



## BACKGROUND PAPER

# Asian Traditions of Wellness

Gerard Bodeker

### DISCLAIMER

This background paper was prepared for the report *Asian Development Outlook 2020 Update: Wellness in Worrying Times*. It is made available here to communicate the results of the underlying research work with the least possible delay. The manuscript of this paper therefore has not been prepared in accordance with the procedures appropriate to formally-edited texts.

The findings, interpretations, and conclusions expressed in this paper do not necessarily reflect the views of the Asian Development Bank (ADB), its Board of Governors, or the governments they represent. The ADB does not guarantee the accuracy of the data included in this document and accepts no responsibility for any consequence of their use. The mention of specific companies or products of manufacturers does not imply that they are endorsed or recommended by ADB in preference to others of a similar nature that are not mentioned.

Any designation of or reference to a particular territory or geographic area, or use of the term “country” in this document, is not intended to make any judgments as to the legal or other status of any territory or area. Boundaries, colors, denominations, and other information shown on any map in this document do not imply any judgment on the part of the ADB concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

# **ASIAN TRADITIONS OF WELLNESS**

**Gerard Bodeker, PhD**

## Contents

I.	INTRODUCTION .....	1
II.	NUTRITION .....	5
III.	MOVEMENT .....	19
IV.	PHYSICAL HEALTH AND WELLBEING: ASIAN TRADITIONAL MEDICINE .....	26
V.	TRADITIONAL MEDICINE: MODELS OF INTEGRATION IN ASIA .....	28
VI.	MENTAL WELLNESS .....	37
VII.	ENVIRONMENT .....	38
VIII.	CONCLUSION .....	39
IX.	SUMMARY POINTS .....	39
	REFERENCES .....	42

## I. INTRODUCTION

**Aim of the chapter.** To bring into focus Asia's wealth of health prevention and promotion strategies that are culturally relevant, evidence-based, self-managed, and low cost, as a means of enhancing health in the region and reducing the illness burden on national health budgets.

**Regional perspective.** Asia's two major systems of traditional health knowledge—Chinese Medicine and India's Ayurveda—are grounded in principles of living healthy and well throughout the human life span. Lifestyle is given primary emphasis over medicines in the classical texts.

East Asia and Viet Nam are strongly influenced by Chinese health knowledge, especially the knowledge in Sun Simiao's *Encyclopaedia of Medicine* and in the *Huangdi Neijing*, the classic text of Chinese Medicine. The health traditions of South Asia and most of Southeast Asia are grounded in Ayurvedic theory and practice, which have the *Charaka Samhita* of Ayurveda as their core text.

**Core principles.** Central to these Asian traditions of wellness is an understanding that people have different metabolic styles, and that understanding these is the basis for developing personalized preventive health and wellness routines. Also of primary importance in Asian wellness theories and practices is an individualized and balanced approach to nutrition based on body type and cultural food traditions.

Integrative exercise is given priority also along with stress-reducing and integrative breathing and meditative practice. Regular connection with nature is seen as a balancing influence on overall wellbeing.

**Scientific evidence.** Many practices from Asian wellness traditions have become widely popular in the West, generating a sizeable global economy around yoga, tai chi, Asian massage traditions, and Asian herbal supplements. In turn, this has led to a surge in research investigation into the health benefits of Asian health and wellness practices. Scientific journals now exist for studies on Chinese Medicine, Japanese Medicine (Kampo), Korean Medicine, and Ayurvedic Medicine. This has resulted in a large body of evidence that is now available, not only on the medicines from Asian health traditions but on the lifestyle practices and preventive strategies from Asia's wellness traditions, such as integrative exercise programs like yoga and tai chi and the untapped potential of Asia's vast diversity of martial arts practices.

**Potential.** There is recognition from the World Health Organization (WHO) and national health administrations that lifestyle changes are the only effective way to reverse the rising trend of noncommunicable diseases (NCDs). With the evidence base that has built in support of Asian wellness traditions in reducing NCD risk, reducing stress and mental health issues, and enhancing quality of life (QOL) and longevity, there is an opportunity for Asia to integrate its own cultural traditions into national and regional guidelines for risk reduction

for NCDs and overall health promotion and mental wellness, according to Asia's own cultural heritage. In turn, this has cost-reduction implications for national health systems, economic opportunities for wellness tourism, and new possibilities for entrepreneurship.

### **Structure of Chapter: Why, What, and How**

**Why.** (i) Regionally, there is great diversity in how Asia sees wellbeing. (ii) At the same time, there is a rich array of traditions that merit prioritization in order to preserve them and harness their benefits. (iii) There are economic opportunities, e.g., new enterprises, wellness tourism, and new food products. (iv) There are new globalization opportunities following the huge global success of yoga, tai chi, meditation, kung fu, judo, and other forms of traditional movement.

**What.** The perspectives on the cultural and traditional diversity of Asia are presented in this section. Then, this section noted that there are a few broad wellness tracks supported by evidence as enhancing mental wellbeing, improving energy and QOL, and reducing risk of lifestyle or NCDs. These categories are nutrition, movement, physical health, and mental wellness. We will examine tradition according to this framework.

**How.** Governments and nongovernment organizations (NGOs) promote local traditions for wellbeing. Educational curriculum includes learning in schools, and learning the science as well. Festival and competitions are within and across traditions and regions.

### **New economics focuses on quality of life.**

Relevant to the understanding of wellbeing in Asia in the 21st century is the shift in economic thinking that began in the late 20th century with the work of Nobel Laureate in Economics, Amartya Sen of Harvard, and philosopher Martha Nussbaum of the University of Chicago. Sen and Nussbaum's work has been seminal in articulating the distinction between welfare and wellbeing/QOL. Here, *welfare* is the value assigned by the individual to income or, more generally, to the contribution to his/her wellbeing from those goods and services that he/she can buy with money (Crocker 1992)

Sen and Nussbaum developed the *capabilities approach* to human wellbeing which focused on what human beings can do and be instead of on what they have. They defined *capabilities* as the abilities, the power of individuals to do certain things, to obtain what they desire, to achieve desired states of being, to utilize the resources they have in the way they desire, and to be who they want to be. While *goods* are the things that individuals possess, *capabilities* facilitate using goods in ways that are meaningful to individuals (Sen 1999, 70–71).

Reflecting the *capabilities approach* to assessing how goods are used in ways that are meaningful to individuals, the Asia Barometer conducted surveys of QOL over a 5-year period in 32 countries in East Asia, Southeast Asia, South Asia, and Central Asia (Inoguchi and Fuji 2013). These surveys took the position that the daily lives of ordinary people are central to them and that politics and economics, let alone international affairs, are peripheral. This led the Asia Barometer to focus primarily on the daily lives and concerns of ordinary people, and then shift to ask more peripheral questions about democracy and government performance.

Unsurprisingly, in this most diverse region of the world, what emerged was how very different the countries and regions of Asia are in how they value aspects of their life, their material status, and their personal and family values.

Why does this matter here? The answer is that diversity in values and priorities across Asia underscores the benefit of activating traditions that have local meaning and familiarity, and that can serve as pathways to wellness that are trusted and can contribute to strengthening the fabric of local society.

Here is a summary of the diversity that the Asia Barometer surveys found across Asia:

- (i) As a whole, Asia is moving upward: East Asia and Southeast Asia are faster, while Central Asia and South Asia are slower.
- (ii) People in East Asia assess their happiness more negatively than their gross domestic product (GDP) per capita and the human development index (HDI) suggest.
- (iii) People in Southeast Asia assess their happiness more positively than their GDP per capita and the HDI suggest.
- (iv) People in South Asia assess their happiness more positively than their GDP per capita and the HDI suggest.
- (v) People in Central Asia assess their happiness more negatively than their GDP per capita and the HDI suggest.
- (vi) People in East Asia tend to prioritize materialist or QOL-sustaining factors (such as housing, standard of living, household income, education, and job) in their daily lifestyle.
- (vii) People in more traditional Southeast Asia (Cambodia, Indonesia, the Lao People's Democratic Republic, and Myanmar) tend to prioritize materialist or Digital Quality of Life -sustaining factors in their daily lifestyle.
- (viii) People in more dynamic, more competitive Southeast Asia (Malaysia, Thailand, and Viet Nam) tend to prioritize post-materialist or QOL-enriching factors (such as friendships, marriage, neighbours, family life, leisure, and spiritual life) in their daily lifestyle.
- (ix) People in state-dominant Southeast Asia societies (Brunei Darussalam, Singapore, and the Philippines) tend to prioritize their daily lifestyle in harmony with state-imposed constraints (such as public safety, the condition of the environment, social welfare system, and the democratic system).
- (x) People in traditional and competitive South Asia (India, Bangladesh, Nepal, and Sri Lanka) tend to prioritize traditional or QOL-sustaining factors.
- (xi) People in South Asia, whose societies face the challenge of tropical weather systems and have dominant-state structures (Bhutan, the Maldives, and Pakistan), tend to harmonize public sphere factors.
- (xii) People in Central Asia, whose societies are more traditional (Afghanistan, Mongolia, Tajikistan, and Uzbekistan), prioritize traditional or QOL-sustaining factors.
- (xiii) People in Central Asia, whose states are dominant (Kazakhstan), tend to harmonize their lives with public sphere factors.

