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Food and Nutrition-Related Diseases: The Global Challenge

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Abstract:

Diets link environmental and human health. Rising incomes and urbanization are driving a global dietary transition in which traditional diets are replaced by diets higher in refined sugars, refined fats, oils and meats. By 2050 these dietary trends, if unchecked, would be a major contributor to an estimated 80 per cent increase in global agricultural greenhouse gas emissions from food production and to global land clearing. Moreover, these dietary shifts are greatly increasing the incidence of type II diabetes, coronary heart disease and other chronic non-communicable diseases that lower global life expectancies. Alternative diets that offer substantial health benefits could, if widely adopted, reduce global agricultural greenhouse gas emissions, reduce land clearing and resultant species extinctions, and help prevent such diet-related chronic non-communicable diseases. The implementation of dietary solutions to the tightly linked diet–environment–health trilemma is a global challenge, and opportunity, of great environmental and public health importance.

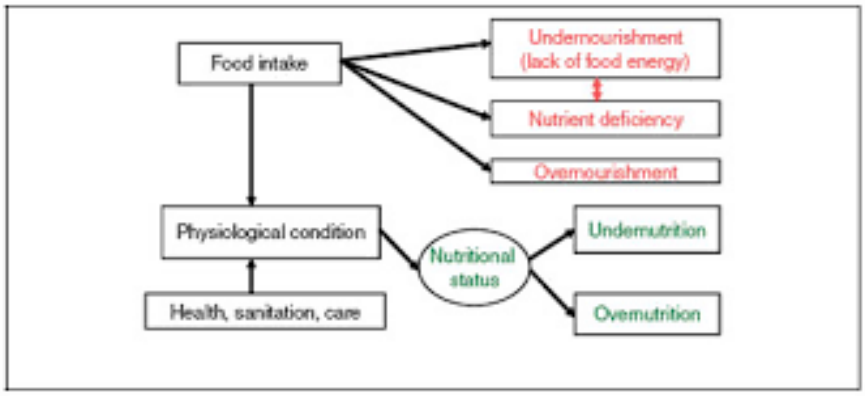
Key words: Globle,change ,Diseases, Food, Nutrition.

Introduction

The relationship between nutrition and health was illustrating that the nutritional quality and quantity of foods eaten, and therefore nutritional status, are major modifiable factors in promoting health and well-being, in preventing disease, and in treating some diseases. It is now accepted that our nutritional status influences our health and risk of both infectious and non communicable diseases. But it is also accepted that billions of people in both developed and developing countries suffer from one or more forms of malnutrition, contributing to the global burden of disease. Mankind has an inherent preference for palatable, sugary, salty, fatty and smooth foods.

These foods are mostly energy-dense and low in micronutrients. Food production, processing, manufacturing, marketing and promotion have responded to this

preference by making high energy-dense foods available at increasingly affordable prices. This has led to changes in food consumption patterns which unfortunately coincided with more sedentary, less active lifestyles. The resultant over nutrition of especially macronutrients is the major cause of obesity and also, together with obesity, a risk factor for many of the no communicable disease (NCDs) such as type 2 diabetes, coronary heart disease, stroke, hypertension, dental disease, osteoporosis, and some forms of cancer.



❖ Nutrition-related diseases in developed countries

The current situation

Economic development, education, food security, and access to health care and immunization programs in developed countries have resulted in dramatic decreases in under nutrition-related diseases. Unfortunately,
many of these factors have also led to unhealthy behaviors, inappropriate diets, and lack of physical activity, which has exacerbated the development of chronic diseases, also known as non communicable diseases (NCDs). These NCDs are now the main contributors to the health burden in developed countries (these are countries with established market economies). In 2002, 28.2 million global deaths (58.6%) were from NCDs. In the same year the predicted mortality for 2020 was 49.6 million (72.6% of all deaths). This is an increase from 448 to 548 deaths per 100,000, despite an overall downward trend in mortality rates. Although the burden will fall increasingly on developing countries (see 15.3) NCDs remain the major cause of death in developed countries.

❖ Definition, terminology and characteristics

The NCDs that are related to diet and nutrient intakes are obesity, hypertension, atherosclerosis, ischemic heart disease, myocardial infarction, cerebrovascular disease, stroke, diabetes mellitus (type 2), osteoporosis, liver cirrhosis, dental caries, and nutrition-induced cancers of the breast, colon, and stomach. They develop over time in genetically susceptible individuals because of exposure to interrelated societal, behavioral, and biological risk factors. Together with tobacco use, alcohol abuse, and physical inactivity, an unhealthy or inappropriate diet is an important modifiable risk factor for NCDs. Diet, therefore, plays a major role in prevention and treatment of NCDs.

