

Plenary Lecture

PL1

NUTRITION AND THE HIV DILEMMA

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The human race has been beset by pestilences and epidemic plagues from prehistory. In 1981, a new syndrome of immunodeficiency and recurrent opportunistic infections emerged among intravenous drug addicts and homosexual men in the USA, and was rapidly recognized in Africa and the Caribbean. It came to be known as Acquired Immune Deficiency Syndrome (AIDS), and the causative agent was soon thereafter identified in the Human Immunodeficiency Virus (HIV), an RNA **retrovirus**. It infected all cell lines, but was most devastating for its destruction of the T-helper lymphocyte. Currently, an estimated 36 million persons are infected with HIV worldwide. We now recognize that this is one of a number of emerging (or reemerging) communicable diseases of humankind that are arising from a shifting and changing relationship of our species with its environment. The basic principles of Scrimshaw, Taylor and Gordon (1968) concerning the interaction of nutrition and infection, however, allow us to frame the issues of nutrition and HIV. The nutritional status of the host influences the risk of and course of infections; infections impacts host nutritional status.

With respect to nutrition on infection issues: We have transmission issues, i.e. The risk of initial exposure and inoculation, be it through the intravenous route (laboratory, i.v. drug use), sexual contact (hetero- or homosexual), or from infected mothers to infants (vertical transmission). What role do nutrients play? We have progression issues of the resistance or susceptibility; both too little and too much nutrient exposure can accelerate progression to AIDS. We have disease outcome issues of the resistance or susceptibility to the opportunistic tumors (Kaposi's sarcoma) and opportunistic infections that characterize the full-blown syndrome. General nutritional support is requisite. Excess iron can aggravate many of the intracellular opportunistic infections.

With respect to infection on nutrition issues: Both HIV (asymptomatic) and AIDS (symptomatic), adversely influence micronutrient status. AIDS produces wasting and cachexia, mediated by anorexia, malabsorption and inflammation. Retroviral treatment has specific effects on body composition.

Ethical Issues: The HIV diagnosis creates a social stigma, and principles of autonomy and anonymity for infected subjects must be respected in protocols for nutritional research. Use of placebo treatments must be balanced with the highest sustainable standards of care available in a society. Recommendations regarding breast-feeding are in the center of a storm related to diet and vertical transmission of HIV.

New Biological Understanding: For the basic science of nutrition, the AIDS epidemic has led to new understanding of the role of nutrients in viral biology and nutrition, specifically zinc in zinc-finger proteins and selenium in selenoproteins.

AIDS and the Nutrition of the Uninfected Population: As AIDS affects and decimates the workforce, the HIV dilemma extends to food insecurity and undernutrition for the child and elderly populations in areas dependent on subsistence agriculture such as subSaharan Africa and Asia.

Conclusions: Two decades after the initial recognition of the HIV/AIDS epidemic, the present dilemma is best characterized in the dichotomous presentation of issues depending on wealth and geography. For affluent nations, it is an issue of managing a chronic disease with retroviral medications and accepting expense and need for pharmaceutical advances, while avoiding complacency regarding primary prevention of transmission. For low-income developing countries, it is matter of increasing accessible measures that reduce transmission, delay progression, and palliate AIDS suffering, while assuring food security for the orphans and elderly survivors of a dying productive-adult population.

PL2

Nutrition and Ageing – Importance of Nutrition in Japanese Longevity**Y. Yamori, M.D., Ph.D.**

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Aim: The mortality rates of coronary heart diseases (CHD) and stroke are inversely related with the average life spans of various populations in the world. Our experimental studies on rat models for these cardiovascular diseases (CVD) have proven CVD can be prevented by nutritional improvements, indicating nutrition affects greatly ageing process. The appropriate food patterns for longevity in the world, particularly Japanese and Okinawans were assessed objectively for their possible protection against CVD by utilizing the WHO-CARDIAC Study data base for world-wide comparisons of the associations between nutrition and CVD, that is, the major determinant of ageing.

Methods: Over 12,000 people aged 47-57 in total, consisting of about 100 males and 100 females randomly selected from each of 60 populations of 25 countries were examined for biological markers of nutritional intakes in the serum and 24-hour urine (24hu) samples in relation to CVD risk factors (Core study), and the aged-adjusted CVD mortality rates (Complete study) in 24 populations where demographic data were available in accordance with the WHO-CARDIAC Study Protocol.

