [23]. Selection of families employed the Lot Quality Assurance Sampling (LQAS) [24, 25] in a multilevel sampling scheme: initially a random selection of communities occurred, from the poorest urban and rural neighborhoods of each municipality; systematic sampling was then used for the final selection of 40 households per municipality. A questionnaire with open and multiple-choice questions was applied, addressing to different aspects of the programs reaching that particular family, as well as the duration and regularity of the benefits. The beneficiaries' comprehension of the programs and the possible effects on their attitudes, behavior and their social awareness, reflected mainly in their concepts of civil and human rights, were also investigated.

Categories for investigation and analysis		Dimensions of program evaluation	
Structure	Process	Outcome	
Program design and strategy	Type and amount of benefits Program strategies and norms	Purchase, storage and transportation Processes adopted to comply with the program design and strategies	Type and quantity of benefit/supplement Compliance to strategies and norms Periodicity and length of benefits
Resources	Managerial and financial resources Human resources Physical structure	Bureaucratic financial procedures Training of human resources Maintenance of the equipment and/or facilities	Timely availability of financial resources Number / quality of technical personnel Adequacy of physical structure to program demands
Selection of beneficiaries	Criteria proposed for selection of – priority municipalities – families and/or individual beneficiaries	Mechanisms for the implementation of the selection criteria as originally planned	Municipalities actually selected Characteristics of the population actually receiving the benefits Targeting to priority population
Program coverage	Definition of coverage criteria Agency(ies) responsible for coverage definition	Procedures adopted to calculate the proposed and achieved coverage	Numbers of beneficiaries reached Coverage achieved in comparison to the one originally planned
Management, monitoring and evaluation	Model of administration and management proposed Instruments planned for monitoring and evaluation	Managerial procedures adopted at central and local levels Frequency, type and flow of information from local to central level	Quality of resulting management Quality and periodicity of evaluation
Program objectives	Objectives related to food availability and food consumption	Investigation of the mechanisms for program implementation	Impact on food consumption, nutritional status, health and mortality indicators

MATRIX 1. Programa Leite é Saúde - PLS (Milk for Health).

To complement information about program implementation semi-structured interviews were performed with several local key informants: (a) local politicians from different political parties; (b) officials involved with either implementation and/or administration of the program at municipal levels; (c) community representatives at the program councils; (d) church leaders.

The investigation in Bahia was successfully completed; of the six programs evaluated, the two presenting higher coverage of the target population included in this study, were the school-feeding program (PNAE) and the food basket program (PRODEA). Focalization and social awareness of beneficiaries was found to be usually inadequate. Most of the programs evaluated required a specific local council to oversee its implementation and functioning. We could identify the existence of such councils in the municipalities surveyed, but true community participation to guarantee the desired and necessary social control, was practically absent. More details about this evaluation were reported elsewhere [21].

Conclusions

The option to adopt a multidimensional methodology for the evaluation of food and nutrition programs was intended to widen the explanatory capacity, in order to investigate whether the positive and/or negative aspects found as outcomes, were due to the way the program was operated (process), or to the inadequacy of norms and regulations, installations, resources or instruments (structure).

The methodology proposed here has been tested in the case of Bahia, Northeast Brazil, and it was found to be adequate for this type of analysis [21]. It was very helpful since the planning stages, where the construction of matrices and the multidimensional approach guided the elaboration of the most appropriate research questions and instruments.

In conclusion, this comprehensive evaluation contemplates the analysis of data concerning structures involved in program implementation, operational efficiency, coverage, targeting priority groups and areas, outcomes or changes in the needs that the program intended to cover, and/or to overcome.

In developing countries, where the techno-bureaucratic-organizational tradition does not emphasize the need for production, storage and analysis of (good quality) data, monitoring, evaluation and auditing public policies are very difficult tasks to undertake, but they are absolutely essential. In the absence of social control, embezzlement, corruption, political misuse of funds can occur, specially when a decentralized model is adopted in a country of such large dimensions.

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Nutrition Goals for Women and Children set in the 1990s - Progress and Future Challenges (UNICEF - Symposium)

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4.12 From Needs-based to Rights-Based Approaches to Child Nutrition: Lessons Learnt From the 1990s

Urban Jonsson, UNICEF, Eadem and South Africa

Trends in protein-energy malnutrition 1990-2000

The World Summit for Children, held in New York in September 1990, agreed on eight nutrition-related goals for the year 2000. These goals are.

1. Reduction in severe, as well as moderate malnutrition among under-5 children by half of 1990 levels;
2. Reduction of the rate of low birth weight (less than 2.5 kg) to less than 10 per cent;
3. Reduction of iron deficiency anaemia in women by one third of the 1990 levels;
4. Virtual elimination of iodine deficiency disorders;
5. Virtual elimination of vitamin A deficiency and its consequences, including blindness;
6. Empowerment of all women to breast-feed their children exclusively for

UN regions and Sub-regions	Prevalence of underweight			(% Number underweight (million))		
	1980	1990	2000	1980	1990	2000
Africa	26.2	27.3	28.5	22.47	30.11	38.32
Eastern	24.9	30.4	35.9	6.92	11.03	16.47
Northern	17.5	15.6	14.0	3.22	3.27	3.08
Western	30.1	33.2	36.5	7.51	11.23	15.41
Asia	43.9	36.5	29.0	145.95	141.31	107.91
South Central	58.1	50.9	43.6	85.35	90.90	78.49
South East	43.5	36.2	28.9	23.00	20.60	16.68
Latin America & the Caribbean	14.2	10.2	6.3	7.32	5.57	3.40
Caribbean	22.9	17.2	11.5	0.78	0.65	0.43
Central America	15.1	15.2	15.4	2.24	2.36	2.52
South America	13.2	8.2	3.2	4.40	2.88	1.08
All developing Countries	37.4	32.1	26.7	175.75	176.99	149.63

Table 1. Estimated prevalence and number of underweight preschool children, 1980-2000.

Source: ACC/SCN Fourth Report on the World Nutrition Situation, January 2000
 Note: Underweight is defined as low weight-for-age at < - 2 standard deviations of the median value of the NCHS/WHO international growth reference.

- four to six months and to continue breast-feeding, with complementary food, well into the second year;
7. Growth promotion and its monitoring to be institutionalised in all countries by the end of 1990s;
 8. Dissemination of knowledge and supporting services to increase food production to ensure household food security.

The process of agreeing to propose these goals to the WSC was complex and difficult. Many meetings were held between UNICEF and WHO. The debate was often about setting 'realistic goals' or 'aspirational goals'. The latter would provide a rationale for strong advocacy and mobilization. WHO often promoted the former, while UNICEF often promoted the latter. The PEM goal (or rather target) was clearly unrealistic and this goal did not serve very well as an advocacy tool either. On the other hand some regarded the virtual elimination of IDD unrealistic. Maybe it was, but the ambitious goal definitely contributed to successful advocacy and mobilization to achieve this goal.

From 1990 to 2000, the number of malnourished children under five years of age decreased from 177 million to 149 million. The prevalence in developing countries decreased from 32% to 27%, a reduction of 17%, which is far below the goal of a 50% reduction.

The average figures mark great variations among the regions of the world. The greatest improvement took place in Latin America and the Caribbean; a reduction from 8% to 3% (i.e a 60% reduction). Some progress was made in Asia (from 36% to 29%), while the situation in Africa actually got worse. In Eastern and Western Africa both the total number and the prevalence of malnourished under-five increased. The information is shown in Table 1.

It is important to note that over two-thirds of the world's malnourished children live in Asia and that South Asia still has a much higher prevalence (44% than sub-Saharan Africa (36%). The 'Asian Enigma' still persists.

Lessons Learned

Even if the PEM goal was far from being achieved in the 1990s, there was significant progress in many countries and there were a number of very successful local programmes and projects.

The overall lesson learnt from the 1990, is that sustainable reduction in PEM requires community based intervention. Capacities must be developed in households and communities to respond to the needs and opportunities at these levels.

As we generally learn much more, and qualitatively more important lessons, from successes than from failures, the focus of this paper is to discuss success-factors.

The following lessons can be learned from successful nutrition-oriented community-based programmes and project in the 1990s.

1. People can not be developed; they must develop themselves. People, including people who are poor should be recognized as key actors in their own development, rather than passive beneficiaries of transfers of commodities and services.
2. Participation is crucial, both as an end and a means. Participation, however, should not only be seen as 'they' participate in 'our' programme or project, but rather that 'we' behave in such a way that 'we' are allowed and invited to participate in 'their' development efforts.
3. 'Empowerment' is important, but is not a strategy. 'Empowerment' and 'dis-empowerment' are aspects of any strategy, such as advocacy, capacity building or service-delivery. 'Empowerment' means 'the replacement of the dominance of circumstance and chance over people's choices with the dominance of people's choices over circumstance and chance'.
4. Monitoring of both outcome and process and actual use of information for decision-making at all levels of society is very important.
5. Role or stakeholder analysis is very useful for social mobilization, programme development and evaluation, because it identifies clear accountabilities in the community and society.
6. Programmes and projects should respond to basic needs of people, with a focus on vulnerable groups. Local ownership is important and development support from outside should always build on existing capabilities. Poverty reduction/eradication and disparity reduction should be over-riding long-term goals in all development efforts.
7. Pure top-down approaches should be rejected, because they deny the principle of 'people as actors.' Pure bottom-up approaches should be rejected because they are utopian. It is not either/or; it is both. It is the synergism between appropriate top-down and bottom-up approaches that should be promoted.
8. Programmes should be developed on the basis of a situation analysis that identifies priority problems and their immediate, underlying and basic causes. Immediate, underlying and basic causes should be addressed, either simultaneously or in sequence.
9. Goal setting is important. The necessity for scaling up needs to be considered at the planning stage. Efforts should promote that positive changes are sustainable and sustained. This includes environmental sustainability.
10. All possible partnerships should be explored with strategic allies including donors and NGOs/CBOs. Also through the linkages to other development efforts, it is often possible to leverage additional resources.

The Difference between Basic Needs and Human Rights

In the past, most agencies were pursuing a basic needs approach to development. Although human rights are need-based claims, a human rights approach to programming is not the same as the basic needs approach. There is no object in a basic needs approach, meaning that nobody has a duty that can be claimed or insisted upon to have the need met. Not all human needs are valid claims. Human rights are agreed normative standards that have to be complied with and which can be claimed against identifiable duty bearers.

The assistance in assertion of rights means involvement in political debate. A basic needs approach may aim for additional resources to help a marginalized group to access health services. A human rights approach may entail that existing resources (in a community) be shared, so that everyone has access to the same service. A basic needs approach does not necessarily recognize willful or historical marginalization. A human rights approach directly aims at removing marginalization.

Language reflects ingrained perceptions, conceptions, attitudes and the pattern of likely decisions and actions. The shift from a basic needs approach to a human rights approach requires a change of language to reflect the paradigm shift. The following table exemplifies some differences between the two approaches:

Basic Needs Approach	Human Rights Approach
Needs are met or satisfied	Rights are realised (respected, protected, facilitated, and fulfilled)
Needs do not imply duties or obligations although they may generate promises	Rights always imply correlative duties or obligations
Needs are not necessarily universal	Human rights are always universal
Basic needs can be met by goal or outcome strategies	Human rights can be realised only by attention to both outcome and process
Needs can be ranked in a hierarchy of priorities	Human rights are indivisible because they are interdependent. There is nothing like 'basic rights'.
Needs can be met through charity and benevolence.	'Charity in obscene in a human rights perspective' (I. Kant)
It is gratifying to state that "80% of all children have had their needs met to be vaccinated".	In a human rights approach, this means that 20% of all children have not had their right to be vaccinated realized<
It is an excuse to state that the "government does not yet have the political will to enforce legislation to iodise all salt".	This means that the government has chosen not to carry out its duty and has instead chosen not to enforce legislation to iodise all salt.

Capacity Development

'Capacity development' has rapidly become the dominant strategy in technical cooperation. The term emerged in the 1980s and replaced concepts like institution building, human resource development and institution strengthening. The new concept of capacity development emphasized sustainability, ownership and process. There are almost as many definitions of capacity development as there are authors on the subject.

Capacity development is relevant for individuals, households, communities, organizations, formal and non-formal institutions, government institutions, NGOs and society as a whole. This raises the question of 'whose capacities need to be developed?' All individuals have both rights and duties, except for the youngest children who have no duties. Individuals, therefore, need capacity to both claim their rights and meet their duties.

As most violations of human rights take place in households and communities, the focus should be on capacity development of communities and households. Community Capacity Development (CCD) places explicitly community level capacities at the heart of the broader analysis, thus situating interventions at other levels of society in terms of how they influence the community level. In other words, this approach aims at developing capacities for community empowerment.

The following components are seen as essential for capacity development:

- a. Awareness**
No action will be taken unless the individual as a right-holder is aware of his/her rights and as a duty-bearer is aware of his/her duties, in relation to a particular problem. Some fathers, for example, do not think they have a duty to care for their children, and others, particularly people who are poor and marginalized, are not aware of their human rights.
- b. Responsibility/Motivation/Commitment/Leadership**
This refers to the acceptance or position of a person or organization that they should do something about a specific problem. It means an acceptance and internalization of a duty. It is often explained in legal or moral terms. Strong motivation is an important determinant of leadership. Some individuals, for example 'activists', accept responsibilities far beyond what may be expected. They are often motivated by moral imperatives and provide leadership in movements.
- c. Authority**
This refers to the legitimacy of an action. That a person or organization feel or know that they may take action. That it is permissible to take action. Laws, formal and informal norms and rules, tradition and culture determine to a large extent what is permissible or not permissible.

d. Access and Control of Resources

If someone accepts that he/she should do something and that he/she may do it, it may still be impossible to act, because he/she cannot do it because of lack of resources. Capacities must therefore mean that the person or organization can act.

The resources available to individuals, households, organizations and society as a whole may generally be classified into three types.

Human Resources Skills, motivation, will power, knowledge, experience, time, commitment, etc.

Economic Resources Land, natural resources, means of production (like tools, equipment), technology, income, credit, etc.

Organizational Resources Formal and non-formal organizations like family, extended family, clan, CBOs, NGOs, administrative structures, institutions, etc. Organizational resources include formal and non-formal rules that structure certain patterns of interaction.

e. Communication capability

Capability to communicate, access to information and communication systems in general are crucial for individuals and organizations in carrying out their responsibilities, and for 'connecting' various key actors in the social fabric into functional networks able to address critical development issues. A systematic communication analysis is often lacking in capacity development efforts and needs to be more strongly pursued - particularly in a human rights approach to programming.

f. Capability for rational decision-making and learning

Rational decision-making requires evidence based assessment and a logical analysis of the causes of a problem. Actions should be based on decisions informed by the analysis. After the action has been taken, a re-assessment of the result and impact will lead to an improved analysis and better action in the next round. (Triple A process) It is through such interactions learning by doing becomes effective. This capability benefits a lot from the capability to communicate.

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4.13 Nutrition and Poverty Reduction: Lessons on Policy Change from the World Bank/UNICEF Nutrition Assessment

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Introduction

The global nutrition situation has improved over the last decade, but only slowly and unevenly. Malnutrition remains a formidable global development challenge. While impressive gains have been made in some regions and countries, progress has been slow in others, notably in Africa. Worldwide, over 180 million children under age five, nearly one out of three, are stunted. Malnutrition is implicated in half of all child deaths and contributes significantly to morbidity and cognitive underdevelopment. About 1 billion adults in developing countries are underweight, and an estimated 1.6 billion are anemic. They suffer from lowered resistance to infection, impaired work capacity and reduced economic productivity. In addition, there is growing evidence that fetal malnutrition has significant consequences – not only threatening survival, growth and development in childhood, but also increasing the risk of contracting various chronic diseases in later life. In spite of the magnitude of the global malnutrition problem, effective policy responses have stagnated.

It was against this backdrop of relative inertia in nutrition that the World Bank and UNICEF decided in April 1999 to join forces in reviewing the agencies' ef-

forts to address malnutrition. The joint assessment comprised several complementary strands of analysis, including reviews of World Bank and UNICEF portfolios, analyses of the evolution of key policy narratives, country case studies, and workshops with Bank and UNICEF staff and selected external experts. The overall aim was to provide a fresh perspective on the global effort to address malnutrition, with a particular focus on the roles of the two agencies in shaping this agenda and its implementation. The study attempted to 'get behind the headlines', to understand how policy change in nutrition happened, what influenced these processes, and what lessons can be learned from them [1].

This paper applies lessons from the Assessment to a major policy challenge that presents itself to our field today: Will nutrition be in the mainstream of the global effort to reduce poverty, or will it be marginalized? The paper gives a brief overview of the Poverty Reduction Strategy Process (PRSP), and then argues that nutrition can feature in countries' poverty agendas if we tackle a number of issues that emerged from the World Bank/UNICEF study.