NCDs are sometimes called "chronic diseases," but some infectious diseases such as HIV/AIDS and tuberculosis are also chronic. They have also been called "diseases of affluence," which is a misnomer because in developed, affluent countries, they are more common in lower socioeconomic groups. Some scientists have a problem with the term "non communicable" because lifestyles, including diets, are transferable between populations. The term "non communicable" should therefore be seen as no transfer of an infectious agent from one organism to another. Because of its first emergence in "Westernized" societies and associations with Western lifestyles, it is often called "Western" diseases, also a misnomer. It is becoming more prevalent in developing countries in other parts of the world. Another misconception is that it is a group of diseases affecting only older people. The risk factors for NCDs accumulate throughout the life course – from infancy to adulthood, and manifest after decades of exposure. The increase in childhood obesity is especially of concern because it has long term implications for NCDs in the developed world.

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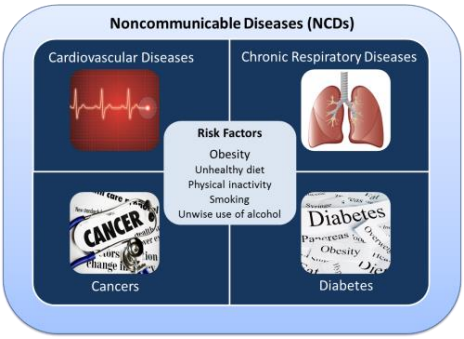
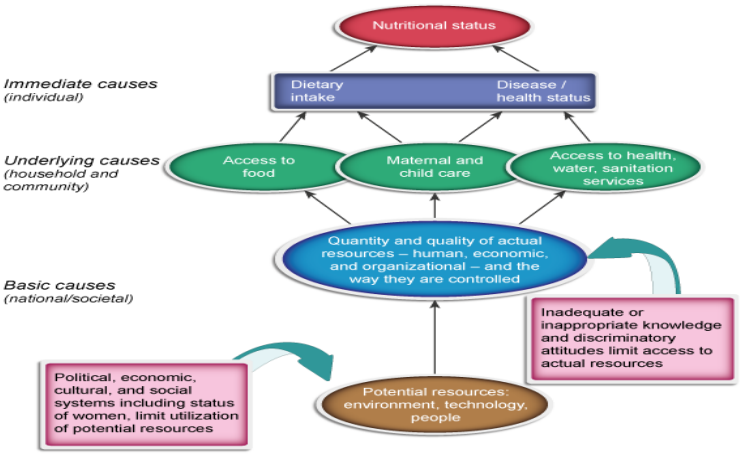


❖ Risk factors for NCDs

The factors are interrelated and form a chain of events starting with societal factors such as socioeconomic status and environments that influence behavior, leading to the development of biological risk factors that cause the NCDs. The biological risk factors often cluster together. For example, obesity (abnormal body composition) is associated with insulin resistance, hyperlipidemia, and hypertension, which all contribute to the development of both cardiovascular disease and diabetes. Cardiovascular disease is furthermore one of the complications of untreated diabetes. The mechanisms through which these risk factors contribute to the development of NCDs are discussed in detail in



The role of nutrition

The evidence that diets and specific nutrient deficiencies and excesses influence the development of NCDs and may therefore be used in

prevention and treatment is solid. It comes from extensive research which collectively gave convincing evidence of the relationships between nutrition and NCDs: first, from ecological studies which compared different populations, the effects of migration of populations, food availability during economic development, and differences in dietary and nutrient intakes. Second, numerous epidemiological studies have established the associations between diet and biological risk factors of NCDs. Third, interventions with specific nutrients and foods in placebo-controlled trials using both healthy and diseased subjects confirmed the relationships seen in epidemiological studies. And last, molecular and genetic research has elucidated many mechanisms through which diet and nutrients affect genetic mutation and expression, adding to our knowledge of how nutrition influences NCD development. This body of knowledge has led to several sets of international dietary recommendations and guidelines to reduce the burden of nutrition-related NCDs. An example of one such set of guidelines from the World Health Organization. These generic recommendations could be used as the basis for the development of country-specific strategies and food-based guidelines for dietary prevention of NCDs.

