WORKSHOP ON DIETARY GUIDELINES AND NUTRITION EDUCATION IN THE NEAR EAST

Amman, Jordan, 17 – 20 November, 1998

(Programme and Abstracts)

WORKSHOP ON DIETARY GUIDELINES AND NUTRITION EDUCATION IN THE NEAR EAST

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Organized By

Food and Agriculture Organization
International Life Sciences Institute
Arab Nutrition Society
Royal Scientific Society, Jordan

PROGRAMME AND ABSTRACTS

Preface

Promoting appropriate diets and healthy lifestyle is one of the strategies recommended to prevent and control nutritional problems in any community. Food-based dietary guidelines were among the tools for promoting sound food habits. This was emphasised by the International Conference on Nutrition which was convened by FAO and WHO in Rome in 1992. Countries in the Region should work to establish a Food-based dietary guidelines relevant to their local situation. The purposes of this workshop, therefore, will be to:

1. Share and discuss scientific information about the diet-nutrition-health relationship.
2. Review existing literature on recommended nutrient intake, applicable to food-based dietary guidelines.
3. Review existing national dietary guidelines and their use in countries.
4. Promote the process of developing and implementing food-based dietary guidelines in an appropriate culture context.
5. Make recommendations for the development and implementation of food-based dietary guidelines.

We hope that this workshop will achieve these purposes and participate in dissemination the need and importance of Food-based Dietary Guidelines in the Near East countries.

Dr. Abdulrahman O. Musaiger
Coordinator, Arab Nutrition Society

Preface

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Dr. Abdulrahman O. Musaiger
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PROGRAMME

Tuesday, 17 November 1998

8:00 – 9:00	Registration
9:00 – 9:30	Opening Ceremony
9:30 – 10:00	Coffee Break

First Session : Current Knowledge in Nutrition and Diet-Related Health Problems (10:00 – 13:00)

Chairman: S. Hijazi (JUST/Jordan)

10:00 – 10:40	Regional Overview of Diet and Health in Near East Countries ***S. Miladi (FAO/RNE/Cairo)***
10:40 – 11:20	Health Status Related to fat and Protein intake ***J. Stanely (UK)***
11:20 – 12:00	Health Status Related to Carbohydrate and Fiber Intake ***K. Hussain (King's College/UK)***
12:00 – 12:45	Energy Balance and Physical Activity ***A. Melhim (Yarmouk University/Jordan)***
12:45 – 13:00	**Coffee Break**

Second Session : Micronutrients and Health (13:00 – 14:30)

Chairman : J. Stanely (Norwich Lab/UK)

13:00 – 13:45	Micronutrients, Vitamins, Minerals and Biologically Active Non-Nutrients and Health ***K. Tontisirin (Mahidol University/Thailand)***
13:45 – 14:30	Round-table Discussion on Macro/Micro-nutrients and Health

Wednesday, 18 November 1998

Third Session : Developing Food-Based Dietary Guidelines (8:30 – 14:30) (Presentation with Discussion)

Chairman: N. Baba (AUB/Lebanon)

8:30 – 9:45	Introduction to Food-Based Dietary Guidelines; what are they, how to formulate, how to use ***W. Clay (FAO/ESN/Rome)***
9:45 – 10:45	Health Information Needed for Formulating FBDG ***A. Djazayery (School of Public Health/Iran)***
10:45 – 11:00	**Coffee Break**
11:00 – 12:00	Methodologies for Dietary Assessment and Analysis at National, Household and Individual Levels ***W. Moussa (Nutrition Institute/Egypt)***
12:00 – 13:00	Use and Status of Food Compostion Tables and Data-base in the Near East Region ***A. Musaiger (BCSR/Bahrain)***
13:00 – 13:15	**Coffee Break**
13:15 – 14:30	Discussion : Indetification Topics for Panel and Follow-up ***Coordinator : W. Clay (FAO/ESN/Rome)***

Thursday, 19 November 1998

Fourth Session : Nutrition Education and Implementation of FBDG (8:30 – 12:00) (Presentation with Discussion)

Chairman: W. Moussa (Nutrition Institute/Egypt)

8:30 – 9:15	Linking FBDG and Nutrition Education: Guidelines, Food Guides and Communication ***W. Clay (FAO/ESN, Rome)***
9:15 – 10:30	Using Mass Media and Social Marketing for Nutrition Education ***A. Musaiger (BCSR/Bahrain)***
10:30 – 10:45	**Coffee Break**
10:45 – 12:00	- Building Partnerships for Promoting FBDG and Nutrition Education - The Role of Private sector ***K. O'Sullivan (Kellogg/UK)*** - The Role of NGOs/consumer groups ***H.S. Al-Ktheiri (Association for Consumer Protection/UAE)***

Fifth Session : Case Studies (12:00 – 14:15)
Chairman : S. Miladi (FAO/RNE/Cairo)

12:00 – 12:30	Pakistan
12:30 – 13:00	Egypt
13:00 – 13:15	**Coffee Break**
13:15 – 13:45	Saudi Arabia
13:45 – 14:15	Thailand