- (xiv) People in Central Asia, whose societies have more cleavages and are more competitive, tend to prioritize QOL-enriching factors (Kyrgyz Republic).
  - (xv) Standard of living and marriage or being married are important for overall QOL in Asia.
  - (xvi) Seniors are less likely to feel happy, but more likely to have a sense of accomplishment in Asia.
  - (xvii) Income is more likely to enhance the feeling of achievement, but less likely to enhance the feeling of happiness in Asia.
- (Inoguchi and Fuji 2013 and Inoguchi 2015)

Clearly, a regional perspective on pathways to wellness for Asia must be one that is not a one-size-fits-all, but represents instead a set of principles and pathways that reflect local values, priorities, and heritage.

### **What are the broad categories for pathways to wellness?**

There is now a substantial body of evidence on the benefits to physical and mental wellbeing of a range of health practices that might be classified as wellness practices or wellness pathways.

In view of research into conception, pregnancy, and what has come to be identified as the first 1,000 days of life, a life span approach to wellness is essential

It turns out that life begins before conception. It is known now that the health of the parents prior to and at the time of conception will influence our life course and some determinants of both health and lifestyle diseases. The first 2 years of life are critical in shaping future physical and mental health. Parenting styles, nutrition, and air quality are some of the factors that shape future patterns of health and mental wellbeing.

A series in the *The Lancet* on Preconception Health has highlighted the study of preconception health as of foundational importance in understanding and shaping future health.<sup>1</sup> One article in the series, titled *Before the beginning*, notes that “observational studies show strong links between health before pregnancy and maternal and child health outcomes, with consequences that can extend across generations” (Stephenson et al. 2018).

At the other end of the life span, replacing half an hour to an hour of sedentaryness with light exercise, including housework, each day is enough to significantly reduce the risk of mortality (Dohrn et al. 2018). A growing number of studies on wellness modalities, e.g., meditation, yoga, dance, are finding positive changes in the brains of regular practitioners, which in turn translate into improved mental wellbeing and cognitive performance. Dance has been shown to enhance memory, communication, and cognition among people with dementia.

Looking at nutrition, and recognizing the great diversity of culinary traditions of Asia and the high use of pharmacologically potent herbs and spices, a healthy, largely organic diet is

---

<sup>1</sup> [http://www.thelancet.com/series/preconception-health?dgcid=etoc-edschoice-email\\_tlwpreconhealth18](http://www.thelancet.com/series/preconception-health?dgcid=etoc-edschoice-email_tlwpreconhealth18).

being shown to be foundational in enhancing both physical and mental wellness. This is so from many different angles, e.g., inflammation, immunity, and preventing metabolic disorders, and has been found to be modulated by an influential pathway between the gut and the brain, known as the gut-brain axis.

Sleep and meditation are different forms of experiencing the rest that is essential for the bodies to renew itself on a daily basis. Evidence shows that enhanced health, cardiovascular functioning, mental wellbeing, and cognitive performance are associated with meditation.

It turns out that the arts, e.g., music, the visual arts, writing, as well as dance, all have documented benefits on mental health and wellbeing. Laughter or just the experience of laughing not at or about anything, but laughing with others, creates health and happiness that are measurable in physiological terms.

Clearly, there are many pathways to wellness that are beneficial across a long life span. The major broad categories under which clusters of wellness pathways exist are nutrition, movement, physical health and wellbeing, mental wellness, and environment

## **II. NUTRITION**

As the world's rapidly growing burden of obesity and diabetes threatens health systems and national economies, the Westernization of diets worldwide is on the spotlight as a major causal factor. Using data from the Food and Agriculture Organization (FAO), Vandevijvere et al. (2015) report that an increase in national food energy production is a powerful predictor of the obesity levels of nations. While proposed policies include managing increased food energy and promoting physical activity, others assert that qualitative changes in food choices play an equally important role in the increase in chronic illness: "Strong evidence and broad consensus exists for such food-based dietary patterns and should inform dietary recommendations instead of relying on the outdated emphases on SFA, total fat, and calorie counting."

With support from the United Nations Human Rights Council, the Special Rapporteur from the Right to Food, Consumers International's 2014 Recommendations Towards a Global Convention to Protect and Promote Healthy Diets promotes the participation of local communities in the development and implementation of socially and culturally appropriate strategies and programs, drawing on local agricultural and culinary traditions.

In this context, it has been noted that: "There has been a recent awakening of interest and concern about the lack of documentation of traditional and indigenous food cultures which are important not only for their own sake, but for the legacy of food knowledge which they can confer on future generations, provided they are not lost. By and large, there is a remarkable resilience and ingenuity of people and their food systems" (Wahlqvist and Lee 2007).

What could be added to this is that Asian diets incorporate herbal medicinal ingredients into the food. This is well established in Japanese, Chinese, and Indian cuisine. Malaysia has its *ulam*, a unique and pharmacologically potent medicinal herbal salad. The lower caloric density of plant-rich diets results in lower caloric intake and high intake of phytonutrients and antioxidants, all of which contributes to preventing the development of NCDs.

## **Asia**

With 4.44 billion people, about 60% of the world's population, Asia is the world's largest and most populous continent. Great variation exists across Asia's ethnicities and their traditions of farming, food processing, and diet. Yet, rapid economic growth is accompanied by a "nutrition transition". The traditional dominance of rice, vegetables, and other staples is shifting towards a dominance of wheat, high protein, fats, and energy dense foods. This is associated with a rise in diabetes and obesity, with some Asian countries having obesity rates of more than 40%.

Central to the problem of dietary risk factors for NCDs is the fact that, as income levels increase in developing countries, exposure to the global "urban" eating pattern increases, resulting in the consumption of many Western-style foods (Pingali 2007 and Kearney 2010). Asian countries in economic and demographic transition are already showing dramatic changes in food consumption patterns.

## **ASEAN Food Imports**

Agriculture in the Association of Southeast Asian Nations (ASEAN) is largely concentrated on rice production. Rice's gross value share of total agriculture production varies widely, including 25% in the Philippines and 60% Cambodia. Malaysia remains a key exception with the majority of its agricultural production concentrated on palm oil.<sup>2</sup> It is also the largest food importer in ASEAN: 25% of food is imported. According to Malaysia's minister of health, Malaysia is also the fattest nation in Asia:<sup>3</sup> And, Malaysia has ASEAN's highest rate of diabetes:<sup>4</sup>

Unhealthy dietary patterns include high energy intake from total fats, excessive use of cooking oil with high saturated fat (including indigenous oils such as palm oil and coconut oil), high consumption of sugars and sweetened beverages, high intake of dietary salt, and low consumption of fruit and vegetables.

Increasingly, the Mediterranean diet is touted as the dietary pattern to counter chronic lifestyle diseases. However, as noted elsewhere, the Mediterranean diet "can be seen as a

---

2 (M. Whitehead 2018: <https://bluenotes.anz.com/posts/2018/03/ASEANs-agri-imports-and-exports-in-five-charts/>).

3 <http://www.straitstimes.com/asia/se-asia/malaysia-battles-the-bulge-as-southeast-asias-fattest-country-wakes-up-to-health-bomb>.

4 <http://www.thestar.com.my/news/nation/2013/06/14/number-of-diabetics-in-malaysia-alarming/>.

Western diet, studied by Westerners on Westerners – now being recommended for the world, 75% of which is non-Western” (Bodeker and Kronenberg 2015).

Clearly, cultures, other than those in the Mediterranean region, have evolved healthy eating patterns using foods available to them and often unique preparation methods. A growing body of research on Asian food traditions merits wider global attention if we are to understand the potential of dietary patterns and traditions in controlling obesity, diabetes, and other NCDs.

### **Asia’s Dietary Traditions**

Asian diets are diverse in vegetables and fruit and include many plant foods rich in pharmacologically active compounds that are beneficial to health. Among these are reishi mushrooms and goji in East Asia, and turmeric and bitter melon in South Asia and Southeast Asia. Many food preparation methods utilize microorganisms, now understood as critical to healthy digestion and physical function.

A growing body of evidence indicates that, in parallel with losing touch with ancestral food traditions, an increase in chronic disease comes.

