

Thematic Article

Evidence-based nutrition and cardiovascular disease in the Asia–Pacific region

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The Asia–Pacific region is undergoing a major change in both food and health patterns, with a connection between the two more than likely. Evidence for certain traditional Asia–Pacific foods as protective agents against chronic non-communicable disease and cardiovascular disease (CVD), in particular, is growing at a time when their usage diminishes. The nature of the evidence to establish relevant Asia–Pacific food–health linkages will include randomised placebo-controlled clinical trials, but is much more extensive and meaningful. Okinawans have probably achieved one of the most successful food cultures from a health point of view and serve as a reference point for the Asia–Pacific region. The expert working party has produced, in November 2000, the ‘Okinawan Recommendations on Nutrition and CVD in the Asia–Pacific region’.

Keywords: Asia–Pacific, cardiovascular disease, chronic non-communicable disease, clinical trials, dietary guidelines, evidence-based nutrition, Japan, Okinawa.

Consensus

In 2001 it is apparent that great shifts have occurred in the disease patterns in the Asia–Pacific region compared with 20–30 years before. The profound and overwhelming problems of protein energy malnutrition (PEM); infectious diseases, especially respiratory and gastrointestinal, viral, bacterial and parasitic-like malaria; and food-borne illnesses have given way to the so-called chronic non-communicable diseases (CNCD) such as obesity, diabetes, cardiovascular disease (CVD), certain cancers characteristic of western societies and osteoporosis. At the same time, however, new infections, including HIV-AIDS have appeared and tuberculosis has become rife again. Antimalarial drug resistance is more problematic. Micronutrient problems such as iron deficiency, possibly folic acid and even, in some places, thiamin and vitamin A deficiency are persistent. Although iodine deficiency is progressively coming under control, its reappearance in Australian cities is disturbing and has raised new questions about the food supply and contemporary food habits.

Atherosclerotic vascular disease is the greatest potential regional health problem in the coming decade of the 21st century, along with growing global concern about mental health and depression in particular.¹ Underpinning this new health scenario are the lifestyle problems of lack of employment opportunities and job satisfaction, sedentaryness, tobacco smoking, changing food patterns and an overall demographic change towards smaller families, ageing societies and urbanisation.

This analysis may, however, be too negative because changes in lifestyle are associated with greater longevity and healthier lives. For example, Japanese and citizens of Hong

Kong are located in the top league of life expectancies at birth in the world. Based on the WHO disability adjusted for life expectancies scales (DALES) Japan was rated number one and Australia was number two.^{1–3}

Several paradoxes about lifestyle and health have required a review of the evidence and caution about the ready and uncritical transfer of ‘solutions’ for the macrovascular disease epidemic from the west to the east.⁴

From 26th to 29th November, 2000 a group of food and nutrition scientists and health care professionals, with a special interest in cardiovascular disease within the Asia–Pacific Region, gathered in Naha, Okinawa, Japan, the seat of the former kingdom of the Ryukus. The Ryukus acquired much culture and tradition from China over a period extending back at least several hundred years. However, they were also a trading kingdom with close links to Japan, South-east Asia, especially what is now known as Indonesia and Malaysia, and The Pacific. For these reasons, what might have been a fairly typical island food culture, developed into a diversified cuisine with characterising food and beverages, often based on imported ingredients, novel food processing and preparative methods. The Ryukus have also been exposed for a long time to ideas from abroad and it is a logical meeting place in which to establish consensus. In this setting Okinawans have

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Table 1. Clinical nutrition trials – strengths and weaknesses

Type of test	Strength	Weakness
Randomised	Locates evaluation to a limited number of variables.	Difficult to manage more than a few variables in the study. Complex systems not amenable to randomisation.
Placebo-controlled	Measures effect over and above background.	Suitable placebo may not be available. Placebo effects may be of greater interest – potential benefit than intervention. Not easy to design for synergistic effects.
Double-blind	Reduces bias.	Ethical constraints depending on nature of benefits; cannot test adverse effects. Duration limited. Cannot be used with basic food commodities and recipes difficult to blind.

maintained low rates of CVD and achieved the longest documented life expectancy among Japanese nationals and in the world. Thus, the Okinawan Consensus Conference on Nutrition and Cardiovascular Disease in the Asia–Pacific Region was held in November 2000.

Okinawa – community success rates as knowledge and evidence

Initially, any proposals about preferred or optimal eating patterns for health must be operationally sound. Okinawa provides an appropriate case study setting for food–health relationships, especially in relation to CVD.⁵ The Okinawan food culture has a number of distinguishing features, some of these features are in common with other cultures. At present, exceptionally good health statistics are available from this food culture – for perinatal maternal, child health, anthropometric and metabolic indices of nutritional status, patterns of CVD, cancer, bone health, mental health and longevity. The complexity and transferability of these relationships is another matter. However, the fact that environmental factors exceed genetic make-up in this picture is now evident through observations of migrant Okinawans in Hawaii and Brazil. In Brazil, the health profile may be less than good, but restituted, in part, through food interventions.⁶ Even here, however, the interdependence of food intake, food beliefs and social structure among Okinawans is not denied.⁷

What is clear is that the knowledge of Okinawan history, culture, lifestyle (including food beliefs) and health statistics, when subject to psychosocial and biomedical analysis, provides important evidence about food–health relationships. Much of this evidence will not be obtainable or deducible in any other way. It will provide the basis for much more cohesive and durable health polices than can otherwise be achieved.