Results: The age-adjusted CHD mortality rates, which, in Japanese study populations, were all among the lowest in the developed countries in the world, were significantly inversely related with 24hu isoflavone and taurine excretions as well as n-3 fatty acid ratios in the serum phospholipids—biological markers for soybean and sea food intakes, respectively. These markers were less evident in Japanese immigrants from Okinawa living in Hawaii and Brazil, whose CHD risk factors were increased with changing dietary patterns and life-style compared with Okinawans in Okinawa. The age-adjusted stroke mortality rates were significantly positively related with 24hu Na excretion and Na/K ratio, that is, risk factors of hypertension, and were inversely associated with serum total cholesterol (CH). Since CH levels were positively related with CHD, the CH range of 180-200mg/dl in average was proven to be the “happy medium” keeping both CVD mortality rates lowest, that corresponded to Okinawans’ CH levels. Nutritional improvements by offering diets supplemented with whole soybeans, soy protein, soy isoflavones, DHA, or dietary fibers from seaweed commonly taken by Okinawans decreased CVD risk factors significantly from the initial levels or in comparison with the placebo control groups in middle-aged Japanese men and women living in Brazil and Hawaii, Scottish men, and Japanese elderly men and women aged 65-70.

CONCLUSION: Nutritional conditions for long life were confirmed to be close to Japanese, particularly Okinawans food patterns of eating soy bean products and/or sea food nearly everyday, which were conferred some protection against CVD despite the world trend of increases in CVD risk factors by industrialization, urbanization, and Westernization etc. of dietary customs. The significant close inverse associations between CHD mortalities and biological markers suggest that daily soybean and sea food intakes such as about 100g tofu and fish, respectively, commonly consumed by Okinawans may be enough to keep CHD mortality as low as that of the Japanese, the lowest among industrialized countries, and contribute to the longest life expectancy of the Japanese, particularly Okinawan women in the world. A much great effort is recommended to identify culturally relevant cardio-protective foods and to encourage such food intakes world-widely so that the life expectancy as well as the quality of life improves in aging populations.

PL3

Opportunities in clinical nutrition in the Asia Pacific Region

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The Asia Pacific Region in the world's most populous, including China, South Asia and Indonesia to its west, some 3 billion; and to its East the Americas, a further billion.

Nutritional problems, along with infectious disease constitute the world's greatest burden of disease, and there is great potential to address both sets of problems through nutritional means. The demography is also one of both youth and of increasing numbers of older people, as life expectancy increases. At the same time, it also has population amongst the top 10 of those in the world for life expectancy at birth (Okinawa, Hongkong and Australia) and for DALES (Disability Adjusted Life Expectancies), the top 2 being Japan and Australia¹. It, therefore, has a lot to gain and a lot to offer in the field of food and health.

Clinical Nutrition is part of the nutritional alliance to advance human health through nutritional means². It fits with a pluralistic health care system and contributes to disease prevention and to management^{3,4}. It operates best when nutritional epidemiology is fully developed⁵.

The scholarship of clinical nutrition has grown substantially in the Asia Pacific Region during the 1990s, as reflected in the Asia Pacific Journal of Clinical Nutrition, which commenced in 1992. After a decade, it has now formed a basis for Continuing Nutrition Education (CNE), which it now plans to formalize in its next phase of development.

Clinical Nutrition is now an established discipline and should play a major role in shaping the future Health Care Systems of the Asia Pacific Region.

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PL4

**PREVENTION OF CORONARY HEART DISEASE
Mediterranean Diet?**

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*Make Food Thy Medicine
Hippocrates 400BC*

Coronary heart disease (CHD) is the single major cause of death throughout the world. Over the last few decades prevalence of CHD has been decreasing in North America, Western Europe and Australasia. In contrast, in Eastern Europe, African and most Asian countries prevalence has been increasing. CHD is a classic lifestyle disease the underlying pathology is atherosclerosis on background of genetic susceptibility. Diet plays a key role in the initiation and progression of CHD.