Friday, 20 November 1998

Sixth Session : Working Groups (8:30 – 12:30)
Chairman: A. Musaiger (BCSR/Bahrain)

Group 1 : Steps needed to develop FBDG at the country and regional level

Group 2 : Actions needed to promote FBDG at the country and regional level

8:30 – 10:30	Working Groups
10:30 – 11:00	**Coffee Break**
11:00 – 12:30	Working Groups (continued)

Seventh Session : Conclusion and Recommendations (12:30 – 14:15)

Chairman: W. Clay (FAO/Rome)

12:30 – 13:30	Report of Working Groups
13:30 – 14:00	Evaluation of the Workshop
14:00 – 14:15	Closing Remarks

ABSTRACTS

REGIONAL OVERVIEW OF DIET AND HEALTH IN THE NEAR EAST

SAMIR S. MILADI

FAO Regional Office, Cairo, Egypt

It is well recognized that the dietary patterns affect the nutrition and health status of individuals and the society. During the last three decades a group of countries from the region experienced rapid changes in their social, economic, cultural and environmental conditions. Other groups had faced economic difficulties, war and political unrest. Dietary changes have been occurring on both groups but with different consequences. Due to the over-consumption and decrease in physical activities, "over nutrition-obesity" led to the increase of the prevalence of diet related non-communicable disease, such as heart disease, hypertension, diabetes and cancer specially in the Arab countries of the Gulf, Jordan, Tunisia, Egypt, and Syria. Whereas, under-nutrition, growth retardation, PEM in infants and young children and maternal malnutrition; represent a major nutritional problem in the population of the second group especially Sudan, Iraq, Somalia, and Yemen.

However, micronutrient deficiencies such as iron deficiency aneamia and iodine deficiency disorders are common in most of the countries of the region, in addition to vitamin A, D and C deficiencies for some population groups.

The need for practical programmes for the control of nutritional problems are recommended. They should be based on proper dietary patterns and healthy lifestyles. Understanding Food-based dietary guidelines between producer and consumer and cooperation among government, NGOs and private sectors are required to achieve better health of the population.

CARBOHYDRATE, DIETARY FIBER AND HEATLH STATUS

KHALID HUSSAIN AND ANTHONY R. LEEDS

King's College London, United Kingdom

Carbohydrate is an essential macronutrient for mankind. It forms the main source of daily energy intake (60%-80%) in the developing countries in contrast to 50% or less in the developed countries. Generally the carbohydrates are classified into polysaccharides (which include starch and dietary fiber), oligosaccharides, and di-monosaccharides. Starch is the carbohydrate digestion and absorption. It is either mobilised to the tissue cells for direct energy production, stored as glycogen in the liver and skeletal muscles for further utilisation, or converted into fat and deposited as an energy reserve. Carbohydrate is important in the human diet because (1) it is easily digested and absorbed. (2) it conserves protein from being used to produce energy, and (3) prevents ketosis resulting from partially oxidized fats.

The optimum diet for athletes and diabetes is high in dietary carbohydrate (55%-60% of total energy) which reduces fat intake to 25-30%. Low glycaemic index carbohydrates are beneficial in controlling blood levels of glucose and insulin in diabetes. Other than being a source of fuel, carbohydrate foods are valuable source of vitamins, minerals, antioxidants and dietary fiber.

Dietary fiber is defined as the plant polysaccharides not digested by human digestive enzymes. Regarding its solubility and physiology, dietary fiber can be divided into water soluble and water insoluble fractions. This division is important in medical and dietetic practice, as soluble fiber affects the upper GIT where it slows food digestion and absorption which can be useful for diabetics, hyperlipidaemics and in body weight control. Insoluble fiber acts basically in the lower GIT mainly by increasing the stool bulk and shorten transit time. This is relevant to the role of dietary fiber as a protective factor in colon cancer.

ENERGY BALANCE AND PHYSICAL ACTIVITY

AYED F. MELHIM

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Yarmouk University, Irbid, Jordan

It is commonly believed that body weight will remain constant when caloric intake equals caloric expenditure. Any imbalance in energy output or energy input will result in a change in body weight. If the energy input is greater, a positive energy balance exists, and the individual gains weight. On the other hand, that individual loses weight if the energy output predominates, a condition of negative energy balance.

Treatment for overweight and obesity has focused on achieving negative energy balance through reduction of energy intake below daily energy requirements, increase in energy expenditure through physical exercise, or both. Virtually every conceivable manipulation of energy intake has been tried in the effort to reduce weight.

Reduction of energy intake is capable of providing a large energy deficit; however, researchers found that few individuals have long-term success in maintaining the weight which is lost. Negative energy balance may also be achieved through physical exercise by itself or in conjunction with energy restriction.