Models and hypotheses

One of the most important ways of testing hypotheses is to develop or define a model system to predict a required outcome and then consider whether, over a nominated time frame, the outcome was achieved. Predictive power which is operational in this way, and then reproducible, is probably the most usual way in which human knowledge advances. Although not usually described as hypothesis testing, it is careful observation and innovative perturbation of a system,

which have almost certainly been at the basis of much traditional practice. For example, careful observation of the ways in which the food system changes and the effects of these changes on health, has probably been at the heart of traditional food medicinals. When, however, not all the inputs are defined and the system translocated, or when erroneous deductions are made from observations, unhelpful belief systems emerge.

There is great potential for the definition and measurement of health food connection such as the diversity of the scarce foods. The utility of these scores to predict health outcomes may be tested over a given time frame. This has been done in the Food Habits in Later Life (FHILL) studies of the IUNS.⁸ This study has demonstrated that a score of the Greekness of certain diets can predict survival.⁹ This can also be done for foods which characterise particular cultures such as soy (tofu, tempe, natto), fish and green tea for Japanese and Okinawan cultures, especially where there are biomarkers (isoflavones, taurine and catechins, respectively).

It is worth noting that health sciences are unusual among the sciences and technologies, in that they underestimate the value of observational evidence in contrast to their expectation of randomised double-blind clinical trials. Recent papers in *The New England Journal of Medicine* demonstrate that it is the quality of the evidence, rather than the kind of evidence, which is important in drawing conclusions.¹⁰ This is a liberating view as only a small fraction of knowledge in the health sciences is amenable to double-blind clinical trials. The trials are usually restricted to a narrow range of variables, with limited application, unless the variable is critical and uniting. This may be the case where there is a definable inherited disorder of metabolism attributable to a single specific mutation (e.g., the LDL receptor defect).

The strengths and weaknesses of clinical nutrition trials

Clinical nutrition trials can test a particular intervention (food constituents, food fortification or formulated foods) in a randomised, placebo-controlled trial double-blind (RPCDB) fashion. These types of trials are regarded by some agencies as the ‘best’ kind of evidence.^{11–13} However, this can mean that the evidence will never be available or, if it is, it may be of poor quality because of the inherent difficulty of blinding subjects. There are strengths and weaknesses of clinical nutrition trials of the RPCDB kind (Table 1).

The aggregate of the strengths is that the findings can be viewed with considerable confidence. However, the inherent weaknesses reason that it is often difficult to extrapolate the findings, to have a reliable estimate of unintended consequences or to understand the impediments to implementation or sustainability.

It is important to consider alternative experimental and quasi-experimental designs which are used in behavioural and social inquiry, education and evaluation research.^{14,15}

Understanding mechanisms: experimental studies

The nature of western science is to find and understand the mechanisms whereby events occur, not only because it increases certainty, but also allows the hypothesis to become more acceptable. Thus, evidence obtained from observational studies (hypothesis-modelling) and intervention trials (such as placebo-controlled double-blind clinical nutrition trials) is further established by complementary experiments *in vitro*, *in vivo* in animals or, less commonly, *in vivo* in humans.

The corollary is that observational studies and clinical trials do not need to stand alone to support a conclusion or recommendation.

Evaluating the health context

One of the most important challenges for the evaluation of particular domains of evidence about health, such as food, is how they relate to other domains of evidence. These include social factors (education and human behaviours), along with genetic, lifestyle, medicinal and the health care system itself domains.

It is easy to underestimate the synergies between food consumption and other behaviours or activities. For example, a plant-based diet in its entirety can lower blood pressure (BP) more effectively than say one plant food alone.¹⁶ Food variety and dairy foods are even more effective in lowering blood pressure.¹⁷ The combination of bodyfat reduction and fish consumption is particularly impressive in lowering blood pressure.¹⁸ In the same vein, Trichopolou has observed that the Greeks' diet contribution to survival is greater than the sum of its parts.⁹

Food consumption is part of a general lifestyle. Healthy food consumption habits may be more tolerable if one is regularly physically active and can eat more without putting on bodyfat.¹⁹ This underscores the importance of gathering evidence about a range of health determinants as one pursues the role of food constituents, food and food patterns for CVD. In the case of Okinawans, the importance of a comprehensive biomedical, psychosocial and spiritual model of CVD risk and longevity has been well documented.²⁰ The present consensus acknowledges this and encourages a broad appreciation of it.

Cost-benefit considerations

Evidence about nutrition and CVD inevitably raises questions not only about the relative merits of preventive and management strategies, but also about their cost-effectiveness. This economic information is increasingly built into evidence-based decisions. For the Asia-Pacific region, pharmaceutical approaches to disease prevention (e.g. blood pressure, lipid and glycaemic control) may overwhelm individual and national budgets. The annual cost of some drug regimens exceeds, by far, the annual income of many who may need them. While

food can also be costly, a safe, secure and nutritious food supply need not be unaffordable.

Nevertheless, this consensus acknowledges that there is much work to be done on the relative economics of preventive and therapeutic health approaches especially in the fields of nutrition economics and pharmino-economics.

Food-based approaches to health and CVD

In 1995 in Cyprus, WHO and FAO jointly developed Food Based Dietary Guidelines (FBDG) to encourage culturally sensitive, affordable and sustainable approaches to sound nutrition and health. These were further developed by WHO for the Western Pacific and published in 1999.²¹ Several nations in the Asia-Pacific region have adopted FBDG. Progress has also been made with FBDG for older individuals.²² The opportunity now exists to render them relevant for disease prevention. Underlying the present consensus conference in Okinawa is the consideration that there can be FBDG to reduce the burden of CVD in the Asia-Pacific region. Indeed, Western Pacific FBDG have been incorporated into the WHO report on CNCN.²³

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