Poverty Reduction Strategies: A global convergence?

Poverty remains the single biggest global development challenge: At the beginning of the 21st Century, more than 1 billion people still live on less than \$1 per day, and in many low income countries, the basics needed for building a better life, such as basic education, health, good nutrition and a decent physical environment, are still not in place.

There is general agreement that poverty reduction goals cannot be met without concerted effort to stimulate economic growth that includes poor people, increasing access to social services, reducing debt, wiping out corruption, and ending conflict. The 1990 World Development Report on Poverty [2] and the Comprehensive Development Framework (CDF) [3], both prepared by the World Bank, echo themes already articulated in earlier United Nations reports [4], reflecting the growing global consensus on what is needed to reduce poverty.

A more recent development is the broad endorsement by the international donor community, and the adoption by large numbers of countries, of the Poverty Reduction Strategy Process (PRSP) [5], which aims to give practical expression to the key principles articulated in the CDF. These principles are

- a long term holistic vision and strategy for poverty reduction,
- enhanced country ownership of development goals and actions,
- strategic partnerships among stakeholders, and
- accountability for development results.

Early experience with the application of the PRSP process indicates that the envisaged improvement in development outcomes will take time and patience. It appears that there is often a gap between the conclusions of the broad consultative processes and the actual policy recommendations being made. While there is broad agreement with the international development targets, country plans do not always prioritize these. And the intention that there would be greater donor coordination and harmonization in support of country priorities is still to be realized [6]. Nevertheless, given the broad support for the approach, and the likelihood that it will be a significant development narrative in the coming decade, it is pertinent to consider how nutrition will be treated in country poverty reduction strategies.

Will nutrition feature in country poverty reduction strategy processes?

Lessons from the WB/Nutrition Assessment suggest that this will depend on several factors. These include,

- how nutrition is positioned within the poverty debate at country level,
- how capacity constraints are addressed,
- how programmatic issues are resolved, and
- whether effective partnerships are built among agencies in support of country nutrition teams.

Positioning nutrition

One major objective is to promote the use of nutritional status as a poverty

indicator, as proposed in the guidelines on monitoring the achievement of the Millennium Development Goals [unpublished data]. Nutritional status indicators provide a ready measure of progress on a country's poverty reduction strategy. Country leaders should be asked 'are the children growing?' as often as they are asked, 'is the economy growing?' Agreement and realism are two essentials in target setting. Although major reductions in malnutrition, echoing the World Summit for Children goals, have routinely been declared as goals, even at local levels, these are usually not linked to project activities; nor have projects had the resources to bring about such major impacts. More realistic planning, using the international targets as a guide, but with local targets and timeframes based on local realities, would contribute to greater credibility, and demonstrate the actual investment needed to improve nutrition country-wide.

Although different views still compete in the nutrition community, there is a greater consensus *among nutrition professionals* on the nature of the malnutrition problem and its causes now than at any other time in the last two decades. The UNICEF-pioneered conceptual framework (CF) of the causes of malnutrition at different levels in society, along with the operational Triple A construct, have probably been the most influential tools for bridging the gap between evolving nutrition theory and effective practice in recent years. We can use the strong consensus on the causal framework, and the body of evidence on the human development impacts of nutrition – impacts on cognitive development, morbidity and mortality, and on productivity, to show that achieving the Millennium Development Goals will not be possible without addressing malnutrition. However, experience with the application of the CF demonstrate that a conceptual agreement is not a sufficient basis for an action agenda. Nutrition must be positioned with full recognition of the perspectives, interests, values and assumptions of the various stakeholders involved.

A more strategic approach to advocacy for action would include building policy networks and alliances, joining hands with other groups with similar policy aims, but being flexible regarding agenda setting and prioritization. We can learn from positive experiences. Advocacy campaigns to promote strategies to address vitamin A and iodine deficiencies have on the whole effectively responded to the perspectives and interests of donors and country leadership eager to see rapid, measurable results. A critical step is the strategic framing and re-framing of problems and solutions in ways that meet varied interests and values, which requires good knowledge of each others' situation and direct participation in the process. The wide range of causes and consequences associated with malnutrition can be an important asset in this process, because it provides for more flexible framing of problems and solutions in ways that meet the needs of diverse stakeholders.

Dealing with capacity constraints

The Assessment suggests that nutrition has moved from an activist stage of integrated nutrition planning led by social science activists in the sixties and seventies, through a period of isolationism in which the emphasis was on narrowly defined specific nutrition interventions in the eighties and nineties. It postulates that we are now entering an era of 'goal-based planning' in which the role of nutritionists would be to ensure that realistic nutrition targets are set and achieved through activities in various sectors. It means that nutrition must be a component of several sectoral strategies being articulated under the PRSP. Nutrition must be systematically considered in sectoral analyses, especially in expenditure reviews, and incorporated in monitoring and evaluation systems. As earlier country experiences have shown, assigning overall responsibility for addressing nutrition in PRSP to a single line ministry is unlikely to be effective. There needs to be clear division of labor and accountability for the different components of the nutrition strategy. Within sectors, and at sub-national level, focal points should be tasked with the responsibility to ensure that both nutritional inputs and outcomes are regularly measured and discussed. And, at national level, one person with decision making authority must be assigned responsibility for incorporating nutrition into the PRSP, otherwise the effort will remain fragmented and piecemeal.

The challenge is to ensure that adequate capacity exists at the different levels and in different institutions, to manage such a nutrition agenda. At the nation-

al and international levels, more attention needs to be given to building a cadre of policy entrepreneurs, who are adept at managing the agenda along the lines suggested above. Both the World Bank and UNICEF need to review and strengthen their own capacities to support countries as they realign their nutrition strategies in the context of poverty reduction strategies and sectoral reform processes.

Resolving Programmatic Issues

In most cases, the cornerstone of successful policies to overcome malnutrition are participatory, community based nutrition programs undertaken in parallel with supportive sectoral actions which converge on nutritionally at-risk groups. Such actions are often underpinned and enabled by policies aimed at improving access by the poor to adequate social services, improving women's status and education, and fostering equitable economic growth. There is no blueprint design, but in most cases, activities that are regarded as "direct nutrition" that may emerge from local problem assessment and analysis processes are similar, across countries and indeed continents. These generally involving growth monitoring and promotion, promotion of breastfeeding and appropriate complementary feeding, communications for behavioral change (nutrition communications or nutrition education), supplementary feeding, health-related services (e.g. Integrated Management of Child Illness [IMCI] and deworming), and micronutrient supplementation and fortification [7].

There are several important technical issues that require further operational research. We need to learn more about how to improve the nutritional status of adolescent girls and women, how to effectively address iron deficiency, and how to operationalize life cycle approaches. We also need to experiment and document food-based approaches to malnutrition reduction. Under what conditions should food supplementation approaches, for example, be considered as the intervention of choice? Food policy and food security has also been neglected in the Bank and in countries. We need to build in systems for rapid operational learning and consensus building and we need to better understand how to scale up effective projects. If PRSPs are to include recommendations for direct, focused nutrition programs, countries need assistance with preparing and costing such programs, giving adequate attention to issues of coverage, targeting and intensity. Within a lifecycle framework, initial focus should be on women and young infants, given that they are the most vulnerable, and the most responsive. The issue of intensity concerns how many resources are used per participant, either expressed financially as dollar per participant per year or with regard to population and worker ratios e.g. number of children per community-level worker or mobilizer, number of facilitators or supervisors per mobilizer. Initial estimates based on limited country cases need to be confirmed for a range of countries [7].

Building agency partnerships

The World Bank and UNICEF share a common vision with regard to nutrition, although there are significant differences with respect to processes and means adopted. The complementary strengths of the two agencies can be recognized and exploited to further the nutrition agenda in the context of the PRSP, building on UN reform efforts, including the common country assessments (CCA) and the United Nations Development Assistance Frameworks (UNDAF). UNICEF's extensive country presence and experience with the implementation of grassroots action complement the Bank's role in promoting attention to nutrition in high-level economic policy discussions based on its analytical work and project support.

Collaboration among the WB, UNICEF, WHO, and other partners has started with joint training activities on integrating health and nutrition into PRSPs in Western and Eastern Africa. The agencies have also gained valuable experience from working together on specific projects, such as the Bangladesh Integrated Nutrition Project, and in the Philippines, where the Bank has drawn on UNICEF's experience and UNICEF staff assistance in the design of an Urban Health and Nutrition Project, and the Early Childhood Development Project, and UNICEF has tried to help resolve procurement bottlenecks through use of its Copenhagen procurement services.

Much more can be done, however, to harmonize country support programs

and approaches. Such a partnership is essential to support country efforts to position nutrition, and to resolve capacity and programmatic issues, necessary actions to ensure that nutrition is mainstreamed in poverty reduction strategies. The Assessment focused specifically on relationships between the World Bank and UNICEF, and remarks in this paper focus on these agencies. But the partnership should not be limited: PRSP provides a important opportunity to mobilize a range of partners in a broad coalition for better nutrition.

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Capacity Development in Nutrition

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4.14 Capacity Development Initiative in the Area of Food and Nutrition Southern Africa

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Background

The Southern African Capacity Development Initiative is part of a global initiative spearheaded by the UNU and IUNS, for the development of human and institutional capacity in nutrition. This global initiative is motivated by the growing recognition of the important role of nutrition in human development and the great need to enhance human and institutional capacity in Africa. A series of international and regional consultations/workshops have been held in the process of driving this initiative.

Problem statement

Malnutrition remains a major threat to development in the regions, as about half of countries in southern Africa report stunting prevalence of over 40%,

while the average underweight prevalence has stagnated at around 35% between 1990 and 1997, and several countries are now reporting deterioration. According to the 4th World Nutrition Report of the ACC/SCN the rate of underweight in many countries in the region is similar to the 1975 rates [1]. In addition childhood malnutrition, even in its mild to moderate forms is reported to be an underlying cause of more than 50% of all deaths in children under five years of age in developing countries [2].

The social and economic costs of poor nutrition are huge, thus investing in nutrition including capacity development, makes good economic sense, as there are significant returns immediately and in the future.

Goal and Objectives

The overall goal of the initiative is to strengthen human and institutional capacity in food and nutrition in Southern Africa. This will be done through creating an acceptable model and framework, based on the concept of a "Learning Co-operative", that would facilitate networking and collaborative partnership between institutions.

Objectives

The objectives are: to establish the Learning Co-operative as an appropriate regional collaborative mechanism for this initiative; to strengthen the advocacy capabilities of the network; to develop training packages based on the particular expertise of different participating institutions that address local and regional priorities in nutrition education and research and to assist in the implementation and to enhance the capacities of selected institutions within the region thus to support more effective participatory programme development and management.

Approaches

A national pyramid for advanced training designed at the IUNS/UNU Manila meeting in 1996 has been adopted and slightly adapted by this initiative as a planning tool for capacity development and as a good model to describe the respective needs at various levels [3]. The training pyramid is a graphic, roughly proportional representation of functional categories within an integrated system that are required to serve the needs of a population [4]. The adapted model considers four categories of personnel, namely category zero consisting of community mobilizers; category one are program implementers; category two includes researchers, planners and trainers and category three consisting of policy and decision makers [4].

In this initiative attention will be given to all levels of the pyramid especially categories one and two with a focus on establishing clear links with community-oriented actions in building, maintaining, and enhancing the human resources pyramid. Special attention will be given to bridging the gap between training at the national level and training at the community level. The learning co-operative approach as such will have a positive influence on persons in category three.

Action learning cooperative

The "Action Learning Cooperative" [5] illustrated in Figure 1 is the approach to be employed for this initiative, as agreed and adopted at the Cape Town 1999 meeting. This approach has been proven to be successful in the process of human and institutional capacity development, and can be a cost-effective approach ensuring sustainability of capacity development. It is a suitable approach for facilitating networking, and collaborative sharing in a cooperative rather than a competitive manner amongst different participants.

Implementation

The establishment of the learning co-operative will take place through the implementation of specific learning actions, which were identified as priorities during regional consultations and in available situation analyses, thus underlining the learning-by-doing approach of the learning co-operative. This will support the development of actions in such priority areas as, advocacy,

Eating and Food Patterns/Feeding Frequency

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4.15 Better Understanding of Eating Pattern for Better Understanding of Human Nutrition

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Introduction

For our understanding of relations between nutrition and health methods of nutritional epidemiology are critically important. Only this research area provides direct information on the relations between the effects of food habits and health in free-living human populations. Such studies are particularly important for our understanding of the lifestyle-related diseases, which are common in modern civilised societies. The challenge for such kind of nutrition research is remarkable, since it is an immense field, which had to be observed and investigated.

Nutrition influences the whole course of human life. There are effects from the very start of a new life, the conception, pregnancy and lactation, till the end of it. Nutrition effects longevity and influences future generations [1]. Tremendous amount of food pass human organism during a life cycle; an individual may ingest almost 100 tons. The kind and number of substances in foods vary with time. Nutritional scientists were able to find out the essential and beneficial substances in this bulk of materials, but also harmful ones were detected. All these enter the metabolic pathways of different humans living in different environments (biodiversity and adaptation). The object of nutritional studies is more than multidimensional, it is apparently "ultradimensional".

In the history of human evolution food insecurity was prevalent, including nutrient deficiencies. In the process of civilisation many succeed to have a surplus of food and no need for physical work and the new lifestyle related diseases emerged. Their pathogenesis are not related to one cause concept, multifactorial models were applied in nutritional epidemiology. Considering investigations applying models which represent all important factors and their different interrelations seem to surmount all research capacities, even considering the improvements in information technology [2, 3]. This complexity can lead to a feeling of the impossibility to explore the universe of human nutrition. The aim of this contribution is to explain a strategy to approach the task.

Re-discovering of basic structures

Already in early pre-science phases of human history recommendations on lifestyle including eating rules were revealed by an mixture of instinct and "pre-epidemiological" skills [4, 5, 6]. Such orientations are needed for survival in polyoptional environments, and they are constructed by basic dimensions, which have distinct poles. Orientations are aiming for balances in these dimensions. Every culture has such sets of rules, those of Hippocrates in ancient Greece are a famous example [7].

Life sciences show **live is organised and structured**, this is found in all levels, like in biochemical (genetic codes, protein structures), cellular and organic one. The environment stimulates reactions of the organisms in a structured manner; the S(timulus)-O(rganism)-R(espone)-models of biological behaviour [8] apply also to higher levels of human communication; our verbal and electronic exchange of information use structured symbols.

Efficient structured "hardware" and appropriate "software" are the prerequisites of live. The basic needs for human live require basic competencies for the exchange of substances (eating, drinking, breathing; mobility, etc) and for the exchange of information (recognition; language, etc.). Every society need a social organisation with own rules and laws.

Cornerstones of every society are languages, households and eating. The language is the frame for communication; the household for the daily activities and eating the source for nutrients. Everyday activities have to be organised, they need structures and rules; they reduce the multitude of factors. It is natural: **Food intake - eating - is patterned.**

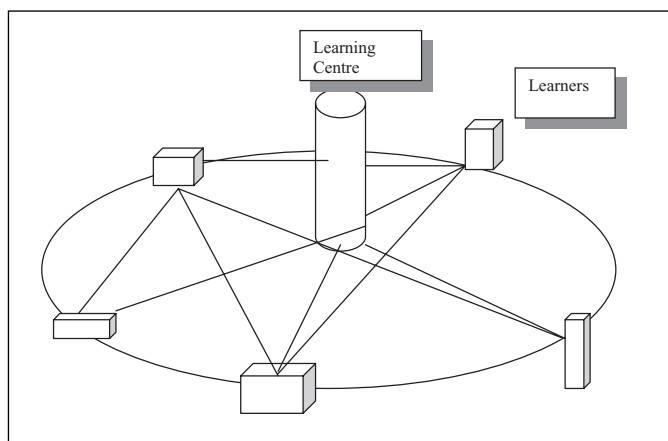


Figure 1. The structure of the learning Co-operative.

training for policy formulation, programmes design and management, and applied research.

Advocacy will focus on strengthening advocacy capabilities of the network including to learn to be better spokespersons and represent nutrition to heads of governments and policy and decision-makers, to convince them that investing in nutrition is critical for sustainable national development. To realise this, specific-training modules will be designed focusing at various levels of the training pyramid, starting with category three, including members of the Learning Co-operative.

Training will include short-term courses, workshops and internships. Existing short courses will be supported and upgraded; new ones will be designed. Priority will be given to improve capacity in food and nutrition policy formulation, analysis, design and implementation of client-focused programmes and their evaluation.

These would include undergraduate and postgraduate programmes, at both degree levels dealing with harmonisation of existing curricula and development of new curricula. Activities should be structured so that they contribute to formal degree programmes. Training courses should be converted into discrete written modules, preferably of similar academic level and size. This will enable their use, across different institutions, as part of formal postgraduate degrees in applied nutrition.