It is generally recognized that prevention of obesity and overweight, is more effective than treatment. Most individuals do not become overweight overnight; they accumulate an extra 75-150 Calories per day that, overtime, lead to excess fat tissue. A daily physical activity program could easily counteract the effect of these extra calories. Dr. Jean Mayer, an international authority on weight control, has stated that no single factor is more frequently responsible for the development of obesity than lack of physical exercise. A large body of knowledge substantiates the point that physical exercise can help to decrease and control body weight. The aim of this article is to explore the role of physical activity in maintaining and losing body weight.

MICRONUTRIENTIENTS AND HEALTH

KRISID TONTISIRIN

Institute of Nutrition, Mahidol University, Thailand

Increasingly, the importance of the roles of various micronutrients in health and disease is being appreciated. These vitamins and minerals are very diverse in their biochemical functions, and sub-optimal intakes can have very serious metabolic and physiological consequences. These range from the well-known deficiency states such as rickets and scurvy due to deficiencies of vitamins D and C, to the more recently understood effects of vitamin A on immune function or of Calcium in regard to the regulation of blood pressure. This presentation will highlight the current knowledge about micronutrients most relevant for dietary guidance and will report on the findings of the recently concluded FAO/WHO Joint Expert Consultation on Vitamin and Mineral Requirements. The presentation will also discuss non-nutrient, biologically-active compounds commonly found in foods (antioxidants, flavinoids, phenols, etc) that may also have an important effect on health and reduce the risk of diet-related chronic disease.

INTRODUCTION TO FOOD-BASED DIETARY GUIDELINES

WILLIAM D. CLAY

Nutrition Programmes Service
Food and Nutrition Division
Food and Agriculture Organization, Rome, Italy

Providing effective information, guidance and motivation to consumers to assist them in making appropriate dietary and related-lifestyle choices is the ultimate aim of nutrition education and communication. Within this broad framework, food-based dietary guidelines have emerged as an important tool for teaching consumers with appropriate messages. Significantly, developing such guidelines can also be an effective process for building consensus among concerned parties regarding the dietary and health concerns that need to be addressed and how to go about doing so. This presentation will define different types of food, nutrient and dietary recommendations; highlight the principles behind dietary guidelines; stress the rationale for developing food-based dietary guidelines (FBDG); and outline the steps generally recommended for developing FBDG in an appropriate cultural context.

HEALTH INFORMATION NEEDED FOR FORMULATING FOOD-BASED DIETARY GUIDELINES

ABOLGHASSEM DJAZAYERY

School of Public Health, Tehran, Iran

Food Based Dietary Guidelines for a country should be based primarily on nutrition-related health indicators which will indicate the areas which need emphasis. Each of the indicators will throw light in the nutritional causes for it. The following indicators are commonly used:

- Prevalence of low birth-weight
- Average weight gain in pregnancy
- Infant and maternal mortality rate
- Prevalence of iron-deficiency anaemia
- Prevalence of diet-related chronic diseases
- Growth patterns of children and adolescents
- Prevalence of micronutrient deficiencies
- Other health profiles

METHODOLOGIES FOR DIETARY ASSESSMENT AND ANLYSIS AT NATIONAL, HOUSEHOLD AND INDIVIDUAL LEVELS

WAFAA MOUSSA

Nutrition Institute, Cairo, Egypt

Detailed information about the foods actually consumed in the community is essential both for assessing nutritional status as well as for determining the dietary etiological factors that may be amenable to correction. Such information is an important component of the database for national nutrition and health planning. The most widely used method of assessing the food supply available for consumption at the national level is based on food balance sheets "FBS". These are defined as a national account for the annual production of food, changes in stocks, imports and exports, and distribution of food over various uses within the country. The net result is an estimate of percaput supply of different food groups, energy and nutrients. Main methods for measuring household food consumption are; the household food record, the inventory, the list recall and the food account. Methods mainly used for individual food intake assessment are recall of past intakes, recording of present intakes, qualitative methods and combinations. Each method has its strengths and weaknesses. The choice of the method depends on many factors but mainly on the objective of the study. Sample size, duration of survey and field schedule have to be considered carefully. Validation and quality control methods are essential. The heterogeneous information on food intake obtained in the field must be converted into inform terms of weight (grams) to be ready for computation of nutritive value through use of food composition tables, sometimes, supported by chemical analysis. One of the most important indicators of quantitative and qualitative dietary adequacy is the percentage contribution of energy and nutrient intake to recommended dietary allowances "%RDA". Examples of food intake data from Egypt are presented.

USE AND STATUS OF FOOD COMPOSITION TABLES IN THE NEAR EAST REGION

ABDULRAHMAN O. MUSAIGER

Environmental and Biological Programme
Bahrain Center for Studies and Research, Bahrain

Although the need for data on food composition has been emphasized by some governmental and non-governmental organizations, food composition is not a government priority in the countries of the Region. Technical issues in the Region are driven by the fact that food composition efforts should concentrate on traditional and most commonly consumed foods. As matter of planning, efforts should not be derived to generating data for imported, processed and raw foods for which valid information is already available. Recently, there is a growing interest in establishing food composition data for the countries of the Region. FAO has participated successfully to strengthing the activities in food analysis and composition in the Near East Region, through organizing three workshops during the period of 1995-1998. The Arab Gulf countries have already established a project so-called "GULFOODS" to compiling and activating the food composition programmes. A similar activity is planning to be carried out in other countries of the region. This paper discusses the current activities in food composition and analysis in the Near East Region.

