



The Twelve Fundamental Dimensions of a High Quality Indo-Mediterranean Diet

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Abstract

High-quality Indo-Mediterranean foods are characterised with unrefined, unprocessed foods, whole grains such as dry millets and beans and porridge. Vegetables such as leaves and gourds, nuts and fruits such as apples, grapes, papaya, guava, etc are major components of this diet. It seems that healthy vegetable oils such as olive, mustard, rape seed oil and protein sources that are beneficial; beans, pulses, cottage cheese are crucial in this diet. Among animal sources, white meats; such as sea foods should also be part of this diet. Vegetables and spices with medicinal properties; gourds, turmeric, fenugreek, coriander and cumin may also be called high quality nutraceutical foods, respectively. There is a need to find out traditional foods from all other countries which may be protective and healthy. There is evidence that calories have tremendous role in weight gain and weight loss. It seems that emphasis on food quality is crucial for prevention of oxidative stress and inflammation in the adipocytes, which predispose obesity and risk of cardiovascular diseases (CVDs) and diabetes. There are gaps in knowledge about the qualities of traditional foods, which prompt authors to present this communication.

Key words: Flavonoids; Inflammation; Chronic diseases; Dietary guidelines; Antioxidants.

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Introduction

It has been established in the Indian Ayurveda (Charak Samhita, Chap 5, Sutra 12,500 BCE), that green beans and porridge are super foods to achieve health and wellness. These foods are important component of Indo-Mediterranean diet.¹ Green beans are source of specific carotenoids that are known to inhibit oxidative stress and prevent chronic diseases such as cardiovascular diseases (CVDs), macular degeneration and improve the microbiota in the gut. Green bean consist of carotenoids like lutein and zeaxanthin which help to prevent oxida-

tive stress on the inner workings of eyes. Green beans are richer in vitamins E and K, vitamin B5, calcium and sodium. Wheat porridge is also rich in flavonoids which have anti-inflammatory effects.² The wheat grain contains ellagic acid, ferulic acid, chlorogenic acid, syringic acid, vanillic acid, p-coumaric acid, caffeic acid and gallic acid that were the most abundant phenolic acids. Other flavonoids in wheat (luteolin, chlorogenic acid, caffeic acid and apigenin) could predict inhibition percentage by DPPH (2,2-diphenyl-1-picrylhydrazyl-hydrate) assay, suggesting a possible role

in the cellular defence against oxidative stress in wheat.² This article aims to highlight the role of the twelve functional dimensions of the Indo-Mediterranean foods which may be determinant of beneficial effects of high quality diets.

High-quality Indo-Mediterranean foods are characterised with unrefined, unprocessed foods, whole grains such as dry millets and beans and porridge, vegetables such as leaves and gourds, nuts such as walnuts and almonds, fruits such as apples, grapes, papaya, guava, healthy vegetable oils such as mustard, rape seed oil or olive oil and healthy sources of proteins; pulses, beans, cottage cheese, white meats, fish and other sea foods.¹⁻³ Vegetables and spices with medicinal properties such as gourds, turmeric and millets, may also be called high quality nutraceutical foods, respectively. These foods may be also recommended in the modified, Healthy Eating Plate.³ It seems that guidelines on dietary intakes have changed during the last decade due to better accuracy in research in finding out suitable foods that may be consumed to maintain health and ideal body weight without obesity and central obesity, with minimal inflammation in the body tissues.¹⁻⁵ Cohort studies indicate that energy intake appears to have significant role in weight gain and weight loss. However, attention should be on food quality, which is crucial for inhibition of oxidative stress and inflammation in the adipocytes, that predispose obesity due to various pro-inflammatory qualities of foods.^{3,4}