The development and implementation of action-oriented research, aims to enhance capacity in action-oriented research for sustainable improvement in the nutrition situation of all countries and regions. Sound research is the only tool for identification of nutrition problems and their causes, the formulation of solutions and the evaluation of progress. Action-oriented research would contribute significantly to providing information that is necessary for improved nutrition programme design and performance, to ascertain what really works to improve the nutrition situations.

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Capacity development in Southern Africa

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Humans are omnivores, but no-one eats all foods. Humans are capable to eat at any time, but no-one eats continuously. Every human society exhibits its own eating culture. Only as biological active substances in foods were discovered, the eating rules became nutrient based; recommended dietary allowances tried to guide eating habits for some generations. This narrow view on the nutrition and health relations was broadened and to-days nutritional recommendations are based on food groups (e.g. dietary pyramid) and even some lifestyle approaches are propagated (e.g. the Mediterranean one, which includes some red wine, physical activity and relaxed ambience). The eating structures become re-discovered.

What are the dimensions of eating structures

The eating structures are related to the answers of such simple questions like: When? What? or Where? we are eating.

Time is one basic dimension of it. Every second one can consider to eat or not to eat. The organism is prepared to ingest in meal form, despite there is a continuous need for energy and nutrients. There are signals for the begin (appetite) and the end (satiety). Meals enable human beings to organise daily activities in ways, that procurement of food and eating will not interfere. Meal times belong to the socio-cultural characteristics of every society.

In principal all plants and animals are edible for humans, the natural resources can be processed in many different ways to yield safe foods. Every society has developed its own selection of foods. Humans can eat at almost every place, but every society has distinct eating places. Every household and each society has to plan carefully the tasks needed to safeguard the food needs. In order to organise the whole food chain (from the soil to the table), there are further dimensions which give structures. They are related to:

- economics (money, resources),
- competence (knowledge),
- food qualities (composition, sensoric, processing),
- food meaning (value, attitude).

Such dimensions build the frame for the patterns which can be observed and identified, at least in traditional societies, e.g. as a characteristic cuisine. There are patterns of rules when, what, where, with whom to eat; schedules of meals during the day, the week, the seasons etc. and there are restrictions and taboos.

The number of relevant dimensions is limited. In everyday practice of humans they are applied in forms of ordinal scales, despite they are representing continued values. Human decisions are depending on some few classes. Even dichotomies (e.g. yes /no) are applied for the single food dimensions. Some few examples illustrate this: hot/cold (thermal, cultural); raw/cooked; liquid/solid (texturic); sweet/sour (organoleptic), known (neophobic)/unknown (neophilic); healthy/toxic; natural/artificial, etc.

The guiding events for eating patterns are the meals. Meals are planned social interactions centred on food [9]. Even on the plates foods are arranged, e.g. the core-fringe model [10, 11], and eaten in portion sizes. Every social group uses limited numbers of meals, dishes, ingredients and food processing techniques. It seems possible to relate such patterns to specific cultures. In a very rough picture societies can be marked by single foods, e.g. the Asians are the people who eat rice every day, the Germans are the (sauer)krauts, the Italians the spaghetti, and Feta identifies a Greek. The regional products are legally protected by the authorities of European Union [12].

The eating structures have to be acquired by the society as whole and by every single member of it. The important process of orientation and organising daily activities to sustain life, needs a long time. In the process of socialisation individuals have to learn how to eat, how to communicate, etc. The related activities and tasks are trained, they are becoming accustomed. By this processes people become fit to survive in complex environments [13]. Societies invent new rules and structures during the process of civilisation [14]. On the base of such theoretical backgrounds research into food patterns seems successful.

The Practice of Eating Pattern Research

A review of activities in empirical nutritional sciences indicates there is insufficient consideration in research on eating patterns [9]. There were a few early

attempts and suggestions for it [15, 16], but in the mainstream of nutrition epidemiology it was neglected. Even in a recent summary there was the step from nutrients to foods recommend, but not the next one to food patterns [17]. Empirical studies of habitual food intake, observing human everyday activity in the natural context are difficult tasks related to the amount of needed information and their quality. In former time the sheer amount of data (along the food chain; food composition, food processing, bioavailability, etc.) limited the analyses. Results of dietary studies were condensed to average intake per day, and neglected time, food and meal combinations. Due to the rapid developments in information technology the information size is no longer limiting.

Investigations into eating patterns follow the principle to condense information to relevant structures. This can be done in two principal ways; a theory guided one, and by explorative data analysis; in such data mining processes the computer groups related data.

A simple theory-guided approach is to look for the most common eaten foods [18, 19] or even the core food in a diet [10, 20]. Related to this approach are comparisons of actual diets with recommend ones and creating food scores. This is used for dietary goals, like those of the diet pyramid [21, 22], the diet pagoda [23], or to the Mediterranean diet [24]. Another theory-guided approach is related to observed meals (related to time, portion size and composition). Meal patterns are analysed for a day, for a week, within seasons, during a year or more. Meal patterns are not evenly distributed within the time, the population, and social groups. How many days, how much information is needed to identify a pattern? Interesting studies are possible in populations who migrate, since then stable and labile pattern can be traced, and reveal which aspects in food patterns are related to the changes in the life, and which are stable despite the new environment. Longitudinal studies are important in this regard, as well as investigation in which way eating structures are influenced by other everyday activities (e.g. shift work, lifestyle structures). Related to this it seems necessary to investigate the mind-structures of people related to food. Everybody has an own food-classification pattern, which are related to different food quality aspects, like taste, satiating, utilisation, social relation, health, culture, religion, etc. [25].

The theory-guided research for eating structures can be supplemented by the explorative data analysis procedures, as it was proposed more than two decades ago [15, 16, 25]. In current nutrition research one can find some good examples of cluster analysis [26-30] and factor analysis [31, 32].

Comparing the relevance of research into eating patterns, the practice is not sufficient yet. There is

Challenge for the future

At first the scattered research on eating patterns should be bundled. There were some efforts in this regard, which can be used as focal points for it [33-36].

Future research has to focus on the basic dimensions of eating patterns, being the time of eating, the environment of eating relevant situations (“settings”) and the competence of consumers to handle and to eat food, which includes use of information on food.

Research is needed on methods for the basic dimensions. Emphasis should be placed to measure them in the way consumer “measures” food and eating; and control their everyday activities. The control mechanisms of humans are decision-oriented (“stop or go”). Gathered information is mainly sensory related, and “softly” or “fuzzy” classified. To decide by the eye (“Augenmass”) or by smooth touch (“Fingerspitzengefühl”) has to be trained. Appropriate methods to investigate this are qualitative, ethnographical ones. There are some examples for this type of research concerning proper family meals [37, 38]. The eating patterns have to be seen in the context of other everyday tasks (life management) [39-41].

The identified different eating and food patterns should be brought into relationship with physiological functions and to health aspects (e.g. in [42-44]). Different nutritional biographies, beginning from infant feeding (breastfeeding vs bottle feeding; meal pattern vs snacking, and so on) and ending in late life of the elderly, can be related with morbidity and mortality. Today such information is available and accessible in principle; longitudinal nutritional epidemiological studies are on the way. Limitations given by ethical issues have to be considered.

The trend of globalisation with indication of erosion of traditional eating cul-

tures and related eating patterns does not indicate a disappearance of eating patterns, but a transition. The marketing targets for ubiquitous nutrition: eating every time, everywhere in arm length, lead to different eating structures. We eat not longer on tables, we are developing to one-hand-eaters on the way to work and leisure places. There is indication for individualisation; even in nutrition. The biochemical individuality needs individual dietary recommendations. But all these is bound to structures. The essential structures are remaining; from the same parts it can be constructed old-fashioned patterns, but also new ones. Future marketing needs more such structures for constructing customised mass-individualisation. The "individual" consumer of to-morrow selects his favourite dimensions and structure elements, e.g. by electronic support he designs his own product ("e-design"), and in the modern factory the automate produces such individual ordered products. Such producer-consumer (or prosumer) systems need structures in order to be economic efficient for all. Research in eating structures has benefits on better understanding of nutrition and health, and also for improvements in food and nutrition policy.

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4.16 Highlighting the Positive Impact of Increasing Feeding Frequency on Metabolism and Weight Management

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Summary

Research on feeding frequency started more than 20 years ago and some studies have shown evidence of nutritional benefits, especially on metabolism and body weight management. Advice on feeding frequency could play an important role in public health policies by reducing levels of overweight and obesity, the prevalence of which has dangerously increased in most countries over the last few decades. The 17th International Congress of Nutrition brought to the forefront the benefits of increasing feeding frequency (i.e. keeping the same total daily energy intake but dividing it into more frequent meals than usual). Recent epidemiological studies, mostly carried out in France, have provided evidence on the beneficial effects of a fourth meal for those individuals who habitually choose this pattern. Supported by metabolic data, these findings have now been supported by experimental studies. The “goûter”, commonly eaten in the afternoon in France by most children and many adults, has the biological characteristics of a meal because it is eaten in response to hunger. Suppressing the “goûter” in “habitual fourth meal eaters” soon leads to an increase in Body Mass Index (BMI). Further, people who are regular “goûter” eaters have a higher carbohydrate intake and better metabolic profile than other adults, even though their total energy intake is not greater. Increased feeding frequency leads to a reduction in the total secretion of insulin, an improvement in insulin resistance and a better blood glucose control, as well as an improvement in the blood lipid profile. The experts agreed that, as long as we do not consume more energy than we use up and we only eat when we are hungry, it may be useful to split our total energy intake into as many meals as our social pattern allows. However, the pattern of eating cannot be completely dissociated from the composition of foods consumed. Therefore within this energy intake, we must take care to consume not only a good balance of macronutrients with high carbohydrate and low fat levels, but also ensure that we get an adequate intake of essential micronutrients.

“What you eat” and “When you eat it” are public health messages to communicate: frequent consumption of low energy dense high carbohydrate foods, rich in micronutrients, must be encouraged ensuring that energy intakes are not greater than energy expenditures and that eating episodes occur in a hunger state.

Introduction

The current increase in the prevalence of overweight and obesity in developed countries is a cause for concern. Since it happened too recently for genetic changes to be incriminated, this increase is apparently due to changes in our eating environment and lifestyle. For the past few decades, research has focused mainly on the effects of the composition of the diet. It is only recently that interest has been shown in the possible role of the amount of food available and, above all, in the role of eating sequence. Studying the sequence means investigating not only the frequency of eating, but also the characteristics (qualitative and quantitative) of the various intakes over the twenty-four hours of a day. Moreover the composition of food in the broad sense, lifestyles, and the frequency of eating are not independent factors.

The purpose of the workshop “About feeding frequency: the fourth meal” that took place as part of the 17th International Congress of Nutrition program was to examine how eating frequency affects the way food is metabolised and, how it may impact on overweight and fatness. The implications of this

effect for a potential therapeutic strategy to reduce weight and improve cognitive performance were also discussed.

Clarifying what we are talking about

Formulating hypotheses and understanding the findings of studies on the effects of eating frequency require a consensus about the definition of the words used [1]. For example, words such as “snack” may have distinct meanings in different cultures. A series of articles [2] about eating frequency, reveals that depending on the authors, a “snack” may be distinguished from a “meal” by the fact that it takes place between main meals, the time at which it is eaten, the amount of energy consumed, or the combination and composition of foods eaten. An alternative is that meals and snacks could be distinguished according to the presence of a genuine physiological need to eat, reflected in the experience of hunger. Chapelot [3] stressed that an eating episode may be classified as a meal if it is motivated by hunger and is associated with a specific biological profile. This type of eating takes place when blood glucose and insulin levels are low, often accompanied by an increase in plasma fatty acid concentration. On the contrary, it is hypothesized that when an eating episode is not motivated by metabolic needs, the blood glucose and insulin levels are consistent with energy storage and energy intake is not compensated for at the next meal (i.e. the amount of food consumed at the next meal is not reduced). Bellisle presented the “Weekly Food Diary”, a validated method for reporting intake in free-living humans [4]. The Weekly Food Diary records amount and type of food consumed, time, day, hunger and satiety levels, and social circumstances of intake. Subjects also indicate whether eating occasions are meals or snacks. In epidemiological studies, tools of this type could be used to improve the assessment of both food intake and hunger levels. However, the definition of eating episodes is still under active analysis and no universal consensus across cultures has yet been reached.

The fourth meal in France

In France, special significance is accorded to an eating episode taken in addition to standard meal times of breakfast, lunch and dinner. This eating occurs in the late afternoon and is called “goûter”. Volatier et al. reported the findings of an epidemiological study (INCA study) carried out in France with 1,985 adults who kept a food diary over 7 days [5]. Twenty-four percent of these adults had a “goûter” (between 3 and 6 p.m.) at least 4 times a week and were thus defined as regular “goûter” eaters. This intake corresponded to 9.6% of the daily energy intake and consisted of 2 (43% of cases) or 3 (23% of cases) different foods. The foods most often eaten were cereal products (80%), dairy products (41%), fruits or fruit juices (35%). This fourth meal contained more carbohydrates (58% of energy excluding alcohol) and less lipids (34% of energy excluding alcohol) than the other meals. Therefore, people who were regular “goûter” eaters had a higher carbohydrate intake than other adults, even though their total energy intake was not greater. The regular consumption of an afternoon meal was associated with a lower BMI and, furthermore, the amount of energy consumed at this meal was negatively correlated with the BMI. These epidemiological results are supported by metabolic data. Chapelot showed that the “goûter” has the biological characteristics of a meal (i.e. occurs in the presence of hunger and insulin and glucose levels are characteristic of a physiological need state). He also showed that suppressing this “fourth meal” in “habitual fourth meal eaters” leads within 4 weeks to an increase in Body Mass Index (BMI) and fatness of the subjects [3, 6].

Frequency of food intake, metabolism and body weight: epidemiological data and clinical approach

A commonly-held opinion is that eating frequently promotes excess consumption and therefore weight gain. However, most epidemiological studies demonstrate an inverse relationship between the frequency of food intake and body weight [7, 8, 9]. Results of the more recent studies are still somewhat contradictory. However there is a tendency to show either an inverse relationship between eating frequency and body weight or the absence of any relationship [10, 11]. These contradictions could be due to the failure to distinguish between different eating episodes on the basis of biology. Nevertheless, Drummond highlighted some additional results which demonstrate the value of more frequent food intake, whatever its nature [12]. When total daily food

intake is divided up into many eating episodes, the sensations of hunger experienced throughout the day are never extreme and therefore not likely to lead to overconsumption. In addition, since the food eaten between meals consists mainly of carbohydrates, dividing the food intake therefore tends to increase the contribution of carbohydrates to the total energy intake, with a corresponding reduction in the lipids. The same beneficial effects of snacks mostly ingested in the afternoon were also presented by Bellisle [4]. Drummond thus concluded that an increase in food frequency could play a crucial role in a strategy intended to prevent obesity and maintain a healthy weight. From a clinical point of view, a weight loss of 5 to 10% brings a valuable reduction in the risks of diseases related to obesity. Given that obesity treatment is rarely followed in the long term unless it is made easy to manage, Krempf proposed increasing meal frequency as a treatment since this is not perceived as a difficult behavioral change (Krempf, Nantes, France, personal unpublished data). Jenkins et al. [13] have accumulated evidence of the metabolic benefits of spreading the absorption of nutrients over the day by eating more frequent and smaller meals. Indeed, modulating the timing of absorption leads to a reduction in the total secretion of insulin.

Results of epidemiological studies and hormonal and metabolic data, listed before, suggest that an intervention of this type could be effective. However, the results of intervention studies that are now available do not convincingly demonstrate a benefit. This is probably due to the fact that these studies were done on a small number of subjects, who were also on a strict diet, without any follow-up of the weight loss and quality of life. Further rigorous clinical studies are thus required, taking into consideration the physiological distinction that exists between meals and other eating episodes.

Impact of the usual meal frequency on the control of energy intake

Kovacs reported a recent experimental study showing the importance of usual meal frequency in controlling energy intake [14]. Subjects seem to better adjust their overall energy intake to a high fat load when they subsequently eat according to their usual frequency, rather than at some other imposed frequency. The higher the usual eating frequency, the better the ability to allow for the imposed lipid intake. In addition, the subjects' baseline blood glucose level, their perception of the sweet taste of the intake, the satiation during the intake, the total carbohydrate and energy intake of the day, are all linked to the usual meal frequency. Clearly, all enzymatic and hormonal reactions involved in the digestive, absorptive, and metabolic "treatment" of the foods consumed are conditioned (in the Pavlovian sense of the term) by the usual meal frequency. This study showed that conditioning is the key to optimal functioning which links behavior to physiology *via* the usual meal frequency of an individual. If the situation changes, it will take time for the system to adapt and find an optimum efficacy in the context of a new frequency.