LINKING FOOD-BASED FIETARY GUIDELINES AND NUTRITION EDUCATION; GUIDELINES, FOOD GUIDES AND COMMUNICATION

WILLIAM D. CLAY

Nutrition Programmes Service
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Once Food-Based Dietary Guidelines are developed the real work of helping consumers make informed a dietary choice begins. A number of informational tools and approaches are available to assist nutrition educators, and this presentation will highlight these. The development and use of food guides, such as the U.S. Food Pyramid and Crescent Man, will be discussed along with different channels of nutrition communication for use among groups and individuals. Identifying and removing constraints to dietary behavior change is central to effective nutrition education; and the need to understand the factors that affect consumer choice will be discussed. The importance of developing positive, non-coercive, easily understood and 'doable" messages, based on the recognition that food choice is affected by a variety of social, cultural, economic and individual factors, will also be stressed.

USING MASS MEDIA AND SOCIAL MARKETING FOR NUTRITION EDUCATION

ABDULRAHMAN O. MUSAIGER

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Food-based dietary guidelines once established need to be disseminated in the community. However, a proper nutrition education and communication are needed to spread the idea of food-based dietary guidelines. Nutrition education is concerned with modifying social communication to bring about middle or long-term change in the food habits of the population. To achieve this goal, a project must be based on a through study of nutrition knowledge, attitudes and practices of the community concerned. A considerable effort must also be made in the field of communication. Only multimedia strategies, utilizing several methods of education and communication, can meet such a formidable challenge. This paper discusses the planning of an intervention in mass communication in nutrition. It will also provides examples on evaluation of some nutrition education programmed in the Region.

THE ROLE OF NGOs IN NUTRITION EDUCATION : EXPERIENCE OF EMIRATES ASSOCIATION FOR CONSUMER PROTECTION

HASSAN S. AL-KHTHEIRI

Emirates Association for Consumer Protection,
Sharjah, United Arab Emirates

One of the objectives of Emirates Association for Consumer Protection is to disseminate health and nutrition information for the public. Therefore, the Association participated actively in organizing seminars, workshops and conferences related to consumer protection. Several booklets related to food labeling and sound dietary habits were produced. The Association is participating actively in conferences and meetings which were held either in the Near East Region or overseas. The Association is also participating in the works and activities of governmental departments and private sectors in relation to the interest of consumer, particularly those in charge of preparing standards specification, review and fix prices, monitor and food safety and control. This paper will explore the role of Emirates Association for Consumer Protection in promotion nutrition education in the United Arab Emirates.

ACTIVITIES FOR PLANNING DIETS IN HEALTH AND DISEASE IN PAKISTAN

TAJAMMAL HUSSAIN

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Peshawar, Pakistan

Diet manuals are planned to maintain good nutrition in health and diseases of an individual or a group of population. The normal and therapeutic diet manual for Pakistan was published in 1993. The manual contains balanced diet charts for normal population, children, adult men and women and therapeutic diets for patients suffering from various diseases or metabolic disorders.

The diets have been formulated from locally produced and consumed, low cost food ingredients and contain diet prescription, recommended calories and protein intake of an individual in health and disease. This manual has served as a guide and reference material for clinicians and dietician in hospitals, researchers in research institutes, teachers and students in universities and general population concerned about their health.

THE ROLE OF HEALTHCARE AGENCIES IN IMPLEMENTING THE DIETARY GUIDELINES: EXPERIENCE IN SAUDI ARABIA

RASHOD AL-SHAGRAWI AND MIRZA BAIG

Riyadh Dietetic Group of KSU Post Graduate Center, Riyadh, Saudi Arabia

Research has confirmed the high prevalence of obesity and other chronic diseases such as hypertension and diabetes in the Middle Eastern Region. There appears to be a gap between the public that is unaware of the basic nutrition knowledge and the scientific community that is increasingly concerned of the public's shift away from healthy food choices. Developing of "Dietary Guidelines is the first step in raising the awareness of nutrition in the public. Relevant Dietary Guidelines for Saudi Arabia have been proposed by the Riyadh Dietetic Group of the King Saud University – Post Graduate Center as presented recently at the 3rd Saudi Symposium of Food and Nutrition in Riyadh. Efforts are underway to have these guidelines recognized by official healthcare agencies of Saudi Arabia. The involvement of healthcare agencies is essential in implementing these guidelines and communicating them in a simple and easy to follow food specific advice. In this paper effective methods of translating dietary guidelines into practice will be discussed.