Changing Dietary Guidelines in Countries

The Healthy Eating Plate as a guide for creating healthy balanced meals; whether served on a plate or packed in a lunch box has been advocated.³ The International College of Cardiology and International College of Nutrition advise to modify existing guidelines of National Cholesterol Education Program by advising more of whole grains such as millets and spices and lower intake of fatty acids blended with rape seed or mustard and olive oil, similar to Japanese, Mediterranean and traditional Indian diets.^{1,2} The World Health Organization (WHO) advises that any healthful diet should be comprised of healthy fat (30 % of calories) and rest from proteins (12-15 %) and complex carbohydrates.¹⁻³ This means eating about 50 to 80 grams of fat daily for health promotion providing, calories and fat for requirement of

physiology and metabolism. Since human body alters approximately 10 % of fatty acids in the gluconeogenesis, rest of the amount of fat is used for physiological functions in the tissues. Among Asians, the fatty acids intake varies between 15-25 % in the traditional diets. The Japanese have the longest life expectancy, therefore, some experts have advised lower intake of fat.^{1,2} The fat intake is also lower (20-30 % / day) among Koreans, Chinese and people living in South Asia, showing no poor health.¹ It has been proposed in 1996 that the limits of waist circumference and body mass index for the identification central obesity and obesity, should be lower for populations living in Asia.¹ Thus, the guideline for consumption of fat for Asians are lower.^{1,2} Therefore, most of the health agencies have proposed food based guidelines.³⁻⁶

There are variations in the biologic effects of saturated fatty acids (SFA), depending upon quality that may be modified via food matrix and content of carbohydrate in the foods.⁶ It seems that foods, such as dark chocolate and whole-fat dairy, although rich in fat, but may not predispose greater risk of diabetes and CVD, possibly due to diversity of foods and slow absorption rate. There is a scarcity of evidence about upper limits on the consumption of SF in the diets that can cause decline in CVD and all-cause mortality. However, cohort studies and randomised trials reported that diet quality may have a role in the health promotion as well as in disease prevention.⁶⁻¹⁰ There is a significant reduction in cardiovascular events and all causes of mortality in all the controlled trials, using Mediterranean style diets as intervention.¹¹⁻¹⁴

It seems that high quality foods with high nutrient density with greater diversity of foods and low glycaemic index are important characteristics of the Indo-Mediterranean style diets. This diet also contain lower saturated fat, trans fat, sugar and salt, but high PUFA including omega-3 fatty acids and flavonoids with other foods known to activate release of nitric oxide, that may be protective against diabetes and CVDs, as well as other NCDs.⁶⁻¹⁴ Interestingly, the role of Indo-Mediterranean style diets in the prevention of CVDs, has also been reported in a meta-analysis of studies.¹¹ The intervention and control groups in these trials, were compared for behavioural risk factors, food intakes, fatty acid intake and on ratio of polyunsaturated fatty acid (PUFA)/flavonoid intake respectively in the two groups (n = 1,446 vs 1,320). The results revealed marked beneficial effects of Indo-Mediterranean style

Table 1: The twelve qualities of the high quality Indo-Mediterranean diet²³

Qualities of foods	Examples of foods
1. Slowly absorbed foods	Nuts, vegetables, whole grains
2. Food diversity	Whole grains, beans, vegetables
3. High nutrient density	Nuts, vegetables, whole grains
4. No trans fat	Grilled foods, boiled foods
5. No/low sugar refined	Use dates, apples, papaya, oranges, raisins
6. Low salt	Fruits, vegetables, nuts
7. Moderate fat	Nuts, pulses, beans, green leaves
8. High fibre	Vegetables, whole grains, fruits
9. Beneficial effects on gut microbiota	Vegetables, whole grains, fruits
10. Non per-oxidised foods	Fresh foods, without frying
11. Spices, 15-30 g/day	Turmeric, cumin, coriander, fenugreek, etc
12. Foods requiring mastication, day time eating	Whole grains like porridge, nuts, fruits, snacks with millets

foods and nutrients on arrhythmias and heart failure.¹¹ It seems that a large body of evidence has shown that a diet rich in healthy plant based foods and with fewer animal source foods; fish other sea foods and poultry; up to five servings of plant sources of food per week, can confer both improved health and environmental benefits.