In 1961 the American Heart Association published the first major dietary recommendations which recommended reduction of total fat.¹ Reduction of total fat in diet has been the cornerstone of diet recommendations ever since throughout the world. However, Ancel Keys an author of these AHA documents noted in 1987, "a policy reducing fat intake to 30% or less of dietary energy should apply only to populations such as those in Northern Europe and United States where most of the fat comes from meat and dairy products".² Recently the AHA has modified its *anti-fat crusade* and its nutrition committee has suggested that "a mediterranean style diet may have advantages over traditional AHA diet".³ Indeed evidence suggests that a traditional Asian type diet also has advantages over the traditional AHA. Perhaps a fusion of both types of cuisine termed Mediterranean may be the optimal diet.

An AHA Step 1 diet is defined as a diet; total fat 30% energy (E), SFA 10% E, MUFA 10% E, PUFA 10% E, cholesterol < 300mg/day. A Step 2 diet is < 30% E fat < 7% SFA, cholesterol < 200mg/day. A mediterranean style diet (Med) may be defined as cuisine traditionally consumed around the mediterranean basin. Up to 40% E comes from fat and includes a variety of fresh fruit and vegetables and usually a glass of wine per day. An Asian diet may be defined as a diet low in total fat (<25% E) which is very low in SFA, usually low in meat and rich in vegetables and soy products.

The 25 year follow up of the Seven Country Study demonstrated very low rates of CHD in Greece and Japan, countries that could be considered archtypical of Mediterranean and Asian type cuisines. In both countries CHD death rates were approximately 1/3 of those in Northern Europe at every level of serum cholesterol (Figure 1).⁴ These results were not explained by prevalence of classic risk factors. Similarly marked variation in risk was noted with elevated blood pressure. Blood pressure of 160 systolic was associated with four fold greater CHD death in Northern Europe than in Japan or Southern Europe

25 Year CHD Mortality

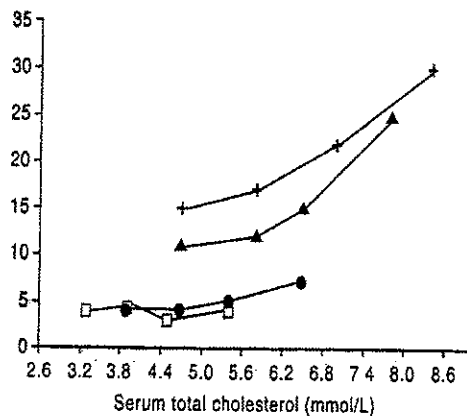


Figure 1. Seven Countries Study: 25 year coronary heart disease mortality rates. (□) Japan; (●) southern Europe, Mediterranean; (▲) United States; (+) northern Europe.

Table 1

TRIAL No of pts Duration	INDIAN 406 12 mths			LYON 605 27 mths		
	DIET	AHA	RR	DIET	AHA	RR
Total Mortality	10.3	18.3	0.55	1.3	3.4	0.30
CHD death and non-fatal MI ¹	24.5	40.6	0.59	1.3	5.6	0.27

Table 2

Number needed to treat to prevent coronary heart disease (CHD) event over 5 years

Annual risk of CHD	OR	0.5%	3%	6%
Aspirin	0.82	222	37	18
Beta-blocker	0.78	181	30	15
Statins	0.74	154	26	13
Smoking advice	0.68	125	21	10
Fish (\pm fish oil)	0.65	114	19	9
Mediterranean diet	0.24	52	9	4

Low fat diets odds ratio (OR) = 0.96; 95% confidence interval 0.89–1.04.
Source: Ebrahim *et al.*²⁷

The most successful secondary diet studies compared Asian (India) and mediterranean (Cretan) to AHA Step 1 (Table 1). These successful diets were vegetarian and rich in unsaturated fat, had a variety of fruit and vegetables, and were based on traditional cuisines. The risk reduction seen was of the same order of magnitude seen with the large statin intervention trials.⁵ Indeed the number of patients needed to be treated to prevent a recurrent coronary event over a 5 year period is less than with any other therapy available in cardiology (Table 2).⁶ The striking benefits from diet therapy ought not be surprising bearing in mind multiple factors implicated in atherosclerosis are modified by diet: lipid, haemostatic, anti-oxidant, immunological and inflammatory factors.⁷ The recent GISSI P trial demonstrated a 20% reduction of mortality and 45% reduction in sudden death with fish oil supplementation.⁸ This study reinforces the compelling evidence that diet ought to remain the cornerstone in management of patients who have CHD.