DEVELOPMENT AND PROMOTION OF FOOD BASED DIETARY GUIDELINES: THE THAILAND EXPERIENCE

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Food based dietary guidelines (FBDGs) serve as important information and communication tools for the public in promoting appropriate food intake for nutritional well being and maintaining good health. FBDGs also play an important role in guidance for policy development in agriculture and education. Over the past 4 decades, Thailand has been popularizing the concept of five food groups for a healthy diet. A set of dietary guidelines expanding on the basic five food groups was first formulated by a committee under the Nutrition Division, Ministry of Public Health (MOPH), Thailand, in 1989. The emphasis however, was mainly on the nutrient component of diets. A revised set of food based dietary guidelines was therefore developed by the Nutrition Division of the MOPH on collaboration with the Institute of Nutrition Mahidol University (INMU) during the period 1996-1998. The working groups for the development process included nutritionists from MOPH, Academicians from INMU and other nutrition related institutions, hospital dietitians and selected medical professionals. A National Committee consisting of key stakeholders involved in planning and policy making also constituted a part of the team in the development process. The national committee met formally at least on 5 occasions during the 2 years period to closely examine the progress of development of the guidelines by the working group and played a key role in its promotion. Based on an analysis of the nutrition and health situation, the committee set its objectives for developing the dietary guidelines.

The guidelines emphasize both qualitative and quantitative aspects of diets using a set of nine Thai foods based dietary guidelines, food pattern plans, portion sizes and a food guide model. Qualitative aspects include the principles and rationale underlying dietary recommendations, detailing the inclusion of a variety of food items.

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A selection of Food Guides for Nutrition Education of the General Public

1. Australia	**Australian Nutrition Foundation (present)**
Eat most	vegetables and fruit (including canned and frozen)
Eat most	cereal foods
Eat moderately	lean meat, eggs, fish, chicken (no skin), nuts
Eat moderately	milk, yoghurt, cheese
Eat in small amounts	fats - butter, oil, margarine
Eat least	sugar

2. Australia	**Target on healthy eating (S. Australia and Victoria)**
Large area	cereal foods
Large area	vegetables and fruit
Intermediate area	meat, fish, poultry, legumes, nuts, eggs
Intermediate area	milk, cheese and yoghurt
Minimal area	butter and margarine

3. Canada	**Rainbow (1992)**
Outer largest quadrant	grain products (5-12 serves/day)
Next, second largest quadrant	vegetables and fruit (including canned and frozen) (5-10 serves/day)
Next, second smallest quadrant	milk products
innermost quadrant	meats (lean), poultry, fish, dried legumes, eggs, tofu, peanut butter (2-3 serves/day)
	other foods and beverages

4. Caribbean	**New Circle**
Semi circle (180°)	fruits and vegetables : 1.75 to 2.5 lb
Next largest sector	ground provisions - bananas, breadfruit, yam, potatoes : 12-18 oz
Next largest sector	cereals : 6-9 oz
Next largest sector (20°)	food from animals : 4-6 oz
Next largest sector	legumes and nuts : 2-3 oz
Equal smallest sector (5°)	fats and oils : 1-1.5 oz
Equal smallest sector (5°)	sugar 1.5 oz

5. Food Square for DEVELOPING COUNTRIES (esp. children), L. Abrahamson (1977)

Staple food	Protein supplement (milk powder, meat, beans or fish)
Vitamins and minerals supplement (mixed vegetables and fruit)	Energy supplement (oil)

6. Denmark	**Kostcirclen**
170°	bread, grains and potatoes
60°	vegetables
57°	meat, fish, egg
40°	fruit
35°	milk and cheese
10°	fats

7. Fiji	**Three food groups of equal size**
Energy	cereals, root crops, coconut, sugar, oil, butter
Health	vegetables, fruits, seaweed
Body building	meats, fish, chicken, eggs, milk, cheese, legumes, peanuts

8. Finland	**Food circle, 1987**
Largest sector	vegetables and fruit
Intermediate sector	cereal foods
Intermediate sector	milk, cheese and yoghurt
Somewhat smaller	meat, poultry, fish, egg, nuts
Smaller sector	potatoes
Smallest sector	oil and fat
9. Germany	**Seven food groups**
Largest area	cereals group and potatoes
Next largest	vegetables, legumes and nuts
Next	fruits
Next	drinks
Next	milk and dairy
Next	meat, sausages, fish, eggs
Smallest	fats and oils
10. Islamic Rep. of Iran	**Four groups shown, of equal size in posters, and a miscellaneous group**
Milk group	milk, yoghurt. cheese, ice cream
Meat group	beef, lamb, organ meats, poultry, fish, chicken, eggs, legumes
Cereal group	bread, rice, macaroni, corn, wheat, barley, fruit and vegetables
Miscellaneous	nuts, fats and oils, sweets, spices, beverages
11. Netherlands	**Maaltijdschijf**
1/3 circle	bread, cereal products and potato
1/3 circle	vegetables and fruit
1/6 circle	meat, fish, poultry, milk, egg and cheese
1/6 circle	a little fat
12. New Zealand	**National Heart Foundation of NZ (present)**
Eat most	fruits and vegetables (fresh)
Eat most	cereal foods
Eat moderately	lean meat, poultry, fish, dried bean, nuts, eggs
Eat moderately	milk, cheese, yoghurt
Eat least	salt, sugar, butter, margarine, oil
13. Sweden	**Matpyramid**
Base	bread and other cereals, potatoes, milk, cheese, table fat
Middle	vegetables, fruit, fruit juice, dry legumes
Apex	meat and fish
14. UK	**Food plate (1994)**
Large sector	fruit and vegetables (including canned and frozen)
Large sector	bread, other cereals and potatoes (choose high fibre)
Intermediate sector	meat, fish, dry legumes, nuts eggs
Intermediate sector	milk, yoghurts, cheeses
Smallest sector	fatty and sugary foods
15. USA	**New (1992) Pyramid**
Base	bread and other cereals, potatoes, milk, cheese, table fat
2nd level	vegetables group (3-5 servings)
2nd level (a smaller area)	fruit group (2-4 servings)
3rd level	milk, yoghurt and cheese (2-3 servings)
3rd level	meat, poultry, fish, dry beans, eggs and nuts (2-3 servings)
Apex	fats and sweets : use sparingly