At the same time, there has been an awakening of interest and concern about the lack of documentation of traditional and indigenous food cultures, which are important not only for their own sake but for the legacy of food knowledge, which they can confer on future generations, provided they are not lost. “By and large, there is a remarkable resilience and ingenuity of people and their food systems” (Wahlqvist and Lee 2007).

What could be added to this view is that Asian diets incorporate medicinal ingredients into the food. This is well established in Japanese, Chinese, and Indian cuisine, e.g., *reishi* mushrooms in Japanese cuisine, *goji* berries in Chinese food, *turmeric* and other potent medicinal species in Indian menus. Malaysia has its *ulam*, a unique and pharmacologically potent medicinal herbal salad. Indonesia has its *jamu* herbal beverages based around nature’s most powerful anti-inflammatory agent, turmeric, and a powerful digestive agent, *ginger*.

Research has shown that the lower amount of calories in plant-rich and the high intake of plant-based nutrients and antioxidants in such traditional diets all contribute to preventing the development of such NCDs as obesity, diabetes, heart disease, cancer, and rheumatism.

### **East Asia**

**People’s Republic of China.** The 7th century C.E. physician and medical scholar, Sun Si Miao, favored food as the first line of intervention in preventing and treating disease. Predating the WHO’s NCD guidelines by about a millennium and a half, Sun Si Miao prioritized food hygiene, advised against rich or greasy food, promoted thorough cooking and avoiding excessive drinking, and recommended taking a walk after a meal.

As Chinese communities lose touch with ancestral traditions, changes in disease patterns occur. In a study of weight loss, those eating a traditional Chinese diet, compared with a standard Western diet, lost more weight despite eating equal calories. They also lost less lean muscle mass and did not feel as hungry. Eating according to traditional food theories is being shown to enhance health and wellbeing, with potential to slow the escalating obesity rates in the Republic of China (PRC).

**Japan.** Japanese people, particularly in Okinawa, are more likely than any others to reach 100 years, a fact attributed to their diet. Traditional Okinawan diet is characterized by root vegetables, other vegetables, soy-based foods, with moderate consumption of seafood, including seaweeds, lean meat, fruit, spices, healthy fats, and tea. It is relatively low in calories and high in phytonutrients. As a result, Okinawans have a low risk of arteriosclerosis and stomach cancer, a very low risk of hormone-dependent cancers, such as breast and prostate cancer. In Asia, the Japanese diet is well studied and there are commonalities with the Mediterranean diet. They share: high intake of unrefined carbohydrates, moderate intake of protein, healthy fat profile, low glycemic load, less inflammation and oxidative stress, and potential modulation of ageing-related pathways. A point of difference is that Asian diets typically include pharmacologically potent ingredients, such as turmeric in South Asia and Southeast Asia; umeboshi plums and reishi mushrooms in Japan; goji berry, ginkgo, and licorice root in the PRC; ginseng in the Republic of Korea (ROK); and the brain tonic *Centella asiatica* in Thailand and Malaysia.

**Republic of Korea.** In the ROK, socioeconomic and lifestyle changes since the 1970s were accompanied by changes in food choices. Animal products replaced plant foods that had been rich in the traditional diet, causing not just changes in energy consumption but also qualitative changes. A traditional Korean diet, compared with a contemporary (Westernized) diet, has been found to improve blood pressure, glycemic control, and cardiovascular risk factors despite slightly larger average caloric intake and a high carbohydrate content, including steamed rice and plant foods. Explanations include health-promoting compounds in the food, and effects from the fermentation central to Korean cuisine.

### **South Asia and Southeast Asia**

**India.** South Asian traditions have not drawn the same attention as East Asian dietary practices. India, an influence on dietary traditions throughout Southeast Asia, has dietary roots in Ayurvedic theory and practice. These offer comprehensive and personalized dietary guidelines for promoting health and managing illness.

Ayurveda's theory of personalized nutritional, lifestyle, and medicinal guidelines is consistent with an emerging 21st century prioritization of personalized medicine, and is strengthened by a growing body of research on the related genomics.

There has been considerable research on food ingredients and spices used in South Asia and Southeast Asian cuisine, e.g., turmeric (*Curcuma longa*), one of the best known natural anti-inflammatory agents. Widely used throughout South Asia and Southeast Asia, turmeric contributes to a dietary approach of preventing and managing type 2 diabetes as well as having well-documented anti-cancer, cardioprotective, and anti-Alzheimer's properties.

Pharmacoactive ingredients are abundant in herbs and spices used in South Asian and Southeast Asian cuisine, including black pepper, chilis, coriander, allspice, and nutmeg. Studies of fruits of the region have identified antioxidant, anti-inflammatory, anti-bacterial, anti-fungal, hypoglycemic, and other beneficial properties.

Clearly, traditional foods of Asian cultures have valuable health benefits. At the same time, tea, a staple across Asia and so beneficial in East Asia, has become a health risk in South Asia and Southeast Asia because of heavy sweetening.

## Malaysia

Malaysia has its *ulam*—a unique and pharmacologically potent medicinal herbal salad (Table 1).

**Table 1. *Ulam***

	Name	Description
1	<b>Jantung pisang (Banana blossom)</b>	An edible flower from the banana plant, its common name literally translates as 'banana heart'. The tender inner core is usually served lightly blanched or used in kerabu, a fragrant, tangy and spicy local salad. Has antimicrobial properties:
2	<b>Temulawak (Java ginger/<i>Curcuma zanthorrhiza</i>)</b>	Traditionally consumed as herbal remedies. It can be eaten fresh and has a sourish, bitter taste. <i>Curcuma zanthorrhiza</i> is used as a medicinal plant. The rhizome contains an ethereal oil (5ml per kg), it primarily consists of Sesquiterpenes. There is also a content of Curcumin (at least 1%, Ph. Eur.) and starch. <i>Curcuma zanthorrhiza</i> is used for dyspepsia. It is a spice too. According to one source it is an effective deterrent and pesticide of mushroom mites.
3	<b>Selom (Java waterdropwort/<i>Oenanthe javanica</i>)</b>	It's prized by ulam lovers for its delicate lemony taste.
		Edible Parts
		Tender stems and leaf stalks are used fresh as salad, to garnish steamed rice and other dishes, or boiled and chopped as greens.
		Health values
		Beta-carotene: high; vitamin E: extremely high; riboflavin: medium; ascorbic acid: high; calcium: medium; iron: high;

		protein: 1.1%. Chlorophyll-rich leaves have antigenotoxic and antioxidative properties.
4	<b>Kerdas (Pithecellobium bubalinum)</b>	A thin layer of skin covers the light green seed inside. The fruit emanates a strong smell and is known as an appetizer. This is used to manage fever in Indonesia and is described as having cooling properties.
5	<b>Terung pipit (Pea eggplant/Solanum torvum)</b>	These little gems contain tiny seeds which pop when you bite into them. Enjoy them fresh or cook them in curries and other dishes. The bitter fruits are appreciated especially by elderly people and are used in soups and sauces or are chopped together with eggplant fruits or tomatoes. Solanum torvum is also used in traditional medicine. When used wisely, its fruit and leaves can be used to control a range of microbial activities. The glycoalkaloid solasodine that is found in its leaves and fruits is used in India in the manufacture of steroidal sex hormones for oral contraceptives. The antimicrobial properties of the leaves have been known for some time in Central America and India. In India leaves are dried and ground to powder, which is used as medicine for diabetic patients. The isoflavonoid torvanol A and the steroidal glycoside torvoside H isolated from the fruits showed antiviral activity against herpes simplex virus type 1. Studies on the effect of dried leaf powder in India showed no significant changes with respect to glucose, lipid profile, glycated proteins, total amino acids and uronic acid levels in non-insulin dependent diabetes mellitus patients.
6	<b>Pegaga (Asiatic pennywort/Centella asiatica)</b>	Besides serving it raw with sambal, it can also be made into a refreshing juice.
7	<b>Peria (Bitter gourd/Momordica charantia)</b>	There are two types of bitter gourd and the one frequently consumed as ulam is the smaller and darker-coloured type. It is also more bitter in taste but those who love the fruit swear that the taste, coupled with the sambal, makes the best and most appetizing combination.
8	<b>Ulam raja (Cosmos caudatus)</b>	Its name means 'king of ulam'. Its grassy taste is accentuated by a subtle peppery tinge. Consumed to enhance blood circulation, studies have shown that it has bone-protective qualities. Claimed to have antidiabetic effects:
9	<b>Jering (Dog fruit/Archidendron pauciflorum)</b>	The fruit is sliced and eaten raw with sambal. Its smell doesn't endear it to many people especially the younger generation, but the older folks swear by its blood-purifying feature which has been proven by scientific studies. However: "Djenkolism is an uncommon but important cause of acute kidney injury. It sporadically occurs after an ingestion of the djenkol bean