It seems that Earth has been considered as “Mother Earth”, in Mesopotamia and Indus Valley ancient civilisations (7000 BCE). Hence, Earth should be protected from change in climate that can occur due to unbalanced use of natural resources for human development. It is the quality of food intake and functional food production which would determine the effects of The Paris Agreement and Sustainable Development Goals (SDGs), as well as the safety of farming with reference to how much food is wasted or lost and how much earth is saved without environmental degradation.⁴ The EAT-Lancet Commission has made scientific targets sustainable food systems and for healthy diets.⁴ Interestingly, achieving functional foods, for 10 billion population, by 2050 from sustainable food systems is possible, if and only if, there is a significant decrease in the animal source of foods, specifically in G20 coun-

tries. There is an urgent need of universal increase in healthy plant-based foods and possibly sea foods in our diets. It is possible that the Planetary Health Diet, based on plant foods and sea foods may optimise health and nutrition, while reducing environmental degradation.⁴ The patterns of food intake in most of the G20 countries have differences; hence, country based guidelines are not successful, in bringing food systems to reduce global warming to 1.5 °C.^{1, 2, 5-7}

The world’s population is facing double burden of diseases due to undernutrition as well as over-nutrition. There are 820 million people having food scarcity and consuming unhealthy foods. It seems that there is an urgent need to shift dietary patterns towards healthful traditional foods with sustainable functional crops to alter the trends of unhealthy global diets.¹⁵ It is possible that health education of public as well as governments on Indo-Mediterranean foods and Japanese foods with reference to traditional foods in the concerned country are important steps for prevention of the risk of NCDs.¹⁵ It may be prudent to be selective on healthful foods which are known to have the Twelve Best Qualities of High Quality Indo-Mediterranean Foods (Table 1).

Diversity of Foods in the Indo-Mediterranean Diet

It is possible that the relation between quality of foods, characterised with diversity of foods and nutrient adequacy with overall status of health and development of diseases are graded based on food quality scores.^{1-4, 16} A simple count of in-

take of foods or food groups over a given reference period can determine food diversity, giving due emphasis on traditional diets. Epidemiological studies have shown a consistent positive association between diversity of foods and growth