Carbohydrates in Human Nutrition
(Recommendations of FAO/WHO Expert Consultation)

The role of carbohydrates in nutrition

The Consultation RECOMMENDS:

1. That the terminology used to describe dietary carbohydrate be standardized with carbohydrates classified primarily by molecular size (degree of polymerization or DP) into sugars (DP 1-2), oligosaccharides (DP 3-9) and polysaccharides (DP 10+). Further subdivision can be made on the basis of monosaccharide composition. Nutritional groupings can then be made on the basis of physiological properties.
2. That the concept of glycemic carbohydrate, meaning "providing carbohydrate for metabolism" be adopted.
3. Against the use of the terms extrinsic and intrinsic sugars, complex carbohydrate and available and unavailable carbohydrate.
4. That food laboratories measure total carbohydrate in the diet as the sum of the individual carbohydrates and not "by difference".
5. That the use of the term dietary fibre should always be qualified by a statement itemizing those carbohydrates and other substances intended for inclusion. Dietary fibre is a nutritional concept, not an exact description of a component of the diet.
6. That the use of the terms soluble and insoluble dietary fibre be gradually phased out. The Consultation recognized that these terms are presently used but does not consider them a useful division either analytically or physiologically
7. That the analysis and labelling of dietary carbohydrate, for whatever purpose, be based on the chemical divisions recommended. Additional groupings such as polyols, resistant starch, non-digestible oligosaccharides and dietary fibre can be used, provided the included components are clearly defined.
8. That the energy value of all carbohydrate in the diet be reassessed using modern nutritional and other techniques. However, for carbohydrates which reach the colon, the Consultation recommends that the energy value be set at 2 kcal/g (8 kJ/g) for nutritional and labelling purposes.
9. That the continued production and consumption of root crops and pulses be encouraged to ensure the adequacy and diversity of the supply of carbohydrate.
10. That the continued consumption of traditional foods rich in carbohydrate should be encouraged where populations are in transition from a subsistence rural economy to more prosperous urban lifestyles. Processed foods are likely to be a substantial part of the diet and processing can be used to optimize nutritional properties.

Source: FAO: Carbohydrates in Human Nutrition, FAO Food and Nutrition Paper No. 66. Rome, Italy, 1998.

The role of carbohydrates in the maintenance of health

The Consultation RECOMMENDS:

11. That the many health benefits of dietary carbohydrates should be recognized and promoted. Carbohydrate foods provide more than energy alone.
12. An optimum diet of at least 55% of total energy from a variety of carbohydrate sources for all ages except for children under the age of two. Fat should not be specifically restricted below the age of 2 years. The optimum diet should be gradually introduced beginning at 2 years of age.
13. That energy balance be maintained by consuming a diet containing at least 55% total energy from carbohydrate from various sources and engaging in regular physical activity.
14. Against consuming carbohydrate levels above the optimum, including carbohydrate-containing beverages, for purposes of recreational physical activity. Higher carbohydrate intakes are only needed for long-term extreme endurance physical activities.
15. That, as a general rule, a nutrient-dense, high carbohydrate diet be considered optimal for the elderly, but that individualization is recommended because their specific nutritional needs are complex.

Dietary carbohydrate and disease

The Consultation RECOMMENDS:

16. That a wide range of carbohydrate-containing foods be consumed so that the diet is sufficient in essential nutrients as well as total energy, especially when carbohydrate intake is high.
17. That the bulk of carbohydrate-containing foods consumed be those rich in non-starch polysaccharides and with a low glycemic index. Appropriately processed cereals, vegetables, legumes, and fruits are particularly good food choices.
18. That excess energy intake in any form will cause body fat accumulation, so that excess consumption of low fat foods, while not as obesity-producing as excess consumption of high fat products, will lead to obesity if energy expenditure is not increased. Excessive intakes of sugars which compromise micronutrient density should be avoided. There is no evidence of a direct involvement of sucrose, other sugars and starch in the etiology of lifestyle-related diseases.
19. That national governments provide populations in transition from traditional diets to those characteristic of developed countries, with dietary recommendations to ensure nutritional adequacy and retention of an appropriate balance of macronutrients.