		(Archidendron pauciflorum), which is native to Southeast Asia (Borneo). The clinical features defining djenkolism include: spasmodic suprapubic and/or flank pain; urinary obstruction; and acute kidney injury.”
10	<b>Petai (Bitter bean/Parkia speciose)</b>	The plant has strip-like pods and the beans must be peeled from the pods prior to consumption. It can be eaten raw or cooked in sambal with anchovies, as well as shellfish such as prawns and cuttlefish. “The nutritional composition of the seeds is substantial with rich proteins (6.0–27.5%), fats (1.6–13.3%), carbohydrates (68.3–68.7%), minerals (0.5–0.8%) and fibers (1.7–2.0%). Edible part (100 g) contains essential minerals like calcium (108–265.1 mg), magnesium (29 mg), potassium (341 mg), phosphorous (115 mg), and iron (2.2–2.7 mg) required for different metabolic reactions in human body. Bioactive compounds like phenols [51.9–84.24 mg Gallic acid equivalent (GAE)/g], flavonoids [47.4–49.6 mg retinol equivalent (RE)/100 g on dry weight basis], terpenoids like β-sitosterol (3.42% of fatty acid content), stigmasterol (2.18% of fatty acid content), lupeol (0.71% of fatty acid content), campesterol (2.29% of fatty acid content) are also present. These bioactive compounds and peptides possess different medicinal properties like anti-hypertensive, antioxidative, anti-inflammatory, anticancer, anti-microbial activity and antinociceptive. P. speciosa is traditionally consumed as vegetable, salad and in boiled form. Rich nutrient value and photochemistry suggest that there is tremendous need of scientific work to explore its food utilization.”
11	<b>Kacang botor (Winged or four-angled beans/Psophocarpus tetragonolobus)</b>	The winged bean has a distinctive frill angling out from the bean pod, hence its name. It is a hardy plant and all parts of the plant including the leaves are edible. The seeds have a high range of protein (27.8–36.6%) and fat (14.8–17.9%), which are similar to soybeans. The seeds contain high phosphorus, calcium and magnesium. The leaf is highest in protein content (33.7%) of all the parts studied except for the seeds. Proximate analyses showed that the composition of winged bean was similar to soyabean. As to the amino acid composition, the lysine level was of the highest value in winged bean (7.5 g/16 g N).

Source: Bodeker, G. Global Initiative For Traditional Systems of Health ([www.giftsofhealth.org](http://www.giftsofhealth.org)).

## Indonesia

*Jamu*, Indonesia’s widely valued herbal beverage tradition, has long been the mainstay for local disease prevention strategies and for the management of common illnesses. Originating in Java, with turmeric and ginger as base ingredients, which are both potent medicinals, *jamu*

beverages have been found to be powerful anti-inflammatory and antioxidant agents. A well-known wonder herb, turmeric is one of nature's most powerful anti-inflammatory agents. In over 2,000 studies, turmeric has been shown to reduce and prevent conditions associated with inflammation, such as heart disease, rheumatoid conditions, and even potentially Alzheimer's disease.

From the classic cane basket of glass bottles with rolled leaf stoppers, carried on the backs of women *jamu* sellers throughout java, *jamu* drinks are now emerging as a commercialized, packaged drink in Southeast Asia.



*Jamu* products, such as *sajen jamu*, have begun to appear on the shelves of Whole Foods stores throughout the United States. At the Four Seasons Hotel in Toronto (as part of the brand's new energy-focused treatments) cold-pressed juices, including turmeric, are delivered to guest rooms daily.

### **Rice: Asia's Food Staple**

Although bread (i.e., wheat) is a staple in West Asia and parts of South Asia, Asia as a whole represents the world's largest consumer group for rice. According to FAO data, in developing countries, rice accounts for 715 kilocalories per day, 27% of dietary energy supply, 20% of dietary protein, and 3% of dietary fat.

FAO's calculations of food energy, and hence of obesity risk as presented by Vandevijvere et al. (2015), include high rice consumption across Asia. Yet, the rice included in these calculations bears little resemblance to that which sustained peoples over the centuries.

Ancient (c.10,000-year-old) traditions of rice production, preparation, and consumption exist across Asia. From its beginnings, rice has served as a source of food energy for population growth and health.

Ayurvedic texts describe different rice varieties according to their respective health promotional effects. In India, ethnographic research has documented over 30 nutritionally valuable varieties of traditional rice and eight medicinally valuable varieties. While classical methods of rice preparation included de-husking, farmers did not typically polish the grain by removing the endosperm, as what happens with modern industrial processing to produce white rice. It is estimated that polishing rice results in loss of 29% of the protein, 79% of the fat, and 67% of the iron. More importantly, the endosperm contains amino acids, B vitamins, and other nutrients. Without the endosperm, nutrients in rice are depleted while the starch

(a polysaccharide) remains intact. White rice, then, becomes a source of high polysaccharide intake, heightening the risk of diabetes and obesity.

A meta-analysis of studies found that white rice consumption is associated with a significantly increased risk of type 2 diabetes. The association was higher in East Asians (Chinese and Japanese) than in populations in West Asia. In South Asia, research has shown that almost half of daily calories come from refined grains. Among these, white rice is predominant, which is consumed on a daily basis during the three main meals.

In Bangladesh, it has been found that the effect of rice on blood sugar levels differs widely between varieties. “In other words, the higher the glycaemic value of a specific variety, the higher its probability to cause diabetes”. While high-yielding varieties have greatly increased rice production in Bangladesh, “production is dominated by varieties that lead to sharp rises in blood-sugar levels,” i.e., that produce diabetes.<sup>5</sup>

Harvard research has found a moderate inverse association in men and women between diabetes risk and brown rice consumption. Specifically, the researchers reported that “In contrast to white rice, brown rice intake was associated with a lower risk of Type 2 Diabetes in age-adjusted models” (Sun et al. 2010, p.10).

**Clearly, rice is Asia’s crisis and opportunity.**

### **Traditional Rice and the Green Revolution**

Naturally, concerns will be raised about this being a potential backward step, given the perceived transformative effects of the Green Revolution on food supply, agricultural productivity, and nutrition.

In Asian countries (including the PRC), the percentage of area planted to modern varieties was 82% by 1998 (Evenson 2003). The rapid increase in agricultural output that resulted from the Green Revolution came from an impressive increase in yields per hectare. Between 1960 and 2000, yields for all developing countries rose 208% for wheat, 109% for rice, 157% for maize, 78% for potatoes, and 36% for cassava (FAO 2004). Developing countries in Southeast Asia (plus India) were the first countries to show the impact of the Green Revolution varieties on rice yields, with the PRC and other Asian regions experiencing stronger yield growth in the subsequent decades (Cassman and Pingali 1995).

In citing the case of India, which was at the forefront of countries that embraced the Green Revolution, critics of the Green Revolution note that the heavy reliance on use of chemical fertilizers and pesticides has resulted in (i) environmental degradation, including loss of soil fertility, erosion of soil, soil toxicity, diminishing water resources, pollution of underground water, salinity of underground water; and (ii) health consequences, such as a high incidence

---

<sup>5</sup> (Food Planning and Monitoring Unit, Ministry of Food and Disaster Management of the Government of Bangladesh: [http://fpmu.gov.bd/agridrupal/sites/default/files/Healthy%20rice\\_Final.pdf](http://fpmu.gov.bd/agridrupal/sites/default/files/Healthy%20rice_Final.pdf))

of cancer, hyperthyroidism, and birth defects in a sizable segment of the population, notably in the agricultural state of Punjab. The key question being asked by policy analysts and critics is whether this food security that resulted from the Green Revolution has been worth the toll it has taken in terms of human health and a degraded environment.

Of particular concern to critics has been that, while the production of wheat and rice doubled post-Green Revolution, the production of other food crops, such as indigenous rice varieties and millets declined. In turn, this has led to the loss of distinct indigenous crops from cultivation and has also caused extinction. Researchers have pointed out that many indigenous varieties of rice and millets are resistant to drought, salinity, and floods (Richharia and Govindasamy 1990)

Richharia and Govindasamy (1990) estimated that about 200,000 varieties existed in India until the advent of the Green Revolution, with an estimated 110,000 varieties in cultivation.

Traditional rice cultivars have also been found to have higher nutritional value than hybrid rice varieties (Bhat 2015), being a rich source of minerals and vitamins, such as niacin, thiamine, iron, riboflavin, vitamin D, calcium, and possess higher fiber. These cultivars also possess several health benefits, such as reducing the risk of developing type 2 diabetes, obesity, and cardiovascular diseases by lowering the glycemic and insulin responses (Umadevi et al. 2012).