Food intake between main meals and cognitive performance

Since glucose is the main fuel used by neurons, one should expect a high-carbohydrate meal to improve at least some aspects of cognitive function. Such an effect has been demonstrated, especially for tasks requiring sustained attention, following an afternoon food intake by secondary school pupils or following a mid-morning consumption of a high-carbohydrate confectionery product by boys [15]. The mandatory intake of food in this experiment could have increased the cerebral use of glucose in subjects. A regular afternoon meal may not have this amplifying effect, but may at least prevent the attention drop associated with hypoglycemia, even mild. Kanarek reminded us that this interesting hypothesis has yet to be confirmed, and that the different types of cognitive performance likely to be improved in such a way also remain to be explained.

Conclusion

Studies, carried out several decades ago, seem to show that the spontaneous demand for food quickly stabilizes at 3 to 4 meals per day, a few months after birth. Children and young adolescents have a sequence of 4 meals that persists in quite a large proportion of adults. The usual eating frequency is set at 3 main meals per day in many developed countries. Recent epidemiological studies, carried out in France, have provided evidence in favor of a fourth meal. Those individuals who habitually choose to eat a fourth meal can regu-

late energy intake and body weight better than those who do not. In these subjects the fourth meal is consistent with metabolic data and these findings have now been supported by experimental studies. Experts agreed that, as long as you do not consume more energy than you use up and you only eat when you are hungry, it could be useful to split your total energy intake into as many meals as your social pattern allows. Within this energy intake, you must take care to consume not only a good balance of macronutrients with high carbohydrate and low fat levels, but also to ensure you get an adequate intake of essential micronutrients. Advice on feeding frequency could play an important role in public health policies by reducing levels of overweight and obesity, the prevalence of which has dangerously increased in most countries over the last few decades. However, before this fourth meal strategy is taken up as a policy for weight maintenance or obesity treatment, it needs to be thoroughly tested in a large scale, long term clinical trial. As experts obviously need to know more about the physiological consequences of meal frequency, they hope this workshop will be the start of a more penetrating inquiry into effects of meal frequency. To go ahead in this way it is necessary to develop a strong methodology to better assess the impact on public health.

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Nutrition Communication: From Theory to Practice

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4.17 A Perspective on Nutrition Communication in Developing Countries: From Theory to Practice

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Abstract

Though nutrition communities are still far from understanding how to bring science to bear in formulating effective policies and programs, the contributions of nutrition science have provided recommendations leading to ways and means to improve nutrition in developing countries. To transfer these recommendations into successful implementation, effective nutrition communication has played an important role in the development. Nevertheless, its success has been limited due to several factors including the fact that there is likely only a small proportion of professionals who consistently aim to use theory as a tool to guide action. This paper highlights the importance of using theoretical frameworks to guide the design and implementation. Based on Thailand's experience, social cognitive theory and social marketing are suggested for further applications in developing country context. It is proposed that the role of researchers/practitioners should be formed to facilitate nutrition implementation. Issues relating to the creation of supportive structures and environments i.e. quality personnel, capacity building, proper status and reasonable budgets, are also identified.

Introduction

Malnutrition is a major cause of the delay in overall social and economic development in developing countries (DCs). It is also a significant obstacle to better health and wellness in these populations. Currently, there exist 30 million infants, who are born each year with intra-uterine growth retardation. More than 150 million preschool children are underweight and about 200 million are stunted. And, about 243 million adults in DCs are severely undernourished including mothers [1].

Nutrition sciences have provided recommendations to improve nutrition at various levels. In general however, nutrition communities in DCs are still facing with difficulties on how to bring science to bear in formulating effective

policies and programs. Communication is indicated to play an important role in transferring these recommendations into action; nevertheless, limited success has been noted [2, 3, 4].

Structured methods and theoretical frameworks

There are several factors relating to unsatisfactory results from nutrition communication work in DCs. Two most important ones are perhaps: 1) the misunderstanding about the role of communication in nutrition interventions; and, 2) the lack of structured methods and use of theoretical frameworks to guide action.

The basic scientific approach, which usually guides nutrition work, has created a worldview that often determines communication as a separate intervention strategy instead of a cross-cutting strategy in nutrition interventions. Human communication, by definition, is the production and exchange of information and meaning by use of signs and symbols [5]. Thus, communication can only be an important complement in the change process [6]. Nutrition problems in DCs are complex and it is unlikely that a single strategy will lead to significant results. Nevertheless, nutrition interventions without good communication strategies are unlikely to be successful or sustainable. Similar to nutrition, there exists adequate, useful knowledge in the field of human communication that nutrition communities in DCs can use to complement their interventions.

In nutrition however, communication is often expected not only to transfer information but also to influence nutritional behaviors. To create these expected changes, it is necessary for nutrition communication to be comprehensive and to work well together with the overall intervention strategies. Success experiences thus far indicate the need for structured methods and theoretical frameworks in nutrition communication work [7, 8, 9, 10].

In practice however, individual talents and good common senses often design nutrition communication work in DCs. This fact together with unavailable descriptions of the process makes it arduous to improve action. Therefore, systematizing knowledge of nutrition implementation including communication processes is urgently needed [9, 11]. Nutrition communities in DCs might argue that available structured methods and theoretical frameworks were developed in advanced countries and thus are not appropriate for use in DCs. The author's proposal is to understand their development and key principles, creatively apply them or improve them with local knowledge and bring forward more appropriate structured methods and theoretical frameworks for each particular context.

Social cognitive theory and social marketing approach

The most important guideline for good theory is the law of parsimony, which states that a theory must be reduced to its simplest and fewest essential principles [12]. Theories relating to nutrition and health behaviors are many and most of them have both strength and weaknesses. In this paper, the author selects Social Cognitive Theory [13, 14] and Social Marketing Approach [15, 16] as bases for discussion.

Social Cognitive Theory (SCT) provides a framework for designing and implementing comprehensive behavior development programs, which is necessary for important nutrition interventions in DCs. It suggests a multilevel change strategy to cope with the dynamics of the interrelationship of environmental, personal and behavioral constructs, which is helpful to guard against oversimplification of nutrition communication approaches in DCs. Also, SCT suggests that the role of change agents is to facilitate appropriate behavior development. The individuals thus control the adoption and they must be confident in their ability to do so. These SCT key principles can be helpful in guiding strategy formulation for communication-focused nutrition interventions in DCs.

Social Marketing (SM) was originally defined as the design, implementation, and control of programs calculated to influence the acceptability of social ideas and involving considerations of product planning, pricing, communication, distribution and market research [17]. It emphasizes consumer-centered planning and often focuses on the positive benefits of a recommended change [18].

SM is also useful in helping nutrition communicators to be more attentive to the resource exchange, product use and service delivery, and then seek to maximize the benefits to both parties [19]. It provides a practical work plan for the analysis, planning, implementation as well as evaluation. Keys to success in SM usually depend upon how well the target audiences are understood and listened to, how well barriers and benefits to new behaviors are strategically and tactically addressed, and how well program components are integrated and managed [9, 16]. Due to its comprehensive and management-focused nature, SM thus offers a framework that can be applied or modified to enhance the effectiveness of important nutrition behavior development interventions in DCs [9].

Integration of theory into practice

Nutrition communication, as one of several nutritional intervention strategies, unquestionably needs to be more effective. Knowledge of the processes involved in its implementation is essential for further development. Nevertheless, systematic relationship between academic research that usually generates theory and the world of action has been limited [9]. One main obstacle is perhaps the fact that theory and practice are often treated as separate realms [20].

In DCs, the integration of theory and practice will require tremendous efforts from all involved; perhaps it should be recommended first to only very important nutrition interventions. The fact that it is indeed necessary to have quality personnel to carry out nutrition communication work and to invest more in this area in DCs has long been raised [2]. As well, capacity building will indeed be essential to enhance the progress. International agencies should play active role in this development.

Researchers/practitioners as facilitators

Practical realities in the integration of theory into practice face both researchers and practitioners in their quest to improve the impact of intervention [20]. To prevent hazardous consequences of nutrition problems in DCs, it is urged that stakeholders involving with nutritional improvement in DCs consider form the researchers/practitioners to be effective facilitators in nutrition implementation. These researchers/practitioners are expected to bring forward the integration of theory into practice in nutrition communication. Also, they should also make theory accessible to general practitioners in order to intensify the efficient transfer of accumulated nutrition knowledge.

Supportive structure and environment

Reviews indicate that communication has not been taken seriously in nutrition communities and the investment available to this strategy in DCs has never been adequate [3, 21]. To improve the situation, nutrition stakeholders in DCs need to set a priority on how to provide supportive structure and environment for effective implementation. As discussed earlier, personnel selection and capacity building will be particularly essential. Nevertheless, they alone cannot compensate for two important supportive structure and environment factors namely: low status and superficial budgets. These two factors are said to make this type of work less attractive for quality personnel to join force [9].

Final notes

Nutrition solutions in the 21st Century require integrative approaches that merge biological, behavioral, social science disciplines and the art and science of implementation including communication in order to accelerate action. It is indeed timely for nutrition communities to produce outcomes of our accumulated knowledge. Knowledge, wisdom and collaboration will be essential to create effective knowledge-based implementation necessary to improve nutrition in DCs.

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4.18 Nutrition Communication from Theory to Practice: Some Future Perspectives

Summary

'Nutrition communication' can be defined as the process by which nutrition knowledge is converted into dietary change. Nutrition communication then includes nutrition education – the process by which people are informed, and sometimes empowered by, nutrition information – but also other actions taken to improve peoples' diets such as restricting misinformation about nutrition or manipulating the composition, availability or price of foods.

Dietary goals for populations and food-based dietary guidelines for individuals constitute the starting point for nutrition communication, and if these could be more evidence-based we would be in a much stronger position to develop more effective nutrition communication. A population-based approach to nutrition communication is complementary to an individualistic approach in theory, but in practice they compete for attention in food policy making circles.

1. Eminence-based or evidence-based dietary goals and guidelines?

Various international and national bodies have drawn up dietary goals for populations [1]. The recently completed Eurodiet Project has published a table of some 17 population dietary goals [2]. Eurodiet suggests, for example, that the population goal for fat consumption should be a mean intake of 30% of energy. Other expert bodies have drawn up dietary guidelines for individuals. These are now commonly represented graphically as plates, pyramids, rainbows, etc.

It worth drawing out the differences between dietary goals for populations and dietary guidelines for individuals because these differences are important but often ignored:

- The purpose of population dietary goals is different from dietary guidelines for individuals: the former are primarily for setting and monitoring food policy; the latter are for helping individuals attain and then maintain a particular diet.
- Dietary guidelines for individuals obviously need to be easy for individuals to understand and act upon. Dietary goals for populations do not need to be particularly understandable but they need to be measurable.
- Dietary guidelines for individuals should probably be in terms of foods (i.e. food-based) because individuals often have difficulties in following guidelines set in terms of nutrients. Dietary goals for populations can be set in terms of nutrients or foods.

Population goals are not generally appropriate for individuals. For example a population goal for fruit and vegetable intake of 400g a day (on average) does not mean that everyone in the population should eat 400g a day. There will be certain population sub groups which need to eat more and some less, e.g. the very young and the very old should probably eat less than 400g a day.

Those setting dietary goals and guidelines have often been confused about whether they should take into account other needs besides health but it is slowly becoming accepted that they should. The population goal for consumption of fish, has often been set at two portions of fish per week but this goal would now be reckless for most developed countries. It would mean that fish stocks would be rapidly depleted to levels from which they could not recover.

An evidence-based way of deriving dietary goals for populations from the science

The main problem with past development of dietary goals for populations is that in general they have been based on narrative reviews of the literature and narrative reviews – however eminent their authors – are subject to the pre-conceptions of those authors.

Population dietary goals now need to be based on systematic reviews rather than narrative reviews because:

- there is now a vast amount of nutrition research and any one individual – however knowledgeable – cannot be expected to keep abreast of the literature;
- electronic databases make it possible to be much more comprehensive than hitherto in gathering all relevant evidence;
- methods for determining the quality and appropriateness of evidence relating to population dietary goals are emerging [3].

The Oxford English Dictionary defines systematic as ‘methodical; done or conceived according to a plan or system’, but systematic – in relation to literature reviews – has also come to mean transparent, comprehensive and with attention to the quality of the research. Systematic review should not be confused with Cochrane review which is a particular type of systematic review [4]. Systematic reviews can include any type of study and not just randomised controlled trials.

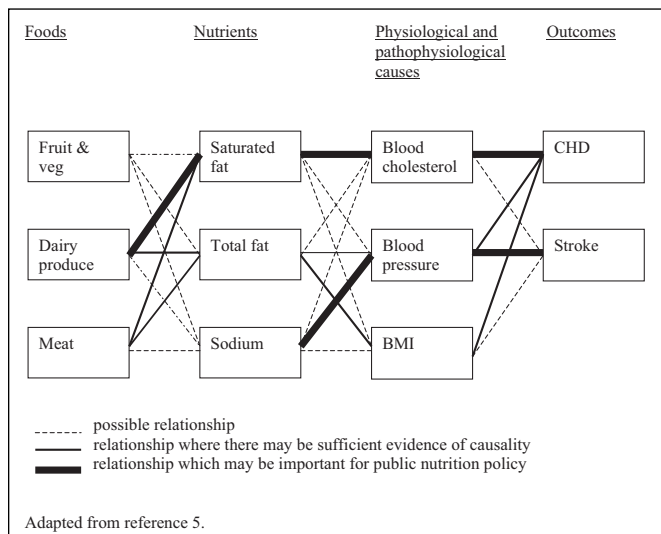


Figure 1. The relationship between diet and health can be conceptualized as a ‘causal web’.

But how could systematic reviews be used to develop dietary goals for populations? The task is huge. Figure 1 - adapted from a paper by Christopher Murray and Alan Lopez from the WHO’s Global Burden of Disease Unit in Geneva [5] - shows how the relationship between diet and health can be conceptualised in terms of a causal web.

Figure 1 shows some, but not all, possible causal links between diet and cardiovascular disease (CVD). Causal links where systematic reviews might provide sufficient evidence of causality are shown with thin solid lines. Causal links where systematic reviews might show that the extent to which health could be significantly improved by changes in diet would be important are shown with thick solid lines. So for example the saturated fat-blood cholesterol-CVD relationship might turn out to be more important in relation to the burden of CVD than the total fat-BMI-CVD relationship. If so then this has huge implications for prevention policies. Without systematic reviews to establish the importance of causal links to public health it would seem impossible to say whether populations should be reducing their saturated fat or their total fat intake.

An evidence based way of turning population dietary goals into food-based dietary guidelines for individuals

Working Party 2 of the Eurodiet Project, basing its work on a report from the World Health Organisation and the Food and Agriculture Organisation [6] have set out a more systematic and transparent way of converting population dietary goals into food-based dietary guidelines (FBDGs) for individuals than has been generally used hitherto. The scheme is not without its flaws, for example it assumes – with little empirical support – that dietary guidelines for individuals should be based on the dietary patterns of those in the population who meet the population dietary goals. Nevertheless it does represent a major step forward in developing a more evidence-based approach to dietary guidelines for individuals.

2. An individual approach or a population approach to nutrition communication

Given evidence-based dietary goals guidelines how can these be realised? To answer this question have frequently resorted to models or theories. These models and theories often have little empirical support but are solely articulations of particular philosophical views.

Communication theories divide into two types: those based on psychological theories of individual behaviour – such as the Theory of Reasoned Action, Social Cognitive/Learning Theory, Consumer Information Processing Theory, Social Marketing Theory, etc. [7] – and those based on sociological theories

of populations which suggest that change in societal level structures may be a more effective starting point to communication.

These two types of theory lead to two different approaches to nutrition communication in practice: an approach which focuses on the health of the individual or an approach which focuses on the health of populations. With the population approach the aim is to improve the average diet (and the distribution of diets) in the population. With an individualistic approach the aim is to improve the diets of individuals and this generally means identifying people with particularly poor diets and offering them appropriate care.

It was Geoffrey Rose who pointed out the distinction between the two approaches [8]. He called them the 'high-risk' and 'population' approaches and argued that they were complementary. They may be complementary in theory but in practice they compete for attention in food-policy making circles and the population approach is often neglected.

Various systematic reviews have investigated whether interventions based on different theories have a greater or lesser effect on dietary outcomes – notably a review carried out by Liane Roe and others and published in 1997 [9] and a recent review by the Agency for Healthcare Research and Quality – part of the US Department of Health and Human Services [10]. These reviews all suggest that an intervention is more likely to be effective if it is based on a theoretical model but do not indicate which theoretical model is best. The Roe et al review found few well-evaluated interventions that had a population-based approach but suggested that those interventions which did were the most effective.

Conclusion

Your theory of nutrition communication has an important impact on how you go about nutrition communication in practice. There are basically two approaches to nutrition communication – the individualistic and the population based. The approaches are distinct and some would argue complementary. An individualistic approach needs food based dietary guidelines for individuals; a population approach needs population dietary goals. Both of these need to be more evidence based.