The role of glycemic index in food choice

The Consultation RECOMMENDS:

20. That for healthy food choices, both the chemical composition and physiologic effects of food carbohydrates be considered, because the chemical nature of the carbohydrates in foods does not completely describe their physiological effects.

21. That, in making food choices, the glycemic index be used as a useful indicator of the impact of foods on the integrated response of blood glucose. Clinical application includes diabetes and impaired glucose tolerance. It is recommended that the glycemic index be used to compare foods of similar composition within food groups.

22. That published glycemic response data be supplemented where possible with tests of local foods as normally prepared, because of the important effects that food variety and cooking can have on glycemic responses.

Fats and Oils in Human Nutrition
(Recommendations of FAO/WHO Expert Consultation)

Minimum desirable intakes of fats and oils

Adults. Adequate amounts of dietary fat are essential for health. In addition to their contribution to meeting energy needs, intakes of dietary fat must be sufficient to meet requirements for essential fatty acids and fat soluble vitamins. The minimum intake consistent with health varies throughout a person's life and among individuals. Adequate intake of dietary fat is particularly important prior to and during pregnancy and lactation. Increasing the availability and consumption of dietary fats is often a priority for overcoming the problems of protein-energy malnutrition. Recommendations to populations concerning desirable ranges of fat intakes may vary according to prevailing conditions, especially dietary patterns and the prevalence of diet-related noncommunicable diseases.

Recommendations on minimum intakes of adults:

- For most adults, dietary fat should supply at least 15 percent of their energy intake.
- Women of reproductive age should consume at least 20 percent of their energy from fat.
- Concerted efforts should be made to ensure adequate consumption of dietary fat among populations where less than 15 percent of the dietary energy supply is from fat.

Infants and young children. Both the amount and quality of dietary fat consumed can affect child growth and development. These influences are mediated through energy levels and through the action of specific fatty acids and various non-glyceride components of the fat. Breast-milk provides between 50-60 percent energy as fat, and during the weaning period (that is, the transition from full breast-feeding to no breast-feeding), care needs to be taken to prevent dietary fat intakes from falling too rapidly or below the required levels. The use of fat, especially vegetable oils, in the foods fed to weanling infants and young children is an effective way to maintain the energy density of their diets.

The consumption of adequate amounts of essential acids is also important for normal growth and development. Arachidonic acid and docosahexaenoic acid (DHA) are particularly important for brain development, and breast-milk is a good source of these fatty acids.

Source: FAO: Fats and Oils in Human Nutrition. FAO Food and Nutrition Paper No. 57. Rome, Italy, 1994.

Particular problems exist for preterm infants who had an insufficient intra-uterine supply of arachidonic acid and DHA and who were born with low fat reserves.

Recommendations regarding infant and young child feeding:

- Infants should be fed breast-milk if at all possible.
- The fatty acid composition of infant formulas should correspond to the amount and proportion of fatty acids contained in breast-milk.
- During weaning and at least until two years of age, a child's diet should contain 30-40 percent of energy from fat and provide similar levels of essential fatty acids as are found in breast-milk.

Upper limits of fat/oil intakes

Excessive dietary fat intake has been linked to increased risk of obesity, coronary heart disease and certain types of cancer. The mechanisms by which these are linked are complex, varied and, in many instances, not clearly understood. Elevated levels of serum cholesterol and LDL constitute major risk factors for atherosclerosis and coronary heart disease. The degree of risk of these and other factors may vary according to, *inter alia:* type and level of fatty acid intakes, percentage of energy from total fat, dietary cholesterol, lipoprotein levels, intakes of antioxidants and dietary fibre, activity levels and health status. Low-fat diets are often lower in cholesterol and higher in antioxidants and dietary fibre. Among adults, there is no nutritional advantage to consuming high-fat diets once essential energy and nutrient needs are met.

Recommendations on upper limits of dietary intakes:

- Active individuals who are in energy balance may consume up to 35 percent of their total energy intake from dietary fat if their intake of essential fatty acids and other nutrients is adequate and the level of saturated fatty acids does not exceed 10 percent of the energy they consume.
- Sedentary individuals should not consume more than 30 percent of their energy from fat, particularly if it is high in saturated fatty acids which are derived primarily from animal sources.

Saturated and unsaturated fatty acids, and cholesterol

The saturated fatty acids - lauric, myristic and palmitic - elevate serum cholesterol and low density lipoprotein (LDL) levels. Stearic acid does not elevate serum cholesterol or LDL levels, however, other health effects are, as yet, undefined. Polyunsaturated linoleic acid moderately reduces serum cholesterol and LDL levels. Monounsaturated oleic acid appears to be neutral in regard to LDL, but raises high density lipoproteins (HDL) modestly. Dietary

cholesterol elevates serum cholesterol and LDL levels, but the extent of the increase is highly variable.