A move towards the cultivation and conservation of traditional seed varieties, especially rice, is growing through NGOs and other sources in civil society in Asia. In India, the Genetic Resource, Energy, Ecology and Nutrition (GREEN) Foundation is a community-based organization that works with disadvantaged groups of smallholder and marginalized farmers in the semiarid regions of Karnataka, South India, with a particular focus on women farmers who are women. The GREEN Foundation's seed banks across the state of Karnataka contain upwards of 100 different varieties of seeds. The GREEN Foundation says that 2,250 households have been impacted by the seed bank program. Now, the state government of Karnataka is funding the establishment of more seed banks. The United Nations Development Programme has partnered with the GREEN Foundation on a case study regarding the work of the GREEN Foundation. An Equator Prize winner,<sup>6</sup> the GREEN Foundation has also helped establish close to 1,000 community kitchen gardens across Karnataka in India, which help families access different types of vegetables that may be too expensive to grow on their individual farms.<sup>7</sup>

---

<sup>6</sup> Organized by the Equator Initiative within the United Nations Development Programme, Equator Prize is a biennial award in recognition of community efforts to reduce poverty through the conservation and sustainable use of biodiversity.

<sup>7</sup> <http://www.greenfoundation.in/>

## Indigenous/Heirloom Rice

### India

A basic feature of rice cultivation in India is that rice is grown in very different conditions across India (conditions differ from field to field in a single village), and it is for this reason that, over the years, a great diversity of indigenous varieties have evolved, each variety being suitable for different conditions, with different qualities.

The late Dr. R H Richharia, former director of the Central Rice Research Institute and one of the leading experts on rice in India, documented and collected 19,000 rice varieties during his career. He estimated that around 200,000 rice varieties existed that were endemic to India. His collection is housed at the Indira Gandhi Agricultural University, Raipur, Chhatisgarh, which has subsequently added another 5,000 varieties of Indian rice, bringing the official number of samples to 24,000.

### People's Republic of China

Some popular indigenous varieties of rice in the PRC are black Asian rice, Manchurian rice (*Zizania latifolia*), *Oryza rufipogon*, Ponlai [ja] rice, and Wuchang [ja] rice.

Research in Yunnan, Sichuan, and Guizhou provinces has found that intercropping new strains of rice with heritage varieties leads to higher yields per hectare, reduced plant disease and insect infestation, higher monetary returns per hectare, and savings on chemical inputs (Zhu et al. 2000 and 2003).

### Sri Lanka

Historic records indicate that Sri Lanka has had up to 2,000 indigenous varieties of rice. The list below identifies some that are being grown currently as heritage varieties, including for the wellness and gourmet markets.

**Suwandel** is a small-grained white rice which, in ancient times, was so prized for its exceptional aroma (from which it derives its name), taste, and diverse medicinal properties, and so it was grown exclusively for royalty. With the lowest known Glycemic Index for rice, it is particularly suited for diabetics.

**Pachchaperumal** translates as "the color of the Buddha", when cooked, takes on a deep burgundy shade. It is also known as the "warrior's grain", and its high quality reportedly made it the staple diet of the armies of ancient Lanka.

**Kuruluthuda**, or "bird's beak", from its distinctive shape, is a rich, red rice, high in protein and fiber, and valued for its aphrodisiac properties. It makes the perfect rice as part of Sri Lanka's legendary rice and curry.

**Kaluheeneti** is a dark red-black rice, well-known in traditional Ayurvedic medicine for its

anti-oxidant and detoxifying properties, and was particularly sought after by those suffering from liver-related illnesses.

**Maa Vee**, or "great paddy", is characteristically tall, often over seven feet, and can be grown in fields where high floods would destroy modern rice varieties, making it the only viable crop for farmers who work in marginal lands.<sup>8</sup>

Both Japan and the ROK have many indigenous varieties of rice that are in wide use; rice is the ROK's main crop.

In Indonesia, there are at least 45 varieties of rice for wet-field production (sawah) and 150 varieties of rice for dry-field production.

## **Philippines**

The Cordillera Administrative Region is an administrative region in the Philippines situated within the island of Luzon. Farmers of the Cordilleras are reported to have expressed an overwhelming preference for the traditional varieties because they are more resistant to pests and diseases, have low fertilizer requirements, and have been adapted for low temperatures and ease in harvesting and storing. They are the preferred eating varieties of the Cordilleras because of their highly prized taste and texture, mild aroma, and fast cooking qualities. At least 300 traditional varieties of rice are reported to exist in the Philippines, creating new opportunities for enhancing the nutritional wellbeing of the population, creating more sustainable rice cultivation, and opening up new market opportunities for the global whole foods and gourmet markets. These markets are currently valued at US\$720 billion in an October 2019 analysis by the Global Wellness Institute. <sup>9</sup>

The largest single shift towards nutritional wellbeing in Asia could be a shift towards regular consumption by Asian societies of traditional rice varieties. Typically, these are high in essential nutrients, many have lower glycaemic indices than commercial varieties, and, in turn, their production could be beneficial for biodiversity conservation, agricultural practice, and landscape preservation, as well as for widespread prevention of NCDs and the promotion of nutritional wellbeing.

**Bridging tradition and science.** There is great potential for food science specialists to provide an evidential basis from published research into the nutritional benefits of ingredients used in Asia's traditional foods and also to work with ethno-nutrition specialists to document local, national, and regional food and dietary traditions.

## **Why document food and dietary traditions?**

This is a high-profile demonstration of a commitment to locally sourced food, cultural preservation and promotion, organic sourcing, and contribution to improve local livelihoods, and create benefit to both the rural and urban levels of society. In addition to recording

---

<sup>8</sup> <http://serendib.btoptions.lk/article.php?issue=75&id=1787>

<sup>9</sup> <https://globalwellnessinstitute.org/press-room/statistics-and-facts/>.

ingredients and recipes to preserve cultural traditions and create unique new wellness menu offerings, this approach can identify culturally established foods that:

- (i) combat specific health problems and improve health;
- (ii) preserve local traditions that may become lost to imported and fast food influences;
- (iii) attach science to them so that the new, scientific generation see tradition in terms of modern insights and understand the science behind the wisdom of their elders;
- (iv) through this kind of understanding, tradition will be more highly valued and passed on to future generations; and
- (v) with this new approach, there is promise of new eating patterns, new agricultural directions, and new wellness products as part of the \$4.5 trillion global wellness economy.<sup>10</sup>

Tapping into the food and beverage market rather than the far tougher medicine market has been profitable for herbal companies and fits well with the booming wellness trends globally. This approach of medicinals as food, functional foods, offers new opportunities for creative, market-savvy herbal and wellness companies in a less-challenging regulatory context than the herbal medicine market. Of course, regulatory hurdles are never far behind new market trends and the climate seems to be getting a little tougher, with good science being the basis for success. In the words of the well-respected trend monitoring group, Euromonitor: “The world is getting older and fatter. As such, health and wellness remain as viable as ever, irrespective of broader economic concerns. Consumers around the world still demand viable health and wellness solutions of ever greater specificity, including gut health and immune system support, weight management, inner beauty, and heart health. However, at least in the near term, tightening regulations represent a significant stumbling block, and further highlight the importance of solid science.”<sup>11</sup>

Beauty is a key driver of the natural wellness products market, as Euromonitor and many other market watchers note. As is anti-ageing as well.

Another growing trend in the field of culturally relevant wellness practices is the emergence of what has come to be known as Islamic wellness traditions. Here, traditional foods, beverages, and herbs are being re-evaluated in a fresh light as a means of combatting the rising tide of lifestyle diseases in the Middle East and elsewhere throughout the Islamic world, whose population now comprises more than 20% of global population.<sup>12</sup>

What does all of this mean for countries with herbal traditions? How can herbal industries be repositioned to look into these new horizons?

First, there are new opportunities for traditional products to become commercial crops, especially using organic production and fair trade principles. Wellness consumers favor

---

<sup>10</sup> <https://globalwellnessinstitute.org/press-room/statistics-and-facts/>

<sup>11</sup> <http://www.euromonitor.com/navigating-wellbeing-today-and-tomorrow-in-functional-food-and-drinks/report>.

<sup>12</sup> <http://www.spafinder.com/content/wellness-traditions-islamic-world>.

products with these conditions on the labels of products and are often willing to pay more for these. Companies such as Himalaya Herbals (<http://www.himalayawellness.com/responsibility/care-for-community.htm>) and Organic India ([www.organicindia.com](http://www.organicindia.com)) in India, and Pukka Herbs in the United Kingdom ([www.pukkaherbs.com](http://www.pukkaherbs.com)), have built their product range and consumer base around ethical values, product purity, and environmental sustainability.