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4.19 Communicating Emerging Science to Maximize Understanding

Sylvia B. Rowe, President and CEO
International Food Information Council Foundation

Twenty-five years ago, the chances were slim that a food and health-related study in a scientific journal would make the evening news or morning newspapers. Now, hardly a week goes by when a breaking dietary study doesn't make headlines. Public interest in nutrition and food safety has increased dramatically.

And food stories – because they are inherently so personal – make for compelling news.

Scientists have a pivotal role and responsibility in developing and communicating new science. And the same holds true for the journals that first publish the studies or other communicators who have an interest in advancing public understanding of the issues and implications of the latest science.

But there's another reality about emerging science, the media and the public. And that's consumer confusion. Surveys tell us that the high volume of media coverage has not brought clarity to or improved understanding of a topic of such obvious impact and relevance to the public's health and well being. More has not always meant better.

The public's unfamiliarity with the scientific process can make the evolutionary nature of research appear contradictory and confusing. Scientists, themselves, don't always agree on what constitutes scientific evidence sufficient to warrant changing recommendations to the public.

Perhaps most important of all, how emerging science is communicated – by scientists, the journals, the media, and the many interest groups that influence the process – can have powerful effects on the public's understanding, on its behavior and, ultimately, on its well-being.

To examine these issues and assist the communications process on emerging nutrition science, the Harvard School of Public Health and the International Food Information Council Foundation convened an advisory group of leading experts.

A set of guiding principles for the communication of emerging science was subsequently developed and published as a booklet "Improving Public Understanding: Guidelines for Communicating Emerging Science on Nutrition, Food Safety, and Health". The "Guidelines" were published in the Journal of the National Cancer Institute, February 4, 1998.

At the heart of these principles is the belief that food-related science can be effectively communicated in ways that serve both public understanding and the objectives of the communicators.

The guidelines aim to help communicators focus on the most vital information the public should have in order to form the most useful net impression of a particular study's findings and to put these findings into context.

The Guidelines are presented in several groupings – first, general guidance relevant for all, followed by more specific guidance for scientists, journal editors, journalists, and interest groups.

They purposely are expressed as questions, rather than imperative statements, to encourage self-inquiry and serve as reminders of responsible communication.

The most universally applicable example, the general guidelines relevant for all communicators, is provided below.

General Guidelines for All Parties in the Communications Process

1. Will your communication enhance public understanding of diet and health? – Is the study credible enough to warrant public attention?

Recommendations/Guidelines and Policy on Nutrition

- With the information you provided, will the public be able to properly assess the importance of the findings and whether they should have any immediate bearing on their food choices?
 - Have you avoided an overly simplistic approach that may inappropriately characterize individual foods, ingredients, or supplements as good or bad? Have you helped the public understand how the food, ingredient, or supplement can be consumed as part of a total healthful diet, or why it should not be consumed?
 - Have you appropriately represented the study's overall conclusions and avoided highlighting selective findings which, on their own, might present a misleading picture?
2. Have you put the study findings into context?
- If the findings are preliminary and non-conclusive, have you made that clear?
 - If the findings differ with previous studies, have you indicated this and explained why? If the results refute previously released results, do you provide a weight of evidence comparable to the earlier findings?
 - Have you clarified to whom the findings apply? Have you avoided generalizing the effects when the study was restricted to populations of a certain age or sex or with specific genetic, environmental, or other predisposing conditions?
 - Have you included information about risk/benefit trade-offs of consuming or not consuming certain foods, ingredients, or supplements? Have you explained how these risks and benefits compare with other factors (e.g. level of physical activity, genetic history) that may also contribute to health?
 - In explaining a dietary risk, have you distinguished between population-wide estimates and individual risk? Have you cited statistics on absolute risk and not just relative risk, e.g., expressing an increase in incidence from "one in a million to three in a million" and not just as "three times the risk"?
3. Have the study or findings been peer-reviewed?
- Has the study been peer-reviewed by independent scientists or published in a peer reviewed journal? At the same time, have you understood that while peer review is an important standard, it does not guarantee the findings are definitive or conclusive?
 - If a study has not been peer-reviewed (e.g., a paper presented at a meeting or convention), are the findings so important that they should be communicated to the public before peer review?
 - Have you distinguished between actual study findings and editorials or commentaries that may have been written about the study? Have you clarified that an editorial is an expression of personal views and has not always been peer-reviewed? Have you investigated how widely held these views are or whether the editorial represents a narrowly-held opinion?
4. Have you disclosed the important facts about the study?
- Have you provided adequate information on the study's original purpose, research design, and methods of data collection and analysis?
 - Have you acknowledged any limitations or shortcomings the study may have?
5. Have you disclosed all key information about the study's funding?
- Have you publicly disclosed all funding sources for the study?
 - Are you reasonably confident of the study's objectivity and independence?
 - Have you considered what the funders stand to gain or lose from the study's outcome?
 - Have you allowed the validity of the science to speak for itself, regardless of the funding?

To obtain a printed copy of the IFIC Foundation booklet "Improving Public Understanding: Guidelines for Communicating Emerging Science on Nutrition, Food Safety and Health" contact:

Publications Manager
International Food Information Council Foundation
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Washington, DC 20036
USA

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Fax: USA (202) 296 6547
E-mail: klooz@ific.org

Alternatively, the text of the booklet can be accessed on the IFIC Foundation Web site <http://ific.org> at:

<http://ific.org/proactive/newsroom/release.vtml?id=17560>

Another useful and informative resource from the IFIC Foundation is their Review "How to Understand and Interpret Food and Health-Related Scientific Studies". Copies can be obtained from the IFIC Foundation, or accessed on the IFIC Foundation Web site <http://ific.org> at:

<http://ific.org/proactive/newsroom/release.vtml?id=17563>

The International Food Information Council (IFIC) Foundation is the educational arm of IFIC. IFIC's mission is to communicate science-based information on food safety and nutrition to health and nutrition professionals, educators, journalists, government officials and others providing information to consumers. IFIC is supported primarily by the broad-based food, beverage and agriculture industries.

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Training in Public Health Nutrition

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4.20 Training in Public Health Nutrition: A Conceptual Framework

This symposium has been convened in recognition of the importance of training in public health nutrition to the improvement of health internationally. Over the last five years considerable progress has been made on defining the knowledge and skills required to function as a public health nutritionist; this symposium aims to draw this developing consensus together to facilitate greater international coordination and cooperation of our efforts aimed at improving nutrition related health.

Public Health Nutrition focuses on the skills and understanding required to apply knowledge from metabolic, epidemiological, and other research to the solution of public health problems in the population. It is the branch of nutrition that focuses on *promotion* and *prevention* at the level of the *population*. It emphasizes the maintenance of wellness in the whole population. The population level approach should ideally develop within a coherent and integrated policy framework. The UNICEF model is clear about the need for a balance between addressing the underlying causes (inequity, education, poverty) with the immediate causes (lack of access to food and infection etc). The scope is broad and integrates activity from the local, national, regional and international (programme and programmatic) levels.

The approach is appropriate for addressing any nutrition related health problems, be they over- or under-nutrition or a complex mix of the two. The simple division of diseases of lifestyle/chronic diseases only applying to developed countries and undernutrition only applying to developing countries is no

longer sustainable. It is possible to see a mix of obesity and micronutrient deficiency in the same individual, let alone community. In all countries there is a complex mix of nutritional problems. Health outcomes include both quantity and quality of life issues, and potentially vulnerable or at risk groups. The reasons for these problems are often complex and will vary from setting to setting. They require a consideration of the wider political, social, economic and cultural context in which the interaction between nutrition and health occurs. Out of this understanding of the causes of problems should emerge the optimal strategy for a solution. The solution should identify the most cost effective and beneficial intervention (achieve the greatest health gain with least cost), and the approach should be amenable to implementation and objective evaluation. It may be that the development of the community intervention develops through a step of assessing the efficacy of the intervention prior to the community wide application (effectiveness).

Without getting too caught up in terminology and debate, it is important to provide suitable training to enable people to perform the functions required to deliver an improved public health. Staff involved in public health need to know how to identify the key problems and best approaches to dealing with these problems, using an evidence-based approach.

A PHN approach

This may be conceptualised as consisting of a logical step wise approach that explicitly requires both knowledge and skills.

1. The identification of the role of nutrition in preventing major public health problems [*skills in epidemiology, health promotion and public health- how to identify the key factors affecting health and prioritise action*]
2. The development of goals, objectives and targets [*skills in quantification of targets allows measurement and facilitates monitoring and surveillance*]
3. The planning and development of programmes of work aimed at achieving targets [*understanding of what works at an appropriate level*]
4. The implementation of those programmes, including identifying rate limiting steps
5. The evaluation of the efficacy and effectiveness of the implementation
6. Assessment through monitoring and surveillance of impact on goals (health outcomes) and feedback to step 1; the process goes around again.

There is no point identifying problems for which there is no solution, or where eliminating the problem would have no impact on public health. Goals for action must emerge out of this review and guide subsequent objectives and programmes of work. There will be options for actions that need to be weighed up for cost-benefit/effectiveness and for potential adverse effects. A clear programme of implementation is then required that considers all the practical details required to deliver the programme of work. The programme should then be evaluated and the results fed back to inform the decision making process and to subsequently revise goals. Evaluation should consider both process (delivery) and outcome (behaviour).

The process depends on the availability of data for monitoring and surveillance and staff to understand and drive the system. The type, and quality of data required will vary from place to place and will depend on the resources available and the precision required to develop and maintain a system that has the required accuracy.

Public Health Nutrition programmes will almost always be multi-sectorial and it is important to consider how best to coordinate activity across different departments of government, voluntary agencies and other groups who have an involvement or impact on the outcome.

Training programmes need to equip students with an understanding of the key methodologies that underpin this approach. Public health Nutritionists may be involved in only a part of the PHN cycle, such as in research, or evaluation or programme delivery, but they should have a sense of how their work fits into a wider context and how their work informs policy. They need to be able to understand where targets and goals come from and how they fit into government policy, they need to be able to understand that there is a rational basis for the derivation of policy goals from research, and that there is also a research base that underpins the practical application of solutions to problems. They need to have a sense of how their work at a local level fits into a wider

regional, national and international perspective, and how food and agricultural policy fits in with the aim of improving nutrition related health.

Conclusions

- Training in Public Health Nutrition has to make a difference to the health and well being of the citizens of our countries to be effective
- Training provides the foundation for solving nutrition related health problems now and in the future, although it has to be supported in the context of wider capacity building and integrated into a coherent nutritional policy for best effect.
- Greater support is required for developing and maintaining the relevant skills base.

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4.21 Public Health Nutrition in Latin America

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Abstract

An inquiry into options for Masters-level training and into attitudes and perceptions among a convenience sample of nutrition students and professionals from 11 countries suggests that the term, “Public Health Nutrition”, as such, is poorly represented and poorly understood in the Latin American region. At least six countries (Brazil, Chile, Cuba, Mexico, Peru, Puerto Rico) at seven sites have Masters programs to provide training for nutrition in a public health context or public health with an emphasis in nutrition. Exploring alliances from the Americas with the formal PHN discipline emerging in Europe should enrich the mutual perspective on curriculum design. However, the form and context of postgraduate training in Latin America must consider first and foremost its own job-markets, diverse public health needs, and resource allocations in building or transforming training programs.

Introduction

Semantic Considerations: The topic of this Symposium revolves around three words in the title, “Public Health Nutrition” (PHN), which can be considered as either an academic discipline, a basis for professional training, or an applied professional endeavor at the population level. The term of PHN comes out of a caldron of competing terminology that has been advanced to define disciplines, training, and activities primarily for low-income **developing** countries (Table 1) (1-8).

In the past, in the context of the terms “international nutrition” and “public nutrition”, I have gone on public record as a skeptic as to their usefulness (9, 10), as have others in the nutrition community (3, 11). A certain rationalization of the various names in this stew has been attributed to Rainer Gross, quoted in the published report of the 1997 Public Nutrition Workshop in Montreal, Canada [8]. Dr. Gross devised a 4 x 3 matrix. On the continuum of technical concerns are placed: 1. food availability and consumption; 2. nutri-

International Nutrition
Community Nutrition
Public Health Nutrition
Public Nutrition
Dietetics
Nutritional Engineering
Derived from references 1 to 8

Table 1. Alternative terms for nutrition disciplines, training programs and professional activities for developing countries.

tion behavior and care; 3. health status and systems; and 4. environmental and housing conditions. The vertical axis' levels of aggregation from top to bottom include: 1. national-regional; 2. district-community; and 3. household-individual. For him, PHN excludes all food concerns, and enters the horizontal axis somewhere within the behavior and care domain and exits somewhere in the environmental column. It covers concerns in two tiers from national down to community. By contrast, the promoters of Public Nutrition (PN) see their field embracing all aspects of all four technical concerns through both superior aggregations, but excluding the household or individual level. Community Nutrition (CN) cuts all the way across the four technical domains, restricted to the area-community boundaries.

PHN is inscribed in the name of a scientific journal, *Public Health Nutrition*, which began publication in March of 1998 [12] with a collective editorship from the U.K., the Netherlands and the United States. Just as the titles of most professional journals reflect the interests and contributions of those in the field, one might conclude that PHN (the discipline) is – or will become – whatever its namesake journal embraces within its pages.

Geographical Context: The term “Latin America” also invokes some semantic intrigue. The continents of North and South America constitute a large number of countries of different sizes, linguistic heritages and socio-economic status. The principal dominant or official languages are English, French, Dutch, Portuguese and Spanish, reflecting the colonial history of conquest and partitioning of the territory among European powers in the 16th and 17th centuries. The large proliferation of nations can be attributed to the dozens of different sovereignties of islands and archipelagos in the Caribbean. What has here been considered to constitute “Latin America” are the countries and territory in which the dominant or official languages are of Iberian origin, i.e. Portuguese or Spanish. For North America and the Caribbean, these include Mexico, Cuba, the Dominican Republic, and Puerto Rico; for Central America, they are Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama; for South America, these include Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, and Venezuela. This is a total of 20 states. Behind the official, colonial-heritage languages, however, there are scores of languages and dialects of the original indigenous populations of the region among the Native Americans of Mexico, Guatemala, the Andean region, and the Amazon forests. Finally, a note should be made of emerging subpopulations of Spanish-speaking individuals arising in two largely English-speaking nations: the United States and Belize (the former British Honduras on the Central American Isthmus).

Although Latin America shares a common legacy of Iberian colonial administration, the heterogeneity and differences among the nations would, on balance, far outweigh the commonalities. Of relevances for the health situation of the region is the physical environment, ranging from tropics to temperate zones. Diets are generally based on a major carbohydrate staple (yuca, maize, rice, potato), although Argentina, Uruguay and Paraguay are known for their production of beef. Urbanization of the great majority of the Latin American population in cities of >20,000 inhabitants is a major characteristic with important implications [13, 14].

The panorama of public health nutrition in the region

Perceptions of the term “Public Health Nutrition” among Latin American students and Professionals: As Prof. Nevin Scrimshaw, citing the Bard, has raised is the question: “what’s in a name?” [11]. In order to develop some perspective on the “name-recognition” issues for PHN in the Latin American nutrition community, I conducted an “unscientific” questionnaire survey among a convenience sample of 31 professionals living and working in the region. The majority filled out the forms in and around the XII Latin American Congress of Nutrition and the post-Congress satellite II Latin American Leadership Workshop in Nutrition in Buenos Aires in November 2000. The 31 persons surveyed came from 11 countries and ranged in age from 26 to 54 y. Eleven were physicians, 16 were non-physicians, and for four the professional training was not specified. In terms of national representation, we had Argentina (n=3), Brazil (n=4), Chile (n=4), Colombia (n=2), Cuba (n=1), Ecuador (n=1), Guatemala (n=4), Mexico (n=5), Nicaragua (n=1), Paraguay (n=1), Peru (n=4), and Venezuela (n=1).

Site: San Juan, Puerto Rico

School of Public Health, University of Puerto Rico
Masters in Public Health, with theme in Nutrition

Site: Havana, Cuba

Institute of Nutrition and Food Hygiene
International Masters in Public Health

Site: Monterrey, Mexico

Faculty of Public Health and Nutrition, Autonomous University of Nuevo León
Masters in Public Health with theme in Nutrition

Site: Cuernavaca, Mexico

Center for Nutrition Investigation, National Institute of Public Health
Masters of Science Program with concentration in Nutrition

Site: Santiago, Chile

Institute of Nutrition and Food Technology
Masters of Science in Nutrition

Site: Sao Paulo, Brazil

School of Public Health, University of Sao Paulo (USP)
Masters in Public Health, with theme in Nutrition

Site: Lima, Peru

PostGraduate School (EPG) of the National Agricultural University “La Molina” (UNALM)
Masters in Public Nutrition

Table 2. On-going programs relevant to the topic of public health nutrition/nutrition in public health.