Recommendations on intakes of saturated and unsaturated fatty acids:

- Intakes of saturated fatty acids should provide no more than 10 percent of energy.
- Desirable intakes of linoleic acid should provide between 4 and 10 percent of energy. Intakes in the upper end of this range are recommended when intakes of saturated fatty acids and cholesterol are relatively high.
- Reasonable restriction of dietary cholesterol (less than 300 mg/day) is advised.

Isomeric fatty acids

Unsaturated vegetable oils are frequently partially hydrogenated to produce more solid, plastic or stable fats. During this process, an assortment of *cis* and *trans* isomers is formed. Compared to oleic acid, the *trans* isomers in partially hydrogenated vegetable oils tend to elevate serum LDL levels and may lower HDL levels. High intakes of *trans* fatty acids are undesirable, but it is, as yet, uncertain whether the use of *trans* or saturated fatty acids is preferable where such fatty acids are required to formulate food products.

Recommendations concerning isomeric fatty acids:

- Consumers should substitute liquid oils and soft fats (that is, those which are soft at room temperature) for hard fats (more solid at room temperature) to reduce both saturated fatty acids and *trans* isomers of unsaturated fatty acids.
- Food manufacturers should reduce the levels of *trans* isomers of fatty acids arising from hydrogenation.
- Governments should monitor the levels of isomeric fatty acids in the food supply.
- Governments should limit the claims concerning the saturated fatty acid content of foods which contain appreciable amounts of *trans* fatty acids, and should not allow foods that are high in *trans* fatty acids to be labelled as being low in saturated fatty acids.

Substances associated with fats and oils

Substantial evidence indicates that relatively high intakes of fruits and vegetables - sources of various antioxidants, carotenoids and other non-glyceride components - reduce the risk of coronary heart disease and some cancers. Yet, specific conclusions and recommendations

concerning the general health benefits and desirable intakes of these substances cannot be made on the basis of current evidence.

Processing and refining techniques used to eliminate or reduce negative characteristics of edible oils can also lead to the loss of various nutritionally beneficial components such as antioxidants and carotenoids. However, producers can minimize such losses through appropriate processing, refining and storage techniques and they are encouraged to do so.

Recommendations on antioxidants and carotenoids:

- In countries where vitamin A deficiency is a public health problem, the use of red palm oil, wherever readily or potentially available, should be encouraged. If the oil is refined, processing techniques that preserve the carotenoid and tocopherol content of red palm oil should be utilized.

- Tocopherol levels in edible oils need to be adequate to stabilize the unsaturated fatty acids present. Therefore, foods high in polyunsaturates should contain at least 0.6 mg tocopherol equivalents per gram of polyunsaturated fatty acid. Higher levels may be necessary for fats that are rich in fatty acids containing more than two double bonds.

Essential fatty acids

The n-6 and n-3 fatty acids have critical roles in the membrane structure and as precursors of eicosanoids, which are potent and highly reactive compounds. Various eicosanoids have widely divergent, and often opposing effects on, for example, smooth muscle cells, platelet aggregation, vascular parameters (permeability, contractility), and on the inflammatory processes and the immune system. Since they compete for the same enzymes and have different biological roles, the balance between the n-6 and the n-3 fatty acids in the diet can be of considerable importance.

A number of studies have shown that the consumption of foods (such as oil-rich fish) containing the long-chain n-3 fatty acids, eicosapentaenoic acid (EPA) and DHA, is associated with decreased risk of coronary heart disease (CHD), probably because of mechanisms not related to serum lipoprotein levels.

Essential fatty acids are especially important for normal fetal and infant growth and development, in particular, for brain development and visual acuity. In well-nourished women, approximately 2.2 grams of essential fatty acids are deposited in maternal and fetal tissues each day throughout pregnancy.

Recommendations concerning essential fatty acid intakes:

- The ratio of linoleic to α-linolenic acid in the diet should be between 5:1 and 10:1.

- Individuals with a ratio in excess of 10:1 should be encouraged to consume more n-3 rich foods such as green leafy vegetables, legumes, fish and other seafood.

- Particular attention must be paid to promoting adequate maternal intakes of essential fatty acids throughout pregnancy and lactation to meet the requirements of fetal and infant development.

Scientific and programmatic needs

Adequate information on nutritional status, dietary intakes and the composition of foods is required for designing and monitoring programmes to improve nutrition, including the promotion of appropriate intakes of dietary fats and oils.

Governments and health authorities in all countries need to be aware of the escalating risk of non-communicable diseases that follow the adoption of inappropriate dietary practices and less active life-styles.

Recommendations on dietary information and programme needs:

- Standard methods and reference materials should be used in the analysis of the fatty acid content of foods and in the preparation of nutrient databases.

- Adequate food composition data on fats should be widely available and accessible with each food item being identified by unambiguous descriptive factors.

- The standard Atwater factor of 9.0 kilocalories (37.7 KJ) per gram of fat should be used for calculating the energy value of fat in all nutrition surveys and food composition tables.

- Periodic surveys of the weight status (body mass index) of adults are desirable in all countries to help identify trends and populations affected by or at greater risk of undernutrition and diet-related non-communicable diseases and to monitor the impact of interventions.

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