Related to this is the potential for medicinal plant eco-tourism, a popular and growing segment of the burgeoning global wellness tourism market, which grew to \$494 billion in revenues in 2013, a 12.5% gain over 2012.<sup>13</sup>

This can support forestry conservation initiatives that have sustainable medicinal plant projects—both in situ and ex situ—as their focus.

A feature of the herbal wellness market is that it is quite changeable. Fads come and go. The West has seen fads for aloe vera, noni, mangosteen, and acai peak and wane in successive 3–5-year cycles. Companies move on to new products once consumer markets are saturated and they bring out new “wonder” products for a seemingly insatiable market appetite for the rare, the traditional, and the scientifically impressive.

This offers both risks and opportunities for countries where there are rich herbal traditions. Companies and governments can plan a sequence of herbals that addresses the 3–5-year boom cycle of herbal fads and can be ready with new products that are ready to go as earlier ones wane, but do not disappear.

New methodologies are giving new life and promise to medicinal research as well. In an important scientific paper, Professor Alan Harvey of the well-respected Strathclyde Institute of Pharmacy and Biomedical Science at the University of Strathclyde in Glasgow, Scotland (2015), asserts with colleagues that: “There is an increasingly powerful case for revisiting natural products for drug discovery”, drawing on new strategies for natural product screening “and the use of genomic and metabolomic approaches to augment traditional methods of studying natural products”. Harvey and colleagues present recent examples of natural products in antimicrobial drug discovery and as inhibitors of protein–protein interactions. They report on “the growing appreciation of functional assays and phenotypic screens” as potentially contributing to a revival of interest in natural products for drug discovery (p. 111).

As the market for medicinal plant-based wellness products grows rapidly, new scientific and technological developments promise to bring medicinal plants back center stage in the search for potent new medicines as well. At the heart of both approaches is the meeting of science and tradition within a context of high standards of enquiry, research, quality control, and production.

---

<sup>13</sup> <http://www.globalwellnesssummit.com/industry-resource>

In conclusion, a wellness approach to health nutrition and healthy ageing across Asia would focus on:

- (i) identifying traditional and nutritious varieties of rice to promote as a means of combatting the mounting diabetes epidemic across Asia that is linked by research to the consumption of hybrid white rice;
- (ii) promoting new and traditional use of heritage foods, herbs, spices, and seasonings, all of which have potent pharmacological properties for enhancing health and wellbeing;
- (iii) documenting heritage traditions of nutrition and food production, and position these towards both an informed domestic market as well as to global gourmet and wellness markets that are looking for exactly such products;
- (iv) through the school system as well as via conventional and social media, education on the benefits of heritage foods and beverages, accompanied by relevant science;
- (v) incentives to farmers and the agriculture sector more widely to expand production to heritage foods and traditional nutrition;
- (vi) building export markets and branding around each country and region's unique heritage foods and their nutritional value; and
- (vii) creating unique herbal products for each region, building on traditional knowledge and local production, targeted to Asia's booming wellness economy as well as to the US\$1 trillion global personal care; beauty and anti-ageing market; and the US\$700 billion healthy eating, wellness nutrition, and weight loss market.<sup>14</sup>

### III. MOVEMENT

There are many well-documented effects of exercise on QOL and longevity (Table 2).

<b>Table 2. What are the health benefits of exercise</b>	
1	Help control weight.
2	Reduce the risk of heart diseases.
3	Help the body manage blood sugar and insulin levels, thus mitigating the risks and effects of Type II diabetes.
4	Help in quitting smoking
5	Improve mental health and mood.
6	Help keep thinking, learning, and judgment skills sharp with age.
7	Strengthen bones and muscles.
8	Reduce risk of some cancers, (including colon, breast, uterine, and lung cancer).
9	Reduce risk of falls in the elderly.
10	Improve sleep.

<sup>14</sup> <https://globalwellnessinstitute.org/wp-content/uploads/2019/12/Global-Wellness-Economy-Bubble-Chart-2019-1-e1575501071855.jpg>.

11	Improve sexual health.
12	Increase chances of living longer.
Source: <a href="https://medlineplus.gov/benefitsofexercise.html">https://medlineplus.gov/benefitsofexercise.html</a> .)	

Specifically, in a prospective study in rural and urban areas of 17 countries (Canada, Sweden, the United Arab Emirates, Argentina, Brazil, Chile, Poland, Turkey, Malaysia, South Africa, the PRC, Colombia, Iran, Bangladesh, India, Pakistan, and Zimbabwe), Lear et al. (2017) found that higher recreational and non-recreational physical activities were associated with a lower risk of mortality and cardiovascular disease (CVD) events in individuals from low-income, middle-income, and high-income countries. Based on this, the researchers pointed out that increasing physical activity is a simple, widely applicable, low-cost global strategy that could reduce deaths and CVD in middle age.

In a 2019 study led by Cambridge University researchers, data suggested that, even if someone decided to exercise after being physically inactive, the benefits for longevity would still be significant. Specifically, looking at physical activity energy expenditure, the analysis revealed that, with each physical activity increase of 1 kilojoule/ kilogram/day (kJ/kg/day) per year, the risk of premature mortality from any cause dropped by 24%. The same modest increase in exercise correlated with a 29% lower risk of cardiovascular death and an 11% lower risk of dying from any form of cancer. The authors explained that an increase of 1 kJ/kg/day per year is the equivalent of not being physically active at all at the start of the study and gradually becoming more active over a 5-year period, to the point of meeting the minimum physical activity guidelines issued by the government.

Yet, in the case of the growing global trend towards gym-based exercise, there are cautions that need to be noted. For example, according to data collected by the United States Consumer Product Safety Commission, almost 460,000 people were sent to hospital in 2012 for injuries related to exercise equipment. The vast majority—nearly 428,000—were treated and released for their injuries. But about 32,000 were hospitalized or were dead on arrival. Of the serious injuries involving exercise equipment, in particular, treadmills are among the most common seen in emergency rooms. In 2014, hospital emergency departments across the United States treated some 24,400 treadmill-related injuries. Treadmill injuries included broken bones, abrasions, rectal bleeding, and people developing chest pain while working out on the machines, according to a review of the United States Consumer Product Safety Commission database system.<sup>15</sup>

According to the Global Wellness Institute's research report, *Move To Be Well: The Global Economy of Physical Activity* (2019), the United States and the PRC are by far the world's largest national consumer markets for recreational physical activity, together accounting for

---

<sup>15</sup> <https://www.usatoday.com/story/news/2015/05/04/treadmill-emergency-room-injuries-exercise-equipment/26898487/>

45% of global expenditures. In addition, Japan and the ROK are included in the top 10 recreational physical activity markets globally (Table 3).

<b>Table 3. Top 10 Recreational Physical Activity Markets</b>	
<b>Country</b>	<b>Value (US\$)</b>
US	264.6 billion
China	109.3 billion
Japan	43.9 billion
UK	40.9 billion
Germany	39.4 billion
France	26.3 billion
South Korea	23.5 billion
Italy	19.3 billion
Canada	18.9 billion
Australia	16.7 billion
Source: Global Wellness Institute.	

A new and important body of research is examining the possibility that benefits from exercise can be inherited. Noting that epigenetics is the study of gene expression changes that occur in the absence of altered genotype, a 2017 review presents experimental evidence indicating that environmentally induced alterations to epigenetic modifications lead to changes in health and disease across generations (Denham 2017).

Noting the need for new research to establish the link between exercise and epigenetic inheritance for human health and disease prevention, the author of this review, Joshua Denham of the University of New England in Australia, argues that “Such studies could establish an extraordinary role for maternal and paternal exercise training to promote exercise-induced adaptations and encourage the prevention of age-related chronic disease in future generations” (p. 18).

Looking ahead, if the benefit of exercise can be established to confer benefits to successive generations, surely there is a need for research on the many Asian exercise modalities referenced here and elsewhere to determine if these also benefit not only the practitioner, but their descendants as well. This would be a research agenda designed to support the need for this generation to take action, not only for its own health and wellbeing but, through this, for the improvement of Asia’s health and wellbeing in the future.

## **Yoga**

The United States National Institutes of Health’s Center for Complementary and Integrative Health states: “Recent studies in people with chronic low-back pain suggest that a carefully

adapted set of yoga poses may help reduce pain and improve function (the ability to walk and move). Studies also suggest that practicing yoga (as well as other forms of regular exercise) might have other health benefits such as reducing heart rate and blood pressure, and may also help relieve anxiety and depression”.<sup>16</sup>

According to scientific research, yoga may reduce stress, relieve anxiety, help manage depression, decrease lower back pain, improve QOL in those with chronic conditions or acute illnesses, stimulate brain function, and help prevent heart disease.<sup>17</sup> An estimated US\$80 billion is spent on yoga worldwide<sup>18</sup>, illustrating how an Asian exercise program can globalize and become a substantial source of revenue (Table 4).