Prevention of NCDs in developed countries

The complex chain of events where behavioral and lifestyle factors influence the development of the biological risk factors for NCDs, emphasizes the need for a multisectorial approach in which all factors in the chain are targeted throughout the life course. In addition to the medical treatment of some biological risk factors and of the NCD itself there is convincing evidence that primary prevention is possible, cost effective, affordable, and sustainable. In the developed world, early screening and diagnosis, and access to health care make primary prevention more feasible than in many developing countries. However, overcoming the barriers to increase physical activity and changing dietary behavior towards more prudent, low-fat, high-fiber diets may be more difficult. The strategies and programs to prevent NCDs would be similar in developed and developing countries, although the context and specific focus of different interventions may vary.

Because the future burden of NCDs will be determined by the accumulation of risks over a lifetime, the life course approach is recommended. This will include optimizing the nutritional

status of pregnant women, breastfeeding of infants, ensuring optimal nutrition status and growth of children, preventing childhood obesity and promoting "prudent" diets for adolescents, adults, and older people. This illustrates that to address the problem of childhood obesity, active and responsible partnerships and common agendas should be formed between all stakeholders (for example between governments, NGOs and the food industry). There are indications that dialogue with the food industry is not sufficient, and that many countries are now considering or already implementing legislation to create a more healthy food environment for children. The problems of childhood overweight and obesity and consequent increases in NCDs are not only seen in developed countries. They are emerging in developing countries and in some the total number of children affected exceeds those in developed countries. Timely interventions are needed to prevent the escalation experienced in developed countries.

❖ Nutrition-related diseases in developing countries

The poverty–malnutrition cycle

Malnutrition in developing countries affects individuals throughout the life course: from birth to infancy and childhood, through adolescence into adulthood, and into old age. Malnutrition affects, therefore, critical periods of growth and mental development, maturation, active reproductive as well as economical productive phases. The health of populations in developing countries is largely determined by their environment. "Environmental" factors include social and economic conditions depending on and influencing availability and distribution of resources, agricultural and food systems, availability and access to nutritious food and safe drinking water, implementation of immunization programs, exposure to unhygienic surroundings and toxins, women's status and education, as well as the "political" milieu including dictatorships, conflict, and war, which often determine the availability of health services. There is a close, interrelated association between under nutrition and poverty in developing countries.

Approximately 243 million adults in developing countries are severely undernourished, with a body mass index less than 17 kg/m2. This means that high proportions of especially Asian and African pregnant women are undernourished. Intrauterine (fetal) growth retardation is common

in these women, leading to low birth weight babies (weight at full term less than 2500 g). Almost a quarter of newborns in the developing world (30 million of the 126 million babies born each year) have low birth weights compared with only 2% in the developed world. These babies, especially when exposed to inappropriate breastfeeding and weaning practices, leading to further nutritional insults, have growth impairment and mental underdevelopment.

❖ Obesity and non communicable diseases in developing countries

Obesity and other NCDs are increasingly becoming major public health problems in the developing world. The WHO estimates that almost 80% of all deaths worldwide that are attributable to NCDs are already occurring in developing countries. A disturbing observation is that they often occur at younger ages than in the developed world. Obesity and other NCDs have similar biological risk factors in developed and developing countries (and will not be discussed in detail here). However, the context in which they develop may differ, being linked with fetal and infant under nutrition. Also, underdevelopment and a lack of resources in developing countries limit the availability of diagnostic and therapeutic care of people suffering from NCDs, leading to increased morbidity and mortality. The other two groups of nutrition-related diseases in developing countries are nutrient deficiency diseases and infectious diseases, which will now be briefly discussed.

❖ Major nutrient deficiency diseases in

It is estimated that nearly 30% of humanity suffer from one or more forms of malnutrition. About 60% of the approximately 11 million deaths each year of children aged under 5 years in the developing world are associated with malnutrition. In addition to the under nutrition related to poverty, hunger, and food insecurity, leading to stunted physical and mental development, specific nutrient deficiencies are causes of specific diseases.