¹ Page IH, Allen EV, Chomberlain FL *et al.* Dietary fat and its relation to heart attacks and stroke. Report by the Central Committee for Medical and Community Program of the American Heart Association. *Circulation* 1961;3: 133-196.

² Keys A. Olive oil and coronary heart disease. *Lancet* 1987; i:983-984.

³ Kris-Etherton P, Eckel RH, Howard BF *et al.* AHA Science Advisory. Lyon Diet Heart Study. Benefits of a Mediterranean-style, National Cholesterol Education Program/American Heart Association step 1 dietary pattern on cardiovascular disease. *Circulation* 2001;103:1823-1825.

⁴ Verscharan WM, Jacobs DR, Bloomberg BP *et al.* Serum total cholesterol and long term coronary heart disease mortality in different cultures. Twenty-five year follow up of the Seven Countries Study. *JAMA* 1995;274:131-136.

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⁶ Ebrahim S, Lampe F, Wannamthee G, *et al.* Cholesterol and coronary heart disease: screening and treatment. *Effective Health Care* 1998;4: 1-16.

⁷ Colquhoun DM. Nutraceuticals: vitamins and other nutrients in coronary heart disease. *Current Opinion in Lipidology* 2001;12:639-646.

⁸ GISSI-Prevenzione Investigation. Dietary supplementation with η -3 polyunsaturated fatty acids and vitamin E after myocardial infarction: Results of the GISSI-Prevenzione Trial. *Lancet* 1999;354:447-455.

PL5**NUTRITION SCIENCE AND POLICY**

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Development of nutrition science has long been associated with that of national health promotion policy in the most of countries of the world. Since nutrition, in its origin as a field of biological science, deals with the question "what kind and how much in amount of nutrient does mankind require as dietary intake to maintain his or her normal growth and good health?", national food and health policies inevitably being in a close relationship with nutrition science. Thus, most of the countries has been establishing and revising their national recommendation of dietary allowances(RDAs) as one of the major health policies in which scientific knowledge of that time had been appropriately incorporated. Although the variety as well as quantity of nutrient listed in the RDAs is sometimes different among countries depending on their varying health and dietary situations, its role as standard for fulfillment of the most of nutrient in order to prevent people from deficiency diseases is evident.

However, recent change of health situation in industrialized as well as, at least in part, in developing countries has brought about an essentially different problems where far more complex and difficult scientific issues were found to be underlying. The newly arising health issue, i.e. how to cope with non-communicable, lifestyle-related chronic diseases requires a primary prevention strategy in which improvement of nutrition to promote a "balanced status" plays a major part.

As a part of the nutrition strategy, several countries including Japan, adopted the Dietary Reference Intake(DRI) concept as the national dietary standard in place of classical RDAs. This concept, originally developed by U.S. and Canadian groups, has been established and materialized so as to reduce risk of chronic diseases as well as to prevent nutrient deficiencies at the same time and, especially, based on solid scientific evidence. It should be emphasized that a novel "secondary-level" scientific approach" was made by introducing a realistic measure as adequate intakes(AIs) where there were lack of enough data for establishing the estimated average intakes.

During the course of developing DRIs for Japanese which was published in 3 years ago, we encountered with many problems which is difficult to be solved because of lack of scientific data, especially those for Japanese. For example, little attention had been paid to folic acid deficiency among Japanese health professionals, since anemia incidence from insufficient intake of this vitamin was few in Japan and RDA for folate had not established until this newest revision. The Newly arising issue of neural tube defects(NTDs) which were preventable by folate supplementation have revealed a need for reconsideration on the actual requirement of this vitamin in Japanese. Another example is iodine-related issue in which many people in Japan appeared to be in danger of overintake if the tolerable upper intake level(UL) is strictly applied. Undoubtedly, much more scientific data are needed to cope with such new issues along with the promotion of "Healthy Japan 21", the evidence-based national health strategy.