<b>Table 4. Key Findings and Statistics about Yoga</b>	
<b>1</b>	36 million Americans practice yoga.
<b>2</b>	There are thought to be 300 million yoga practitioners worldwide.
<b>3</b>	Between 2012 and 2016 the number of Americans doing yoga grew by 50%.
<b>4</b>	Approximately one in three Americans have tried yoga at least once.
<b>5</b>	The number of over 50s practicing yoga has tripled over the last four years.
<b>6</b>	Flexibility and stress relief are the most popular reasons for starting yoga.
<b>7</b>	Americans spend \$16 billion on yoga classes, clothing, equipment, and accessories each year.
<b>8</b>	There are currently 6,000 yoga studios in the US.
Source: Bodeker, G. Global Initiative For Traditional Systems of Health. <a href="http://www.giftsofhealth.org">www.giftsofhealth.org</a> .	

## Tai Chi

Tai chi, also called tai chi chuan, combines deep breathing and relaxation with flowing movements. Originally developed as a martial art in 13th-century PRC, tai chi is today practised around the world as a health-promoting exercise and a means of developing self-awareness.<sup>19</sup>

As balance is the core goal of tai chi (balance while in motion) it is not surprising that tai chi has been used as a means of developing and maintaining balance among those at most risk of falling and incurring often life-damaging injuries, viz. the elderly. A meta-analysis of studies on the effects of tai chi in preventing falling in the elderly found that tai chi exercise is indeed effective for preventing falls in older adults. The preventive effect seems to increase with the frequency of tai chi practice. Interestingly, the study found a difference in effect with

<sup>16</sup> <https://nccih.nih.gov/health/yoga/introduction.htm>.

<sup>17</sup> <https://www.medicalnewstoday.com/articles/320392.php#types-of-meditation>

<sup>18</sup> <https://www.thegoodbody.com/yoga-statistics/>

<sup>19</sup> <http://www.nhs.uk/Livewell/fitness/Pages/taichi.aspx>

different styles of tai chi. Yang style tai chi (created in the 19th century and the most widespread form of tai chi today) seemed to be more effective than Sun style tai chi, the most recently created form of tai chi (Huang et al. 2017).

Veterans with post-traumatic stress symptoms took part in a four-session introduction to tai chi in Boston. In addition to reporting a high degree of satisfaction with the program, participants reported feeling very engaged during the sessions, and found tai chi to be helpful for managing distressing symptoms (i.e., intrusive thoughts, concentration difficulties, and physiological arousal) (Niles et al. 2016).

In 2016, a map of 107 systematic reviews of tai chi was published. The map identified a number of areas with evidence of a potentially positive treatment effect on patient outcomes, including tai chi for hypertension, fall prevention outside of institutions, cognitive performance, osteoarthritis, depression, chronic obstructive pulmonary disease, pain, balance confidence, and muscle strength (Solloway et al. 2016). As with all systematic reviews, there was a call for further research to be done to fine-tune these findings.

At the same time that yoga and tai chi have become globalized from their origins in India and the PRC, across Asia, there is a multitude of diverse exercise traditions, most derived from local martial arts practices and each usually accompanied by medical knowledge and music and dance for practice. Yoga is perhaps an exception as it derives from meditative movement rather than from a martial arts tradition. The following box illustrates the diversity of martial arts traditions in Asia.

**Table 5. Martial arts traditions in Asia**

1	Boli Khela	Bangladesh
2	Lathi Khela	Bangladesh
3	Bokator	Cambodia
4	Kbachkun boraan	Cambodia
5	Kbachkun Dambong-veng	Cambodia
6	Khmer traditional wrestling	Cambodia
7	Pradal Serey	Cambodia
8	Adimurai	India
9	Gatka	India
10	Huyen langlon	India
11	Inbuan Wrestling	India
12	Kalaripayattu	India
13	Malla-yuddha	India
14	Mardani khel	India
15	Musti-yuddha	India
16	Mukna	India
17	Pehlwani	India

18	Shastar Vidya	India
19	Silambam	India
20	Sqay	India
21	Varma Kalai	India
22	Vajra-musti	India
23	Cakalele	Indonesia
24	Pencak silat	Indonesia
	Bakti Negara	
	Beksi	
	Cingrik	
	Inti Ombak	
	Perisai Diri	
	Kwitang	
	Tapak Suci	
	Tunggal Hati Seminari	
25	Perang pandan	Indonesia
26	Pasola	Indonesia
27	Kuntao	Indonesia
	Liu Seong Kuntao	
28	Kebasaran	Indonesia
29	Tarung Derajat	Indonesia
30	Aikido	Japan
31	Daitō-ryū Aiki-jūjutsu	Japan
32	Iaido	Japan
33	Judo	Japan
34	Jujutsu	Japan
35	Kendo	Japan
36	Kenjutsu	Japan
37	Kenpo	Japan
38	Kūdō	Japan
39	Kyudo	Japan
40	Naganatajutsu	Japan
41	Ninjutsu	Japan
42	Nippon Kempo	Japan
43	Shorinji Kempo	Japan
44	Sumo	Japan
45	Okinawan martial arts	Japan
	Karate	
	Kobudo	
	Tegumi	
46	Choi Kwang-Do	Korea

47	GongKwon Yusul	Korea
48	Gwonbeop	Korea
49	Gyongdang	Korea
50	Hankido	Korea
51	Hankumdo	Korea
52	Hapkido	Korea
53	Hwa Rang Do	Korea
54	Kuk Sul Do	Korea
55	Kumdo	Korea
56	Moo Duk Kwan	Korea
57	Soo Bahk Do	Korea
58	Ssireum	Korea
59	Subak	Korea
60	Taekkyeon	Korea
61	Taekwondo	Korea
62	Tang Soo Do	Korea
63	Yusul	Korea
64	Muay Lao	Laos
65	Silat Melayu	Malaysia
	Seni Gayung Fatani	
	Seni Gayong	
66	Lian Padukan	Malaysia
67	Tomoi	Malaysia
68	Mongolian wrestling	Mongolia
69	Bando	Myanmar
73	Banshay	Myanmar
70	Lethwei	Myanmar
71	Naban	Myanmar
72	Arnis/Eskrima/Kali	Philippines
73	Bultong	Philippines
74	Buno	Philippines
75	Dumog	Philippines
76	Kinamotay	Philippines
77	Sikaran	Philippines
78	Suntukan	Philippines
79	Yaw-Yan	Philippines
80	Angampora	Sri Lanka
81	Cheena di	Sri Lanka
82	Krabi-krabong	Thailand
83	Lerdrit	Thailand

84	Muay Boran	Thailand
	Muay Chaiya	
85	Muay Thai	Thailand
86	Maay Thai Stunt	Thailand
87	Silat Patani	Thailand
88	Sayokan	Turkey
89	Yağlı güreş	Turkey
90	Karakucak	Turkey
91	Turkish archery	Turkey
92	Cuong Nhu	Vietnam
93	Nhat Nam	Vietnam
94	Vovinam	Vietnam
95	Tam Qui Khi-Kong	Vietnam
96	Võ thuật Bình Định	Vietnam
97	Köräş/Kurash	Central Asian folk wrestling
98	Koshti Pahlevani	Persian wrestling
99	Furusiyya	Arab knightly martial exercises
100	Arab Archery	Arabian Peninsula

Source: Bodeker, G. Global Initiative for Traditional Systems of Health. [www.giftsofhealth.org](http://www.giftsofhealth.org).

#### IV. PHYSICAL HEALTH AND WELLBEING: ASIAN TRADITIONAL MEDICINE

Traditional medicine (TRM) is widely used globally and, since the WHO's Alma Ata Declaration on Primary Health Care (1978), traditional health systems have been a formal focus of policy development at national and international levels.

The Alma Ata Declaration (WHO 1978), adopted by the WHO and the United Nations Children's Fund (UNICEF), stated that:

- (i) Primary health care (PHC) is essential health care based on practical, scientifically sound, and socially acceptable methods; and technology made universally accessible to individual and families in the community through their full participation and at a cost that the community and country can afford.
- (ii) PHC forms an integral part both of the country's health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact of individuals, the family, and community.
- (iii) PHC relies, at local and referral levels, on health workers, including physicians, nurses, midwives, auxiliaries, and community workers as applicable, as well as traditional practitioners as needed, suitably trained socially and technically to work as a health team and to respond to the expressed health needs of the community.