❖ Nutrition-related infectious disease in developing countries

Nutrition is a major determinant of

the human body's defense against infectious diseases. Optimal nutrition is necessary for the integrity of the physical barriers (skin, epithelium) against pathogens. Specific nutrients furthermore play important roles in defining acquired immune function (both humeral and cell mediated responses) and to influence, modulate, or mediate inflammatory processes, the virulence of the infectious agent, and the response of cells and tissues to hypoxic and toxic damage. The immune system and the influence of malnutrition on its functions are discussed in detail in the clinical nutrition textbook of the series. Given the high prevalence of malnutrition (under nutrition) in developing countries, it is not surprising that infectious diseases are still dominating mortality statistics in these countries. In children under 5 years of age these are diarrhea and common childhood illnesses in which malnutrition could lead to premature childhood deaths. In some developing countries, children die of AIDS-related diseases. HIV/AIDS is an infectious disease that has pandemic proportions in developing countries. It will be discussed in more detail here to illustrate the complex role of nutrition
in this tragic situation.

❖ The global challenge to address malnutrition

The nutritional problems and diseases facing mankind at the beginning of the twenty-first century have been identified and briefly discussed in this chapter. In developed countries these are mainly childhood and adult obesity and the NCDs related to a combination of over nutrition, lack of activity, smoking, alcohol abuse, and stressful lifestyles. In developing countries the magnitude of under nutrition is staggering. Moreover, obesity and NCDs have emerged in these countries and are increasingly becoming major causes of mortality. This double burden is further exacerbated by the HIV/AIDS pandemic.

❖ Dietary patterns responsible for the problems

The dietary patterns and nutrient intakes responsible and contributing to these problems have been intensively researched in epidemiological, clinical, and basic molecular studies. There is a huge body of scientific evidence available to identify the immediate deficiencies and excesses in intakes, as well as all the

environmental factors associated with suboptimal dietary patterns that lead to the nutrition-related diseases highlighted in this chapter. Broadly, these dietary problems can be summarized as:

- hunger and food insecurity in developing countries, with infants, pregnant women, and older people being the most vulnerable
- "hidden hunger" or micronutrient deficiencies in both developed and developing countries, especially of iron, vitamin A, zinc, iodine, and all dietary antioxidants
- overconsumption of unfortified and refined staple foods in "low-quality diets"
- availability and intake of too many high-fat, sugary, and refined convenience and fast foods, increasing total fat, saturated fat, trans fat, omega-6 fatty acid, sugars, and salt intake
- not enough fish and other sources of omega-3 fatty acids in the diet
- not enough vegetables and fruit and their products in the diet
- not enough dietary fiber-rich foods in the diet;
- too little dietary variety
- over-reliance on dietary supplements in the developed world.

❖ Suggestions to meet the challenge

In an ideal world, every human being would be able to exercise their right (often constitutionally defined) to regularly access, at affordable prices, adequate (enough, sufficient), safe (uncontaminated), and nutritious food to prevent under nutrition and to ensure optimal nutritional status for health, wellbeing, a quality life, ability to actively and productively work and play, and moreover to reach their mental and physical development potential. This is often defined as being food and nutrient "secure." The above situation would be possible if all stakeholders in the global community (UN agencies, governments, NGOs, food industries, academics, civil society, and others) worked together in partnerships to create a food and nutrition environment in which healthy food choices were available, acceptable, and affordable and where consumers were educated, informed, and motivated to make the right choices. But we do not live in an ideal world, as the high prevalence's of nutrition problems indicate.

Conclusion:

This study describe the major nutrition-related diseases in the developed and developing world, to show the interrelationships between the causes and consequences of under- and over nutrition, and to identify the global challenges in addressing the heavy burden of malnutrition that contribute to underdevelopment, disability, and premature death. disease, stroke, diabetes mellitus, osteoporosis, liver cirrhosis, dental caries, and nutrition-induced cancers of the breast, colon, and stomach. They develop over time in genetically susceptible individuals because of exposure to interrelated societal, behavioral, and biological risk factors. Together with tobacco use, alcohol abuse, and physical inactivity, an unhealthy or inappropriate diet is an important modify able risk factor for NCDs. Diet, therefore, plays a major role in prevention and treatment of NCDs. NCDs are sometimes called "chronic diseases," but some infectious diseases such as HIV/AIDS and tuberculosis are also chronic. They have also been called "diseases of affluence," which is a misnomer because in developed, affluent countries, they are more common in lower socioeconomic groups. Some scientists have a problem with the term "non communicable" because lifestyles, including diets, are transferable between populations.

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