In response to the question regarding ranking of the four subdisciplines (epidemiology, clinical nutrition, social sciences, nutritional biology) in order of their importance in the training and expertise for a “public health nutritionist”, 15 placed epidemiology in the highest priority rank and 1 had it in second place, whereas 7 ranked social sciences first while 14 ranked them second. Clinical nutrition and nutritional biology were evenly ranked among the last three priority ranks. With respect to the impression of whether any training in PHN were available in their home countries the respondents were mixed, but almost all responded that any compatriot “public health nutritionists” would likely have been trained outside of their countries. Among the three disciplinary terms, the group found “community nutrition” the easiest to define, followed by “public health nutrition”, followed finally by “public nutrition”.

Training Programs in Public Health in the Latin American Region: I must apologize for what is undoubtedly not a complete and exhaustive roster of all of the relevant programs of training within the region in the display of Table 2. They do however reflect the current state-of-the-art within the region. Historically, the Institute of Nutrition of Central America and Panama, beginning in the 1970s, created a degree-granting arrangement with the national university, the Universidad de San Carlos, through a covenant arrangement. This was a one-year program which provided a “Masters degree in Nutrition with emphasis in Maternal and Child Health”; over a decade, scores of students from all over Central America received training in this program. I had the privilege to teach basic nutrition in that course.

One of the issues, potentially a problem, in the curricular design of the extant programs is the large number and diversity. The program on PN in Lima has 18 modules of from 1 to 3 weeks duration in the first two semesters of the course leading to a professional Masters degree [15]. As set out in the webpage of the MPH program in Monterrey, Mexico, the comparable number of course materials is 15 assigned courses of 69 credit hours and 20 hours of additional requirements from among the optional courses in which the concentrations can be made.

Conclusions

Richard Semba [16] begins the introduction to his chapter on “Nutrition and Development: A Historical Perspective” in his book, *Nutrition and Health in Developing Countries*, (co-edited with Martin Bloem) with the words: “In the last two centuries, there has been a general improvement in the health of peo-

ple worldwide that has been attributed largely to changes in nutrition, hygiene and public health". The Latin American region is linked by a linguistic and a historical heritage. To the extent that a primary integration of the professionals of the nutrition community in that region exists, as through organizations such as the *Sociedad Latinoamericana de Nutrición* (SLAN) and its triennial Latin American Congresses on Nutrition, it would be an entry-point for communication about postgraduate training across this whole range of semantic salad in which PHN is a pivotal term.

There is a tension between whether the intrinsic objective of PHN is one of creating new knowledge and understanding (research inquiry), resolving the problems of nutrition in populations (service component), or both. Caution is needed in making generalists with such a broad array of elements that each one can only contain a thin veneer of understanding. In my opinion, any field of training or service without a strong research foundation is doomed to obsolescence and irrelevance before it takes flight.

The current financial situation in higher education throughout the region is not propitious to creating or launching new disciplinary programs without the strongest justifications. Hence, the situation for Spanish- and Portuguese-speaking nations and populations is amorphous and formative. The most prudent course of action (to the extent that initiative and action is to be taken), would be to open up discussion and dialogue between the European Commission-based processes of PHN definition and curriculum formation and the currently-operating postgraduate degree programs of the region. An iterative process of examining to what extent curricular concepts and developments around the world can be mutually supportive while responding to the local needs to resolve nutritional deficiencies, excesses and imbalances. The bottom-line, indeed, is an assessment of local needs and priorities for understanding and action within a context that "old truths" about deficiency and food insecurity must meet the emerging reality of urbanization, sedentarism, meal consumption away from home with demographic and epidemiological transition.

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4.22 The Development of a European Master Programme in Public Health Nutrition

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Introduction

The most significant controllable risk factors for the European population, affecting long-term health, are what they eat, and how physically active they are. Public Health Nutrition is "the promotion of good health through nutrition and physical activity and the prevention of related illness in the population" [1, 2, 3].

The task of undertaking effective population-based strategies to reduce the burden of disease related to unhealthy diet and physical inactivity in the European countries, demands people that are trained and competent in public health nutrition. The public health nutritionists should also have comparable skills for optimal mobility within the Union and for joint research and development. These individuals must be able to apply knowledge leading to research action, use evidence based practise, evaluation and monitoring, and link policy to evidence (i.e. feed-back).

This calls for proper training across Europe, leading to the development of comparably skilled and competent individuals. Common standards of training should be set and monitored. During the last four years, a new master's programme in public health nutrition has been developed, as a collaborative effort over Europe and funded by the European Commission, DG SANCO [1].

The development of the programme has been co-ordinated by our unit at Karolinska Institutet, Stockholm. Currently, all the original 17 renowned universities in 16 countries are still taking part in the programme (Table 1), which also includes teacher and student exchange. The work has been funded for four years, and will be funded for another year from EU Commission DG SANCO.

In the work so far some of the significant achievements to be highlighted are:

- the development of a general course structure of two years, including ten

University of Vienna, Austria	University of Gent, Belgium
Royal Veterinary & Agric. University, Denmark	University of Kuopio, Finland
Université Victor Segalen Bordeaux 2, France	University of Giessen, Germany
German Institute of Human Nutrition, Germany	University of Athens, Greece
University of Iceland, Iceland	National Institute of Nutrition, Italy
Wageningen University, Netherlands	University of Oslo, Norway
Oporto University, Portugal	Trinity College Medical School, Ireland
University of Navarra, Spain	Karolinska Institutet, Sweden
University of Zürich, Switzerland	Queen Margaret University College, UK
University of Gran Canaria, Spain	University of Southampton, UK

Table 1. Partners in the development of a European Master Programme in Public Health Nutrition.

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core modules and a master thesis of half a year, building on two years of previous university training;

- the development of an initial quality assurance system; and
- the development of a European network, accredited by the European Commission.

The Course

The ten core modules (Table 2) have been developed by the programme's Working Group, which has also developed descriptors for each of the modules [4]. These are to help in the organisation of the course and to ensure that the students have the required pre-requisite knowledge to enter a particular module. Each module has two unifying cross-curricular themes, namely, the European dimension and the physical activity dimension. Students must fulfill an admissions criterion for entry to the course. This should consist of at least two years of academic training, including basic physiology, nutrition or public health. Within the programme, they will undertake the equivalent of 90 ECTS of core modules and electives followed by a research project (and thesis) worth 30 ECTS, in total 2 years.

The Scope

The European collaboration has meant a quality improvement within the area of Public Health Nutrition training. Not only at graduate and postgraduate level, but also for the potential of building training programmes on more basic level for healthcare staff and others, by providing potential teachers within the member states. The collaboration has also developed into a European network for public health nutrition, which will develop consensus statements and background documents for the Master Programme, as well as support joint research between the universities involved.

Through the support from the European Commission to postgraduate training in public health nutrition across Europe, we can hope for increased mobility, networking and understanding between European nutrition and physical activity professionals. We can look forward to a new brand of professionals, who are truly European in their training, but who also have an integrated view of nutrition and physical activity, interrelations, possibilities for intervention etc. There are currently high demands related to the development of the specialty public health nutrition. There are in parallel high demands for showing cost efficiency and positive results in all public health work. These demands can only be met if today's public health generalist work force is complemented with a specialized work force of public health nutritionists.

The Challenge

The current major challenge will be to ensure the sustainability of the European training programme. The main event 2002 will be the summer school "EU Basics in Public Health Nutrition" in Spain in June, due to the Spanish EU presidency. This will be organised in collaboration with two other master programmes in Health Promotion [5] and Gerontology, respectively.

Since the early days of the programme, a number of developments regarding the importance of public health nutrition can be noted. The European Commission recently funded a project called "Dietary Guidelines and Guidelines for a Healthy Lifestyle", or *Eurodiet* for short. This project provid-

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Principles of nutritional science (15 ECTS)• Principles of public health (10 ECTS)• Principles of health promotion (10 ECTS)• Principles of physical activity (5 ECTS)• Epidemiology and biostatistics (10 ECTS)• Assessment of nutrition and physical activity (10 ECTS)• Food habits: An integrated perspective (10 ECTS)• Food safety (5 ECTS)• Food and nutrition policy (5 ECTS)• EU basics in public health nutrition (5 ECTS)• Research project and thesis (30 ECTS)• Electives (5 ECTS) |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 2. Modules in the European Master programme in Public Health Nutrition.

ed a good base for national food based dietary guidelines and valuable public health nutrition strategies to implement these guidelines. The *Eurodiet* project delivered an expert consensus on population goals on a number of topics, including physical activity levels, certain nutrient intakes, fruit and vegetable consumption as well as exclusive breastfeeding duration [3, 6]. Similar proposals were given by the French Initiative, during the French presidency during the autumn of year 2000 [7, 8]. All these issues provide a good basis for national and international work within the area for Public Health Nutrition.

What *Eurodiet* also underlines is the need for trained and competent people over Europe, capable among other things, of tackling the tasks of

- assessing the current situation in member states, and
- designing ways forward on national level, based on current reliable and comparable data.

The European Master Programme fills an important gap in this development, by providing trained staff with skills for performing comparable baseline assessment, but also for performing comparable monitoring programmes and designing cost-effective project and programmes, including policy developments on national and international level.

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4.23 The Importance of High-Level Training Human for Nutrition Scientists in Sub-Saharan Africa

S. Wade, Dakar, Sénégal

Abstract

Can the African people investigate and critically analyse nutrition needs in their context, identify national or community nutrition problems, plan and evaluate

nutrition programs, educate, and communicate scientific knowledge in nutrition without high-level trained staffs with a strong scientific base in human nutrition? Will they be able to tackle their nutrition problems without a sustainable organisation for long-term training and research?

In this paper, an attempt is made to analyse factors that will contribute to improving human nutrition in Sub-Saharan Africa. The paper also highlights an experience of institutional capacity building in Senegal, West Africa.

Introduction

Nutrition science is multidisciplinary and vast. It cannot be limited only to physiological requirements and/or pathological states (malnutrition). Consequences of the introduction of food technology processes, new plants varieties, change in socio-economic status and food habits in term of public health are all part of basic nutritional science.

Every body recognises the importance of nutrition in the process of development [1] but well-trained nutritionists and support for nutrition research are incredibly lacking in Sub-Saharan Africa.

With the pressure of the World Bank and IMF, Sub-Saharan countries have focussed their efforts on economic reforms but neglected social development of which, research, education and training are of prime importance. As a consequence of the Structural Adjustments Programs, the number of poor has increased considerably [2]. Many Sub-Saharan governments have consequently made a strong commitment in nutrition as a public health problem and some countries, such as Senegal, have developed huge national community nutrition programs mostly funded by the World Bank but without any input for training or institution building for nutrition in the long term.

National demands

In sub-Saharan Africa and particularly in the French-speaking countries, public health nutrition training is integrated into the medical education courses and has no identifiable curriculum. Only a few hours are devoted to clinical nutrition and this conventional training does not have significant impact on public health, and is unable to develop skills in human nutrition.

International institutions and governments have repeatedly emphasised the need of training and research in human nutrition in the developing countries, usually in meetings where the calls are recorded and ignored (3-6).

Scientific understanding of world nutrition has progressed but at the same time, the nutritional situation continues to be catastrophic in many less developed countries [7] and the trend, particularly in sub-Saharan Africa is worrying [8]. Our "old" diseases (kwashiorkor, marasmus, stunting) go under-addressed and, the rapid urbanisation in Sub-Saharan Africa urbanises malnutrition, poverty and food insecurity as well [9]. Change in diet patterns and greater exposure to environmental pollution result in "new" emergency nutritional disorders and are serious threats. Lack of expertise particularly in training and research, opportunities and infrastructure, funding endogenous research, with the developed world concentrating in its own nutrition problems, are on the main reasons why malnutrition in Sub-Saharan Africa is not sufficiently tackled.

For most nutrition scientists in sub-Saharan Africa, (particularly in the French-speaking countries) post-graduation is carried out in the developed world. Whatever the content of the training program (i.e. experimental, clinical or community nutrition), skills and technologies are inappropriate and result usually in much time and efforts needed to adapt the knowledge to the specific situations. The consequence of failure to adapt is "brain-withdrawal". In view of the size and seriousness of the problem in Sub-Saharan Africa, investment in long-term training is critical. However, we must keep in mind that high-level degrees of endogenous training in public health nutrition must maintain high standards. As mentioned by Golden (10), what we need is "First world science in a Third World environment on Third World problems".

International assistance and governments have developed local short-term training courses in nutrition in some Sub-Saharan countries [11, 12] but failed to place sufficient emphasis on professionals with graduated qualification at both the Masters and PhD levels. Indeed, short-term training in public health nutrition is essential for community development workers or professionals coming from health, agriculture, economic and other backgrounds but, its benefit in terms of sustainable human resources in nutrition is questionable. Program oriented training are useful to answer focus nutritional or emergency problems (development of specific skills) and in this way, must be developed and improved.

Sustainable training

Relevant and sustainable training for African nutritionists and specifically, training of academic leaders in the field of nutrition capable of integrating our critical characteristics, of adapting new knowledge to local problems, of training others, of doing high quality research and of transferring scientific skills is a pressing need.

It is often said that basic and fundamental research and training should be done in developed countries and that operationally oriented research and training are need for the developing countries [3, 6]. Ironically, advances in the physiology of malnutrition [13] come from studies conducted in the developing world (for instance, Jamaica, Zaire, The Gambia, and Uganda). Most of the time, mainly European teams, in well-endowed institutions have done the work with facilities to carry out locally laboratory-based research or clinical and metabolic studies. When they depart, they leave almost nothing behind. That was the case of in West Africa and in East and Southern Africa [6].

For successful nutrition interventions in Sub-Saharan Africa a critical mass of post-graduate people is a pre-request [6]. Effort will lead to success when high-level training is implemented at academic institutions: university or institutions attached to universities [14, 15].

High-level nutrition training building at the University of Dakar: The Senegalese initiative

In 1990, a few cores post-graduated nutritionists decided to move from their institutions to the University of Dakar in order to join their efforts and pool funds to create a human nutrition team for research and training. Their research activities were oriented on food intakes and energy requirement in rural population, effects of long-term severe malnutrition, in vitro bio-availability of iron in local foods, infant nutrition and breast milk production etc.

Soon after, with the help of their partners in the developed countries, a decision was taken to set up a Master and PhD degree in human nutrition. The initiative was motivated by the gap between the recognition of the important role of nutrition in human development and the total absence of advanced training in human nutrition in all the French-speaking countries in Sub-Saharan Africa. In Senegal as in many Sub-Saharan countries, the Faculty of Sciences delivers Masters and PhD by hence we decided that the training should be implemented there.

A key strength of the initiative was to foster collaboration with the different faculties of the university and with national health, agriculture, and food and technology institutions. This was achieved by organising, under the auspices of the Faculty of Sciences a meeting where people were made aware of the importance and multidisciplinary components of training.

In order to ensure quality assurance of the training, a curriculum was written in line with the French (bio-medical oriented) and English (multidisciplinary-oriented) nutrition training policy. Then it was submitted for review to international key persons with a strong expertise in nutrition in the developing countries (D. Lemonnier, J.C. Waterlow, R.K. Chandra, P Hennart, A. Ferro-Luzzi, M. Golden, E. Jéquier, F.E. Viteri, R.G. Whitehead); it was positively appreciated by the experts.

The initiative was further appreciated by the different assemblies of the University (Department, Faculty, University) and the training started in 1998 without any funding except the willingly participation of our colleagues from the North and the South and later on, the technical assistance of a TC project from IAEA. Now, the government of Belgium supports the training. The qualification is officially recognised by the CAMES (Comité Africain et Malgache pour l'Enseignement Supérieur), the African authority structure for the promotion of academic teachers and researchers.

May we hope in the future that the UN bodies will help promote and sustain the initiative.

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4.24 A Human Rights-Based Approach to Food and Nutrition in Development - Reflections from the ACC/Sub-Committee on Nutrition

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In the early 21st century human rights will increasingly influence what happens in all aspects of life

Just over eight years ago, in 1993 in this wonderful city of Vienna, the World Conference on Human Rights forcefully reminded the world community of the human rights foundations of the United Nations Charter, and their more precise expression in the Universal Declaration on Human Rights and subsequent internationally recognised legal human rights instruments. The United Nations is founded on the principles of peace, justice and human rights. The Universal Declaration of Human Rights recognizes human rights as pre-requisite for peace, justice and democracy. The current reform of the United Nations is based on a revival of the UN Charter, which is binding on all member states and UN system organisations. In the launch of the UN reform in 1997, the Secretary General explicitly stated that all major UN activities should be guided by human rights principles [1].