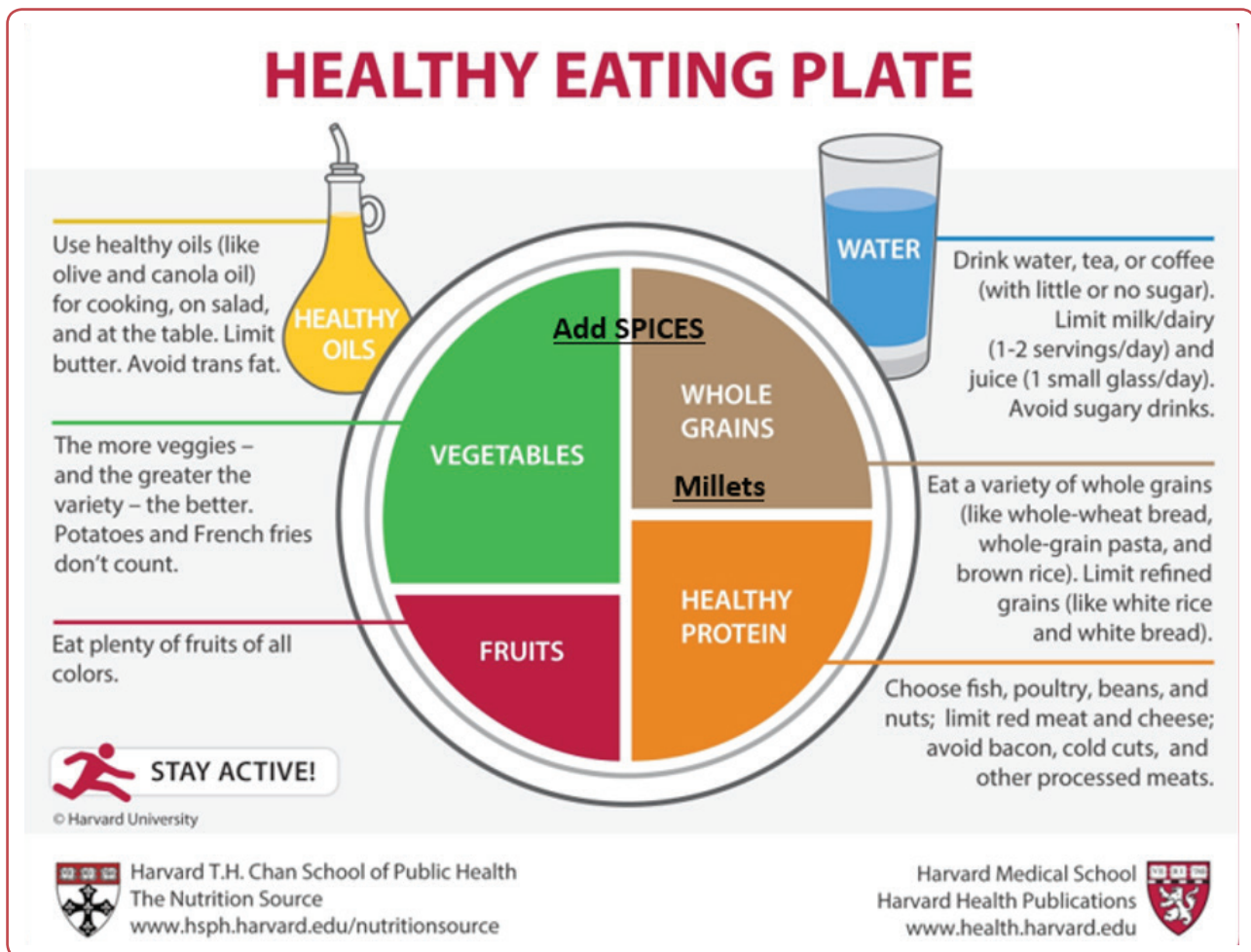


Figure 1: The best diet, quality counts. Harvard TH Chan School of Public Health³

of infants and children. Further evidence from a multi-country analysis suggests that diversity of foods at household-level is strongly associated with social class and availability of total energy from food quantity may be an indicator of food security.¹⁶ It seems that contribution of nutrients such as iron, calcium and protein from animal foods has sufficient nutrient adequacy. In addition, Indo-Mediterranean plant foods can provide all the Twelve Qualities of High Quality Foods which may be adequate for the growth of infant and children as well as for prevention of chronic diseases in later adult life.¹¹⁻¹⁴ The growth of infant and children with emphasis on peri-conception and perinatal factors and socioeconomic status of the family and community are known to influence food consumption as well as food production.

Some experts have suggested The Healthy Eating Plate, which appears to be an interesting approach for providing healthful diets with diversity of foods to communities, which may include traditional foods of the concerned community and country (Figure 1).³

Glycaemic Index

In many developing countries, grain-based carbohydrates may constitute approximately 60 % of total energy consumption compared with 42 % for Caucasians. The intake of refined carbohydrate diets, causes hyperglycaemia and insulin response, which may contribute to insulin resistance.^{1,2} Poor quality and refined carbohydrates are quickly digested and absorbed, thereby giving rise to high blood glucose and insulin induced spikes with pro-inflammatory cytokines. Observational studies have shown that the consumption of low glycaemic index (GI) foods is associated with a lower risk of type 2 diabetes mellitus, significantly less insulin resistance and a lower prevalence of the metabolic syndrome.¹⁻⁴ The concept of GI may provide a useful marker to select the most appropriate carbohydrate-containing foods or for the maintenance of health and the treatment of several diseases.¹⁷ Eating a high carbohydrate, rapidly absorbed foods may be associated with rapid increase in triglycerides, free fatty acids, with increase in nuclear factor kb