The outlook for the early 21st century is that human rights will increasingly influence what happens in all aspects of life-civil, political, economic, social and cultural. This view is shared by the high-level Commission appointed by the ACC Sub-Committee on Nutrition to identify the nutrition challenges of the 21st century. The Commission completed its work in 1999 and made recommendations concerning a human rights-based approach to food and nutrition in development at international, regional, national and local levels [2].

Earlier, the 1995 Copenhagen World Summit on Social Development had already given expression to an ethical, spiritual and human rights-based vision of social development: Heads of State and Government underlined their commitment "to a political, economic, ethical and spiritual vision for social development based on human dignity, human rights, equality, peace, democracy, mutu-

al responsibility..." [3]. And at most other global UN development conferences of the nineties, the realisation of human rights was stressed time and again as an essential part of the development process. As such, the purpose of the United Nations, as described in article 1, paragraph 3 of the UN Charter, "to ensure respect for human rights and fundamental freedoms for all without distinction as to race, sex, language, or religion", finally received the attention and recognition that the Charter gave it in 1945 [4]. At the same time, these conferences made a beginning in raising consciousness of the need to unite what should not have been separated in the first place: human rights and development.

The normative and legal framework of international human rights

The human rights principles set out in the UN Charter found their earliest codification in the 1948 *Universal Declaration of Human Rights (UDHR)*. The great contribution of the UDHR is that it extended the human rights platform to embrace the whole range of aspects of life, that is both civil and political aspects, and economic, social and cultural aspects, and that it made the different rights interrelated and mutually reinforcing. Subsequently, the principles of the Universal Declaration were further elaborated in two major treaties, the 1966 *International Covenant on Civil and Political Rights (ICCPR)* and the 1966 *International Covenant on Economic, Social and Cultural Rights (ICESCR)* (Figure 1). These two Covenants, together with the UDHR, constitute what has become known as the *International Bill of Human Rights*.

The drafting of two separate Covenants, one on civil and political rights and another on economic, social and cultural rights, reflects the widespread tendency of dividing human rights, in contrast to the Universal Declaration, into two main categories, which resulted from a controversial and contested decision by the UN General Assembly in 1951. Underlying this decision was the often argued assumption that the two sets of rights were of a different nature and, therefore, needed different instruments. A related assumption was that civil and political rights were 'justiciable' in the sense that they could easily be applied by courts and similar judicial bodies, whereas economic, social and cultural rights were of a more political nature. It was further believed that civil and political rights were 'free' in the sense that they did not cost much, while the implementation of economic, social and cultural rights was held to be costly since they were understood as obliging the state to provide welfare to the individual [5].

While these misconceptions persist to a greater or lesser extent, much progress has been made in overcoming the artificial polarisation of human rights. Here again, the Vienna World Conference on Human Rights was unequivocal in its powerful statement in the Vienna Declaration [6]: "All human rights are universal, indivisible, interdependent and interrelated. The international community must treat human rights globally in a fair and equal manner, on the same footing, and with the same emphasis".

The International Bill of Human Rights has since been extensively elaborated through the adoption of numerous conventions and declarations. The rights



Figure 1. The relationship between diet and health can be conceptualized as a 'casual web'.

The right to adequate food and nutrition and to be free from hunger

The right to adequate food and to be free from hunger is contained in article 11 of the ICESCR. Clearly, it is among those most cited in solemn declarations of political intent and most neglected and violated in practice. Part of this neglect – the lack of political will and resources apart – has been a generalised lack of understanding of what the implications of this right are. Article 11 provides some general guidance as to what States Parties, individually and through international cooperation, should do, namely:

- (a) “To improve methods of production, conservation and distribution of food by making full use of technological and scientific knowledge, by disseminating knowledge of the principles of nutrition and by developing or reforming agrarian systems in such a way as to achieve the most efficient development and utilisation of natural resources;
- (b) Taking into account the problems of both food-importing and food-exporting countries, to ensure an equitable distribution of world food supplies in relation to need”.

While these points remain valid, our knowledge – some 35 years after the drafting of the ICESCR – of food and nutrition problems and their manifold interrelationships with health, care and social and economic factors clearly points to the inadequacy of these ‘prescriptions’. The latter fail to emphasise that the ultimate objective of the right to food is to achieve nutritional well-being and that in this broader sense the right to adequate food is to be understood as the right to food and nutrition. Moreover, serious questions have been raised over the years about the specific nature of the obligations of States and other actors and the legal implications involved in realising the right to food.

In recognition of these uncertainties and in an attempt to break the right-to-food rhetoric, the 1996 World Food Summit took a landmark decision when it called for a clarification of the content of the right to food and to be free from hunger and of the means for realising this right [7]. On both fronts, progress has been substantial¹.

A significant achievement in the Summit follow-up has been the authoritative interpretation of the right to food by the Committee on Economic, Social and Cultural Rights, which is the ICESCR treaty body, in what is known as the General Comment 12 (GC 12) [9]. The GC 12 synthesises the fairly broad-based consensus on the contents of this right, which it describes as follows:

“The right to adequate food is realised when every man, woman and child, alone or in community with others, have physical and economic access at all times to adequate food or means for its procurement... The core content of the right to adequate food implies the availability of food in quantity and quality sufficient to satisfy the dietary needs of individuals, free from adverse substances, and acceptable within a given culture; [and] the accessibility of such food in ways that are sustainable and that do not interfere with the enjoyment of other human rights”.

The GC 12 summarises the legal obligations of states in terms of the aforementioned “respect, protect, fulfil” and indicates conditions constituting violations of the right to food. On the implementation side, it calls for national strategies to ensure food and nutrition security for all and illustrates some of its general components, drawing linkages to important nutrition-related fields such as health and education. In this context, the Committee’s recent General Comment 14 on the right to health takes on particular importance [10]. Other important implementation elements include the setting of verifiable benchmarks for subsequent monitoring and the adoption of framework legislation and corresponding accountability and remedy measures in support of national strategies. The GC 12 has thus delineated a framework for implementing the right to adequate food, which now needs to be operationalised under specific country conditions.

The drafting of the GC 12 has benefited from inputs by, inter alia, the first two expert consultations organised by the UN High Commissioner for Human Rights in response to the WFS right-to-food recommendations (Geneva, December 1997; Rome, co-hosted by FAO, November 1998). A third one (co-hosted by the German Government, March 2001) addressed implementation issues within the GC 12 framework. Moreover, the UN

<p>Civil and Political Rights</p> <ul style="list-style-type: none"> • the right to life • the right to liberty and security of person • freedom of movement • equality before the law • independence of the judiciary • the right to privacy • freedom of thought, conscience and religion • freedom of expression • freedom of association • the right to take part in the conduct of public affairs • the right to vote and to be elected • the right to freely determine political status <p>Economic, Social and Cultural Rights</p> <ul style="list-style-type: none"> • right to the highest attainable standard of physical and mental health • right to education • right to an adequate standard of living, including adequate food, housing and clothing • right to take part in cultural life • the right to freely pursue economic, social and cultural development • right to work, form trade unions, safe and healthy working conditions

Figure 2. Examples of Human Rights.

Source: van Weerelt [4]

contained in these instruments form a wide-ranging, interrelated normative system. Some of the core treaties are shown in Figure 1.

Human rights refer to those rights that are inherent to the person and belong equally to all human beings regardless of their race, colour, sex, language, religion, political and other opinion, national or social origin, property, birth or other status. They represent universal values. They constitute an ethical imperative to safeguard the dignity of every human being and provide fundamental norms of outcomes and processes of action to this end. Figure 2 provides illustrative examples of human rights.

The ultimate responsibility for the realisation of human rights rests with States Parties to the various treaties. This responsibility must not be misinterpreted as a straightforward welfare function of the state vis-à-vis the citizens under its jurisdiction. Rather, states are first and foremost obliged to *respect* and *protect* the rights of their people, and to *facilitate* the realisation of human rights. Only as a last resort are states obliged to assume a ‘fulfilling’ or ‘providing’ role. Figure 3 explains the meaning of these levels of obligations.

Internationally, states are accountable to the so-called ‘treaty bodies’ of the various human rights treaties and conventions. These are international expert committees set up in conformity with the respective treaties. States have to report to these bodies periodically, as part of the international human rights monitoring and supervision system.

<p>LEVEL OF OBLIGATION TO RESPECT</p>	<p>EXPLANATION Requires States to <i>refrain from interfering</i> directly or indirectly with the enjoyment of rights</p>
<p>TO PROTECT</p>	<p>Requires States to take measures that <i>prevent third parties from interfering</i> with the enjoyment of rights</p>
<p>TO FULFIL</p> <p>(a) facilitate</p>	<p>Requires States to <i>adopt appropriate legislative, administrative, budgetary, judicial, promotional and other measures</i> towards the full realization of rights</p>
<p>(b) provide</p>	<p>Requires States to <i>directly provide</i> assistance or services for the realization of rights</p>

Figure 3. Three levels of state obligations under International Human Rights Law.

Commission on Human Rights has appointed a Special Rapporteur on the right to food, charged with gathering information on the realisation of this right, collaborating with Governments, intergovernmental organisations and NGOs in the promotion and implementation of the right to food, and with the identification of emerging issues related to the right to food worldwide [11].

UN agencies have, to varying degrees, examined their roles and options in realising the right to food and related rights or adopting rights-based approaches to development more generally. The same can be said about a number of NGOs. In this latter category, a group of NGOs has developed a Code of Conduct on the Right to Food as a Human Right, spelling out obligations of state and non-state actors [12]. The intention is to have this Code formally negotiated as a voluntary legal instrument – a proposition likely to be brought forward at the forthcoming World Food Summit-five years later, to be held in November 2001.

The academic world has not failed to make its contribution to breaking new ground in a rapidly advancing field. A case in point is the work of the François-Xavier Bagnoud Center for Health and Human Rights at Harvard School of Public Health, focusing on right-to-health aspects in the context of food, shelter and broader development; and the International Project on the Right to Food in Development (IPRFD), established at the University of Oslo. The IPRFD aims at competence building, the promotion and execution of research and studies, and the provision of related advisory functions concerning the right to food and nutrition as a human right in the context of a broader rights-based approach to development [13].

The role of the ACC Sub-Committee on Nutrition in promoting the right to food and nutrition

The ACC Sub-Committee on Nutrition (ACC/SCN), through its Working Group on Nutrition, Ethics and Human Rights (WG-NEHR), has played a pioneering role in advancing food and nutrition as a human right in the UN system, long before the World Food Summit created the current momentum. Inspired by the Convention on the Rights of the Child, the Working Group was formally proposed by UNICEF and established at the 20th SCN session in Geneva in 1993, with the objective of promoting an ethics-based human rights approach to food and nutrition problems and related development issues. It held its first meeting just prior to the 21st SCN session in New York in 1994. Meeting annually (except for 1995), the WG has pursued its mandate in-between sessions with the technical assistance of an existing support group outside the UN system, i.e. the World Alliance for Nutrition and Human Rights (WANHR). WANHR is a network of people and institutions seeking to improve nutrition, food, health and care conditions through application of a human rights approach [14].

At the risk of oversimplification, the work and achievements of the Working Group to-date can be divided into three (overlapping) phases [15]:

(i) *1994-1996: Building understanding.* The early years were largely devoted to raising awareness, understanding and interest related to the topic among SCN member agencies – in short, to building a constituency within the SCN. While the SCN responded positively to the recommendations of the WG, it left no doubt about its perplexity concerning the policy and programme implications of a human rights approach to nutrition problems and specifically the benefits to be derived from such an approach. The general attitude prevailed that what a rights approach aimed at achieving was already being pursued through existing basic needs strategies, and a common question concerned the “value added” by a human rights approach which would not already be achieved through existing programmes. The general tenor was to move ahead with caution.

(ii) *1997-2000: Developing co-operative action.* As awareness and understanding of a rights approach gradually increased, the subsequent years focussed on developing co-operative action on the right to food and nutrition both among SCN members and between them and the Geneva-based UN human rights bodies. These efforts were inspired and guided to a large extent by the UN Secretary’s General human rights oriented reform proposals and the right-to-food recommendations made by the World Food Summit. Tangible manifestations of these efforts included the entry of the Office of the High Commissioner for Human Rights (OHCHR) into the SCN membership, the participation of SCN member agencies in the High Commissioner’s Consultations on the

Right to Food, the organisation of the first ever SCN Symposium on nutrition and human rights at the High Commissioner’s headquarters, and the co-hosting by the OHCHR and the SCN WG-NEHR of an International Encounter on the contribution of international development, humanitarian and human rights institutions to the operationalisation of the right to food and nutrition, organised by the IPRFD in Geneva in August 2000 [16].

(iii) *2001 onwards: Consolidation of cooperation at technical and institutional levels.* The SCN’s work on a rights-based approach to food and nutrition problems has now entered its consolidation phase. With the overall challenge ahead being the operationalisation of the right to food and nutrition, co-operation must now focus on two levels: At the *technical level*, priorities include the translation of the guidelines contained in General Comment 12 into some kind of operational ‘manuals’ for practitioners at different levels and related capacity building for rights based nutrition programming, and the development of rights-sensitive indicators for nutrition assessment, programming and monitoring; this latter area is one of the principal subjects of the present workshop, taking as a starting point for our discussions the work done to-date and planned in the SCN context. At the *institutional level*, there is a need to formalise existing collaborative arrangements among SCN members and between them and the UN human rights institutions. This would include rights-based co-operation at the country level, in the framework of existing co-operative arrangements such as the Common Country Assessments (CCA) and the UN Development Assistance Frameworks (UNDAF).

Why we must move ahead with a human rights-based approach to food and nutrition problems

The World Food Summit and other development summits of the nineties and the UN reform programme have set the direction for a rights-based approach to development in general, and to food and nutrition in particular, in the early 21st century. But these directions will translate into effective action only when all actors within and outside the UN system, in government and civil society and in the scientific community have actually taken ownership and internalised the concept of a rights-based approach. The experience in the ACC/SCN Sub-Committee on Nutrition, which – as noted above – started out with perplexity and caution before it gradually moved to understanding and co-operation, may be indicative for the ‘adoption process’ in any group of actors. The IUNS will be no exception.

The question about the benefits – or the ‘value added’ – to be derived from a rights-based approach is the most common one among newcomers to the rights concept in development. It certainly was a principal concern in the early years of the SCN human rights debate.

At the surface level, the differences between a rights-based approach and conventional approaches to food and nutrition of the basic-needs type may appear subtle, but on reflection they emerge as fundamental. They have both an *ethical* and *juridical* dimension, as well as important repercussions for food and nutrition policies and programming. Basic needs approaches define “beneficiaries” and their needs. The approach is one of dependency in the sense that beneficiaries have no active claim to ensure that their needs will be met. And there is no binding obligation or duty for anybody to meet these needs. As such, basic needs approaches have an element of charity. The fundamental difference in a human-rights approach is that it starts from the *ethical imperative* that all people are entitled to a certain standard in terms of material and spiritual well-being.

A human rights approach thus removes the charity dimension inherent in basic needs strategies, however valuable this may be, and emphasizes rights and responsibilities. It recognizes beneficiaries as active *subjects* and ‘claim-holder’ and establishes duties or obligations for those against whom a claim can be held (‘duty bearers’) to ensure that needs are met. The concept of claim-holders and duty-bearers introduces an important element of *accountability*. Increased accountability holds the key for improved effectiveness of action and as such offers the potential for ‘added value’ flowing from the application of a rights-based approach [17].

In juridical terms, human rights are legally binding for States, not optional as in the case of recommendations from global summits and conferences.

International human rights need to be translated into appropriate national law, in accordance with the UDHR and the international covenants. Human rights require active and effective remedies, not necessarily by the use of courts, but any person or group whose rights are violated should have access to appropriate remedial measures, juridical or otherwise.

These ethical and juridical aspects become all the more important in a globalising world dominated by the forces of economic and financial markets, which have little regard for the well-being of people and run the risk of further marginalizing large numbers of people.

The challenges ahead and the expected contribution from the current workshop

In conclusion, the follow-up to the World Food Summit recommendations on the right to adequate food and nutrition have led to broadly-based agreement on the content of this particular right. The challenge now lies in its operationalisation. Efforts to this effect have to be made simultaneously at several levels: methods for mobilising state and non-state actors for the adoption of a rights-based approach to food and nutrition and broader development problems; research and studies on technical aspects of implementing rights-based approaches; and related capacity development.

Within this context, the current workshop will address three selected major issues:

- How to mobilise state and non-state actors to adopt the concept of a rights-based approach, including consideration of how to integrate rights into policy and programme planning;
- How to develop rights-sensitive benchmarks and indicators for assessing and monitoring the realisation of the right to food and nutrition, starting from the current state of work within the ACC/SCN; and
- What can the human rights paradigm contribute to the nutritional sciences.

The workshop exchange of views on these topics should help bring about a continuing, broad-based discussion among nutrition scientists and open up dialogue between them, development specialists and human rights experts.