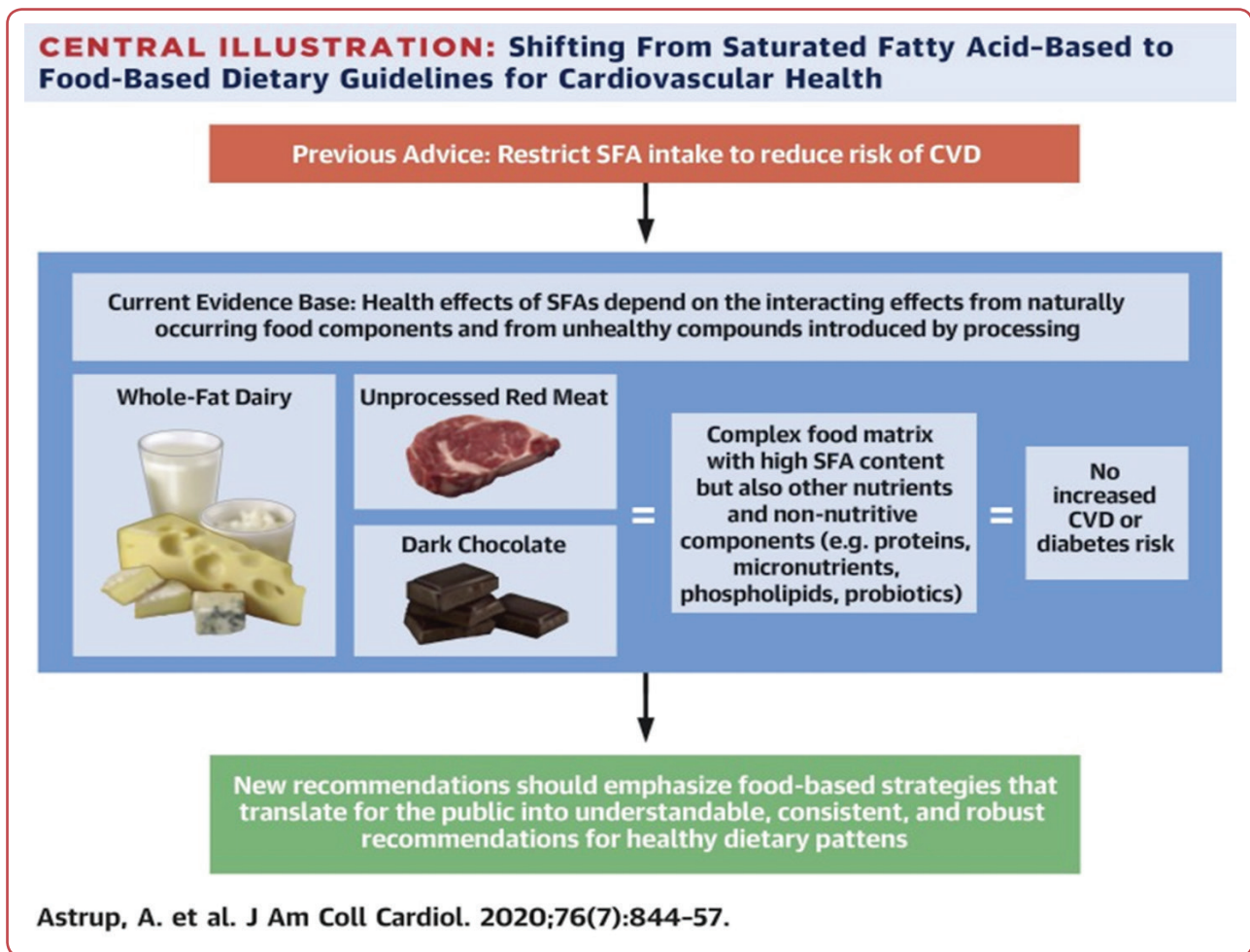


Figure 2: Effects of fatty acid intake on cardiovascular diseases⁵

(NFkB0), a transcriptional factor regulating the activity of at least 125 genes, most of which are pro-inflammatory. High GI foods also increase pro-inflammatory transcription factors; activating protein-1 (AP-1) and early growth response protein-1 (Egr-1) which are markers of dysfunction of endothelial cells and adipocyte.¹⁷