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¹ For a summary account of follow-up to the WFS in this area see Kracht [8].

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4.25 Mobilising States and Other Actors for a Rights-Based Approach to Food and Nutritional Health

Exploring some critical aspects of the process: catalytic and strategic initiatives in Mali and Norway

Wenche Barth Eide, Arne Oshaug and Ousmane Omarou Sidibe

1. Introduction

This workshop deals with a human rights perspective on food and health needs for nutrition security and wellbeing as a development goal. Herein lies a challenge, not only to policy makers and professionals, but to a large extent also to *the scientific community* concerned with the ethical aspects of their chosen fields of study. In this presentation we shall point to some elements of this challenge that emerge *if and when* we accept the need to put the human rights to adequate food, health and care at the center of efforts towards sustainable human development for all.

Our point of departure is that human development is intrinsically linked to freedom from hunger and nutritional wellbeing for all. But before we can discuss the challenge to the scientific community, we need to discuss whose responsibility it is to implement the right to food. Is this a matter of "somebody" actively pursuing certain actions, or are we merely interested in using it as an indicator of progress towards food security? What is the meaning of *the right to adequate food and nutrition* as compared to that of food and nutrition *security*?

The international human rights system as articulated in international human rights law, is first of all *a system of agreed moral and legal principles regulating the relations between the individual and the state*. This is not to deny the essential roles of non-state actors in realizing human rights including the rights to food and health. But at the end of the day it falls upon the state authority to create the environment needed for the various non-state actors to constructively contribute to this realization. This is a critical aspect of what should be expected by the state in addition to exerting its own protection functions and, when needed, direct interventions to help those in particular need to enjoy their rights. We shall therefore first briefly review an analytical tool that has been proposed to help direct the work to define and operationalise state obligations according to some broad categories of state performance that may be delineated. Secondly, we shall outline some recent initiatives for strategic thinking and action in two widely different countries: Mali and Norway. Thirdly and lastly, we shall summarize what we see as the agenda ahead espe-

cially for the scientific community to advance the human rights to food, health, and care in order to promote nutritional security and wellbeing.

Implementing the right to adequate food: understanding the nature of state obligations

The right to food and nutrition “movement” has provided a conceptual and analytical tool for identifying the more precise nature of states’ and other actors’ obligations and responsibilities in protecting and promoting human rights. Part of the current conceptual basis for analysing and promoting economic, social and cultural rights, originated as an interdisciplinary exercise by academics in nutrition and international law and with the right to adequate food and nutrition as the focus of interest. It has found its expression in the form of “a right to food matrix”(Figure 1) [4], essentially combining the notion of different levels [5] and degrees of state interventions, with the essential elements of food security in normative development terms. The “levels of interventions” can be referred to three or four broad categories of state involvement: At the first level, there should in fact be no interference by the state at all. The obligation of the state would merely be to *respect* people’s right to acquire food through ways they have adopted to cater for themselves out of their own means, if this already functions successfully. The next level is to *protect* the right through food laws and administrative regulations from abuse by third party interests. Only when all opportunities for self-help are exhausted, the state is obliged to help *fulfil* the right to food. This can mean to *facilitate* the conditions for people to feed themselves, or as a last resort, directly *provide* the resources necessary including food.

As will be seen from the matrix, each level can in theory be concretized pertaining to each element of the normative content of the right to food. This can be done both in terms of the adequacy of food one has a right to – broken down in nutritional adequacy, safety, and cultural acceptability (or other characteristics in the interest of the consumer). Further more, it points to the long-term features of the availability of, and access to food through an ecological, economic and social sustainable system. The matrix is an attempt to see the complexity of the right to food concept in its practical dimensions of supply, access and consumption. The obligations for action ought to be derived from these in operational terms, once the nature of the right elements have been clarified in a given setting.

The matrix can be expanded to concern the right to food, health and care [6], or the format can be used to elaborate more in depth each of these or other corresponding obligations.

The essence of the thinking behind the levels of obligations and the structure of the right to food matrix, has given inspiration to an important recent development in the form of two so-called General Comments on the right to food [7] (GC No. 12) and health [8] (GC No. 14) respectively. They were issued in 1999-2000 by the Committee on Economic, Social and Cultural Rights – the independent body under the United Nations to monitor progress in the realization of economic, social and cultural rights by individual member states. These General comments constitute the most authoritative interpretations to date of the two rights as established in binding international law, specifying in much further detail although in general terms, the nature of the rights and the corresponding obligations to help realize them. They can guide interested coun-

tries in beginning to systematically identify the issues at stake and the practical measures needed to address them properly backed by domestic law. Clearly, the prospect of an appropriate utilization of the principles in the General comments requires that there be access to good and meaningful data, in fact those principles will themselves serve as guides for the identification of data needs.

This is a direct challenge to both the food and nutrition community and to the national statistical bureaux. In meeting this challenge one must be aware that data here concerns more than outcome data, important as they are for objective assessment of dietary and nutritional outcome of development policies and programmes. There is an equally strong need for data on *processes*, to be able to monitor the progressive implementation of obligations to realise the rights to food, health and care which as we know are all essential for desirable nutritional status. In this context there is need to understand the nutrition situation and prospects for its improvement within the broader political economy of a country’s situation and performance and how it impacts positively or negatively on all human rights, including the right to adequate food and nutrition. But advancing human rights needs more than good data. There is also a need to identify the right *institutional contexts* that can foster both a better political understanding of the problem, and find the right ways to open political doors and mobilise the public and civil society more broadly for the implementation of this right. The following two examples illustrate very different but equally opportunistic avenues.

Two cases in point: Mali and Norway

The challenge now is to transform the concepts and available mechanisms into means and tools, to back up, reinforce, and if necessary change food and nutrition policies and programmes. The time has come to catalyse systematic and strategic thinking and initiatives in single countries, about what a rights-based approach might mean more concretely in specific national situations. A rights-based approach should be seen as a strategic tool for interested governments and civil society alike in advancing nutritional security and wellbeing for the individual child, woman and man.

But what can two so widely different countries as Norway and Mali provide of general insight and inspiration? Here we turn to the Vienna Declaration and Plan of Action (VDPA) [9] that also states in the second part of Article 5 on the universality of human rights:

While the significance of national and religious particularities and various historical, cultural and religious backgrounds must be borne in mind, it is the duty of States, regardless of their political, economic and cultural systems, to promote and protect all human rights and fundamental freedoms.

The VDPA is thus categorical in not making exemptions for any of the members of the world community. At the same time it recognises that the notion of universal human rights principles is only meaningful if interpreted in the given economic and cultural, hereunder the religious system in which they are to be applied. Beyond this, no government can be allowed simply to “pick and choose” among those rights that they like or don’t like. Thus when Mali and Norway are chosen here as cases in point, this is possible because both countries have, despite widely different economies, culture and religion, accepted the universality of human rights and have ratified the pertinent international conventions. But also because both countries have committed themselves to implementing, to the best of their ability, the principles contained therein.

In implementing the principles, each country needs to be ‘opportunistic’ in the sense that strategic thinking must be tailored to the specific internal structural and political space that would best favour an internal dialogue. Likewise, initiatives will have to be taken where there is already a favourable setting for it. The two examples therefore emphasise the importance of appropriate institutional contexts in which one may catalyse desirable processes. The first, that of Mali features a human rights approach as a *prospective* venture, the second, of Norway, reports on *actual* official policy.

Mali

Enclaved in the Sahel and classified among the poorest countries in the world, Mali has been confronted with food insecurity in various ways. But in spite of lessons learned during the droughts in the 1980s, the near to self-sufficiency in cereals, and the fact that several sectoral policies have been devel-

Guiding principles	Food Security				
	Adequate food			Stable supply and access	
Level of state obligations	Nutritionally adequate	Safe	In the interest of the consumer	Environmental sustainability	Social and economic sustainability
Respect					
Protect					
Fulfil Facilitate					
Provide					

Figure 2. The Right to Food Matrix.

oped to eradicate hunger and improve the quality of living such as food security policies, hunger eradication policies, labour policies and so on – Mali's food security policy has not achieved all its objectives.

The policies have *not* yet been related to a human rights approach. And yet, Mali has ratified both the International Covenant on Economic, Social and Cultural Rights and the Convention on the Rights of the Child. This means that Mali's national legislation does reflect recognition of the fundamental right to adequate food and nutrition. The prevailing political and socio-cultural context is also favourable: Mali was in early August characterised, by the UN Committee on the Elimination of Racial Discrimination, as "exemplary in the region for its democratic development" [10]. There is also a real political interest to promote human rights and satisfy essential needs according to the means at disposal of the country's resources. It should be mentioned that in June 2000, an African Institute for Human Rights Learning was created in Mali. This institution aim at developing a new form of training of human rights educators in forming community leaders whom can promote economic and social transformation in Africa. The purpose is to make the people aware of their rights and have them participate in a conscious way in societal change, towards a sustainable development that places the human being in the centre of the development process. And while the civil society has reached a level of development that is very important for Mali, the traditional solidarity remains strong and tends to protect people from being left alone without assistance in times of need.

What should and could be done more specifically in Mali to adopt an explicit human rights framework to its food and nutrition security policy? There is no straightforward answer, and Mali is therefore an example of a country where explicit strategic thinking will need to be initiated with a view to what a rights-based approach to food and nutrition policies would imply under the circumstances prevailing in the country. In approaching this as an intellectual exercise to start with, a good conceptual framework is needed to spark off a process of reflection and progressive acquisition of innovative ideas from different stakeholders.

The General Comment No 12 on the Right to food [11] and the General Comment no 14 on the Right to health [12] provide such a framework. The task will be to examine how its principles can be adapted for use in a poor, multiethnic but democratic and peace-seeking country like Mali. This brings up the need to identify the right institutional context that can foster both a better political understanding of the problem and find the right ways to open political doors and mobilise the public and civil society more broadly, for the implementation of this right.

The availability of the two General Comments coincide well in time with the recent establishment of a new structure at the office of the Prime Minister - the *Commissariat for Institutional Development* [13].

The function of this Commissariat will, in general, be to provide content and vision to aspects of state *reform*, to the process of *decentralisation*, to *capacity development*, and to *strengthening of the civil society*. A further examination of a rights-based approach to food and nutrition security can be carried out under the auspices of this new structure and function. As a first step, a national seminar is likely to be organised by early 2002 to begin that process, which very soon should be repeated on a decentralised basis in the provinces. Such seminars would serve several purposes:

- 1) to *raise the attention* among policymakers, judges and others from the legal constituency, public service administrators, NGOs and academics alike, about the nature of international human rights especially economic, social and cultural rights and the prospective value of a human rights approach to food and nutrition security policies and programmes;
- 2) to open an *internal dialogue* about how the principles of a human rights approach to food and nutrition can be translated into the Malian reality and help define the obligations of the state to implement it, especially how far can these obligations be met within the scope of Mali's current financial, organisational and human resources and capacity, and where can obvious gaps be identified for assistance from external sources in the short and long term perspective;
- 3) to discuss the current *capacity* of the country and its various state and non-state actors, and the need for an active institutional and human resource development to ensure that the country will be able to secure the right to be free from hunger and promote the right to adequate food for all.

To conclude on Mali, we know that the quality of the questions to be raised is

as important as the answers. Mali may become one of the first countries where such questions are being raised directly out of the situation in that particular country. For this, the contribution of expert food and nutrition analysts and practitioners is needed, first of all from among Malian experts themselves, but in the foreseeable future still with the support also of international colleagues. It is hoped that a factual report of what will have happened in Mali in the three-four years to come, can be reported on at the next IUNS Congress in Durban in 2005.

Norway

Norway has for many years been in the forefront of voicing human rights, including economic, social and cultural rights, in the international community. Norway was also one of the countries proposing that the right to food be given due attention in the Declaration and Plan of Action of the World Food Summit (WFS) in 1996. This resulted in a recommendation to clarify the content of the right to food and its corresponding obligations by states and others responsible (Objective 7.4 of the WFS Plan of Action). Norway does not consider the right to adequate food to be a matter only for third world countries.

Food and nutrition security is a major concern for Norway, and a rights perspective, explicitly applying some of the fundamental principles implied, can strengthen and secure a continued attention to this national and human goal for all parts of the population. The recommendations of the WFS had a direct impact on the most recent policy development in Norway, which is outlined in a White Paper adopted by the Norwegian Parliament (the Storting) in May 2000 (St meld 19, 1999-2000). The document has a broad perspective; almost all the different Ministries were involved in the preparation process and a number of actors were consulted. The principles of *participation* and *transparency* thus found a concrete manifestation in this recent food and agricultural policy.

Food Security - the overall goal for the food and agricultural policy

A particular feature of the new agricultural policy is its emphasis on the need for the agricultural sector to contribute to the health of the people. As an overall goal to achieve this through the national food and agricultural policy, "food security" as defined by the World Food Summit of 1996 was used. While the main preoccupation of the WFS was the hungry, the poor and malnourished, the definition is valid for all countries – rich and poor – given that it contains some fundamental principles for policy development. The White Paper thus used the WFS definition as follows:

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

But the new agricultural policy goes further: It underlines *the right* of all residents in Norway to be able to enjoy a *nutritionally adequate and safe* diet. Hence the need to attend to *the interest of consumers*, which leads to an emphasis on involving consumers in influencing objectives, strategies and programs along the whole food chain from primary production to consumption. What were the means suggested to implement this?

Government obligations: Adequate food is a human right

The International Covenant of Economic, Social and Cultural Rights (ICESCR) was made a national law in May 1999. Having thus first legally established that the right to food is a human right for all people in Norway, the White Paper follows up Objective 7.4 of the WFS Plan of Action, which requests the State parties to:

... give particular attention to implementation and full and progressive realization to this right as a means of achieving food security for all;

and furthermore, to

... make every effort to implement the provisions of Article 11 of the ICESCR...

In developing a policy in the follow-up of the WFS recommendation, the White Paper makes explicit use of General Comment 12 on the Right to adequate food issued by the Committee on Economic, Social and Cultural Rights (appearing as a “non-printed annex” to the White Paper). This General Comment is the most authoritative interpretation to date of what ought to be content of the right to adequate food, by an important UN monitoring body and therefore serves as a useful basis for policy formulation.

The key feature: a production based on consumer's needs and preferences

A key feature of the rights-approach to implementing a Norwegian food and agricultural policy with Food Security as an overall goal, is a strong consumer orientation. The White Paper specified the following obligations of the State:

- *Respect the consumer's rights*, including the right to information and to be able to choose a nutritionally adequate diet.
- *Protect the consumers* through producing safe food; ensure honest marketing and presentation, and through a sustainable production, which should be ethically acceptable. The services shall be highly professional, accountable and have a high degree of trust in the population.
- *Facilitate increased consumer participation* in fora where food and agricultural policies are discussed nationally and internationally, and make the distance between the producers and the consumers shorter. Furthermore, to new industries and product development, adaptation and competition in the agricultural sector and the food industry, through a well functioning market, offer products of good quality and a broad spectrum of products at an acceptable price.
- *Implement measures* to increase the influence of consumers on decisions, regarding food production and market availability, for improving information on the conditions of production of food, the origin and quality, and contribute to increase in knowledge about food and nutritionally adequate diets.
- *Prepare an action plan* for the implementation of the consumer policy.

At present the Ministry of Agriculture is working on an action plan for implementing the consumer policy. It has started a dialogue with the various services on how they should open up more to the public (that is, ensure transparency), how to create a meeting place with consumer groups and how to involve the consumers in policy making. Presently one is considering the establishment of a consumer panel, composed of randomly selected individuals from all of Norway. The ministry is also financing activities such as supporting staff in the national Consumer Council to work specifically with food related issues and with participation of consumer representatives in national and international meetings regarding food.

An agenda ahead for the scientific and professional nutrition community to contribute to the promotion and protection of the right to adequate food and nutrition

We wish to conclude this paper by providing some suggestions for what we see as challenges to the scientific community, under three headings:

1. Contribute to empirical and policy research on the content/obligations related to the right to food, to health and to care, with a view to better understand both the opportunities and the constraints to implementing these rights as part of state and non-state action;

2. Undertake research on and field test indicators of the realisation of the right to food, health and care for use in the setting of benchmarks for planning and programming and monitoring of results;
3. Encourage academic training, master and doctoral studies and in-service programs as feasible, for interested students and professionals who wish to equip themselves with the essentials of human rights based thinking and action applied to food and nutrition.

And finally: the incoming IUNS Board should perhaps consider creating a special Committee on rights-based approaches to food and nutrition security. It could serve as a link between interested groups and individuals in the scientific nutrition community, and the ongoing international and national efforts to promote the rights to food, health and care. We believe there is a great potential within the collective nutritional sciences for playing a significant role in the clarification and promotion of these rights in fighting hunger and promoting food and nutrition security and wellbeing for all in a rapidly changing world.

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