The GI is a numerical figure to show the ability of a highly absorbed food to increase blood glucose level. It is expressed as a percentage of the incremental area under the glycaemic response curve (AUC) produced by a food portion with 50 g carbohydrate compared with the AUC shown by a standard reference food of 50 g glucose or sugar or white bread.¹⁷ If the rate of absorption of carbohydrate is slow, into the blood, there would be lesser rise in blood glucose level with the lesser GI value. A GI value ≤ 55 is low and a GI value 56–69 inclusive is medium and the value of GI of ≥ 70 is considered high, where glucose GI = 100.¹⁷ It is possible that food-based intervention using GI could be an important tool in the management of diabetes. The foods that have low GI

such as whole, grains, nuts and vegetables may reduce insulin demand and lipid concentrations, causing improvement in blood glucose and reduction in body weight. The intake of such foods may prevent glycaemia induced cardiovascular complications. It is known that traditional foods in most Asian and some of the European and African countries, have lower GI. However, all kinds of fast foods, including some snack foods, such as chips, crackers, tater tots and French fries, some spreads, such as margarine spreads or peanut butter and cookies have higher GI. The GI data of Asian, African and East European countries are scarce.¹⁷

Dietary Fat

Most of the developed countries, follow the limits given by American guideline for total fat intake, which is 30 % of total calories intake including

10 % energy from saturated fat.⁴⁻⁷ The limit for intake of trans fat in foods is up to 3 % in most guidelines. The limit is higher in countries dependent on ready prepared foods provided by the industry.¹⁻⁴ There are several options made available for eliminating or reducing trans fats, saturated fat and salt in the food-supply chain. It explores how such policies could contribute to decreasing the disease burden caused by intake of industrially produced trans fats in the WHO European Region. Despite some evidence of no adverse effects, the advice to limit intake of saturated fat is persisting, due to its low glycaemic index and diversity of foods (Figure 2).^{5,7}

Diet and Gut Microbiota

It seems that some vegetarian plant foods rich in whole grains, nuts, vegetables and fruits as well as microalgae may produce beneficial effects on gut microbiota, whereas meat intake may cause harmful effects.¹⁸ It is also proposed that eating a flexitarian diet; containing excess of plant foods along with moderation in meat may not be unhealthy, which could be a healthy approach for health promotion with improved SDGs.^{4,5,18-20} The shape of gut microbiota may be improved via healthy diet and lifestyle factors that are crucial for the development of microbiome.¹⁸⁻²¹ In a cohort of 441 Colombians, microbial diversity was greater in subjects with greater consumption of nutrients from sources of plant-food.¹⁸ The consumption of food groups and nutrients correlated with structure of the microbiota. The communities of microbes, producers of short-chain fatty acid (SCFA) were more common in the microbiota of subjects eating diets rich in fibre and plant-foods, such as beans, vegetables and fruits.¹⁸ Surprisingly, an inflammatory microbiota composed of putrefactive microorganisms and bile-tolerant and along with opportunistic pathogens thrived in subjects eating diets of animal-food sources and of ultra-processed foods and lower in fibre.¹⁸ It is possible to conclude that diet is strongly linked with the gut microbes and emphasise connections between health and microbiota.

Diets for Healthy Life Expectancy and Sustainability

It seems that the diets for good health in future and improved life expectancy are determined by sustainability and health effects of diets and foods consumption.^{4-7,18-20} It is proposed that dietary transitions to Indo-Mediterranean foods can reduce, food-related greenhouse gas emissions and provide improved distribution of these emissions within planetary boundaries.^{4,15} These efforts are likely to address all forms of under-nutrition as well as over-nutrition. The countries such as India, China and Indonesia that have dense population, appear to have food intake patterns, that is crucial to protect health and the planet. This state of food pattern may be due to scarce modernisation and continuation of traditional food intake pattern and traditional lifestyle with greater occupational physical activity.^{1,2} However, this situation may change due to attack by advertising food industry.^{4,15} The role of diet qualities have been well emphasised,^{20,21} because these diets can modulate immune function which is a worldwide problem.²²⁻²⁴ It is proposed that there are clear opportunities for all health agencies, to reduce greenhouse gas emissions and realise the health and related economic benefits of shifting toward more healthy traditional and sustainable Indo-Mediterranean type of diets, to serve the Sustainable Development Goals of the United Nations Organisation (UNO).

Conclusion

It is possible that the twelve protective features of a high quality diet may be crucial, for healthiness and healthy life expectancy. Functional food diversity from traditional food sources, in particular with dry whole grains such as millets and beans, vegetables, nuts, fruits, spices, with no trans-fat and little salt and low glycaemic index are important for health promotion and disease prevention.

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Conflict of interest

None.

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