Most TRM systems have a theoretical basis, a *materia medica*, a range of therapeutic modalities, an empirical approach to treatment, and a tradition of training. Extensive scientific research has been conducted and published on TRM.

Some TRM have been proven safe and effective through controlled clinical trials. Some TRM practices have been shown to be dangerous (e.g., hepatotoxicity or herb–drug interactions) or ineffective.

In both rural and urban areas, the key point is that there is demand for TRM, and people seek guidance in selecting from traditional and modern health care options. Increasingly, in line with the WHO's policies, partnerships are developing between modern and traditional health practitioners.

The WHO Global Atlas on Traditional Complementary and Alternative Medicine (Bodeker et al. 2005) provided the first global overview on utilization and policy development in the TRM sector. It was found that more than half of the world's population uses these approaches on a regular basis and pay out of pocket to do so. By this standard, there is nothing “alternative” about these approaches to health care. Rather, they constitute a collective majority body of health practices.

In Asia, more than half of the population is reported to use TRM on a regular basis, varying in usage across urban and rural areas (higher in rural areas) and educational levels. A bimodal curve with high use at low educational and income levels, regular usage is assessed consistently at around the highest use of educational and income levels.

The WHO has produced a strategy on traditional and complementary medicine (T&CM), which looks ahead to the year 2023 (WHO 2014). The WHO's Traditional Medicine Strategy 2014–2023 has two key goals:

- (i) to support member states in harnessing the potential contribution of T&CM to health, wellness, and people-centered health care; and
- (ii) to promote the safe and effective use of T&CM through the regulation of products, practices, and practitioners.

The WHO has outlined three strategic objectives for meeting these goals:

- (i) building the knowledge base and formulating national policies;
- (ii) strengthening safety, quality, and effectiveness through regulation; and
- (iii) promoting universal health coverage by integrating T&CM services and self-health care into national health systems.

Much of the use of traditional medicine by those with higher levels of income and education is for the purpose of health promotion and disease prevention, more widely referred to as wellness.

Indeed, the editorial of the September 2018 edition of the Bulletin of the World Health Organisation, co-authored by Amina Mohammed, Deputy Secretary-General of the United Nations, and the WHO's Director General, Dr. Tedros Adhanom Ghebreyesus, and titled Healthy Living, Well-Being and the Sustainable Development Goals identifies the three strategic priorities of the WHO as (i) universal health coverage, (ii) health security, and (iii) improved health and well-being

## **V. TRADITIONAL MEDICINE: MODELS OF INTEGRATION IN ASIA**

In Asia, there always has been widespread acceptance of traditional medicine at the community level and formal recognition for several decades. Back in 1956, Viet Nam was the first country in Asia to formally incorporate its traditional medicine system into national health care. The PRC did the same in 1958 and India in 1970. Yet, by and large, this has been a system of two parallel tracks, with consumers making the choice of how to select between them. It has not been an integrated clinical model of care, which offers the best of both systems to consumers according to their needs. This is beginning to change now. Yet, early collaborative research in the PRC into traditionally used medicines for fever (febrifuges) led to the identification of the plant *Artemisia annua* used to manage hot-cold fevers, identified as malaria, and thus to the identification of the sesquiterpene lactone *artemisinin*. This paved the way for the development of an entire new class of antimalarial drugs and the awarding of the 2015 Nobel Prize for Medicine to Professor Tu Youyou of the PRC's Yunan Institute of Pharmacy and Shangdong Institutes of Parasitology. Professor Tu discovered a method to extract the active ingredient from *Artemisia annua*, isolated that active ingredient for structural studies, and conducted the first clinical trial of *Artemisia* extract in human patients.

### **India**

India is home to several historical traditions of health care that far predate the introduction of Western medicine. Ayurveda is the main traditional system and is used by the majority of India's population, Hindu, Muslim, and Christian.

Theoretically linked with Ayurveda, yoga is a lifestyle system which includes meditation, physical practices, diet, breathing exercises, and lifelong learning.

The Tamil health care tradition is called Siddha and is similar to Ayurveda in both theory and clinical practice.

Unani is the Graeco-Arabic health care tradition that came to India with the Muslim conquerors from Afghanistan and Persia from the 8th century to the 16th century.

The arrival in India of homeopathy in the early 19th century led to homeopathy being recognized as a traditional system within Indian health care in 1973, along with Ayurveda, yoga, Unani, and Siddha which were formally made a part of Indian health care under the Indian Medicine Central Council Act of 1970.

These first letter of each of these five systems—**Ayurveda, Yoga, Unani, Siddha, and Homeopathy**—have been used to form the acronym **AYUSH**, which is now the name of the Ministry of Ayurveda, Yoga & Naturapathy, Unani, Siddha Homoeopathy (Ministry of AYUSH), which is responsible for the development of traditional medicine in India and its integration into formal health care services.

On 25 September 2018, India's Prime Minister, Narendra Modi, launched the nation's new National Health Protection Scheme, known as *Ayushman Bharat Yojana*.

The backdrop to this has been highlighted in part by a series of recent studies by the Global Burden of Disease (GBD) Study on the epidemiology of selected health conditions in India. Published by The Lancet as a series of articles in September 2018, the GBD group concluded that India has a disproportionately high burden of diseases in a number of areas: chronic respiratory diseases, CVD, and cancer. Strikingly, the GBD study found that 32.0% of the total global disability-adjusted life-years in 2016 occurred in India because of chronic respiratory diseases. CVD is rising in all states of India with prevalence of ischaemic heart disease being highest in the less-developed states. The GBD study found that 8.3% of the total deaths and 5.0% of the total disability-adjusted life-years in India in 2016 were because of cancer. This was double the contribution of cancer in 1990 (GBDa, GBDb, GBDc, and GBDd 2018).

With this as the backdrop, the *Ayushman Bharat* program has been designed to cover over 100 million vulnerable families, totalling about half a billion beneficiaries, and provide health cover up to ₹500,000 per family per year. A beneficiary covered under the scheme will be allowed to take cashless benefits from any public and/or private hospitals registered with the program across the country. The scheme aims to target the lowest-income sectors of Indian society. The insurance scheme will cover pre-hospitalization and post-hospitalization expenses. At the time of writing, 14 states had finalized their memoranda of understanding with the Central Government.

Critics of the program point out that, currently, it is focused on tertiary care, whereas the need in India's rural areas is for PHC services. However, this is part also of the planned rollout with 15 million PHC wellness centers to be in place by 2022. However, to date the AYUSH systems have not been included in planning for *Ayushman Bharat*. Leading scholars and practitioners of Ayurveda are petitioning the Prime Minister to cover AYUSH under the *Ayushman Bharat* program as more than 70% people in the country directly or indirectly depend on herbs or plants by which medicines are prepared.

Yet, separate from this public sector debate over whether to integrate Ayurveda into all levels of the formal health system, both private sector and NGO initiatives have been moving down the road of integration of services for a decade or more. The following is a model where prevention and home management with Ayurveda are brought together with modern medicine in a rural dermatology setting. This is the other end of the wellness user spectrum—those who are rural, with low income, and able to benefit from lifestyle changes and interventions drawing from their traditions.

## **The Institute of Applied Dermatology, Kerala, India**

The skin is the body's largest organ and its failure to function correctly, whether as a result of wounds, infections, cancer, or inherited disorders, is a major cause of morbidity and disability. Skin disease occurs in all cultures, can arise at any age, and has been estimated to affect 30%–70% of individuals, with even higher prevalence in some vulnerable subpopulations (Hay et al. 2013 and also Bhuchar et al. 2012).

In the traditional medicine sector, skin and wound treatments are estimated to account for about a third of all traditional medicines (Balick and Cox 1996). This figure may not include the natural products applied regularly to healthy skin in many parts of the world to promote hygiene, such as “soap plants” and emollients.

The WHO's Department of Control of Neglected Tropical Diseases plans to promote an integrated strategy for the skin neglected tropical diseases THT require intensified disease management. Targeting skin neglected tropical diseases also provides a platform for treatment of common skin conditions and, therefore, has wider public health benefits.

Community dermatology is a concept that extends the focus of care delivery from the individual patient, who comes to see the doctor about a skin problem, to a proactive intervention to improve the care of skin and diseases that present with skin signs in the broader communities in which they live (Ryan 2015). Essential to this is the idea that practitioners use all means of achieving this goal. Therefore, those who can contribute will vary from situation to situation, but programs that use local health care workers, those that use traditional practices and those that involve other groups, such as burn care experts, are all manifestations of the same basic principle that, to achieve the best results, teams are usually multidisciplinary and sensitive to local practices and needs.

The Institute of Applied Dermatology (IAD) ([www.iad.org.in](http://www.iad.org.in)) was founded in 1999 by dermatologist Dr. SR Narahari along with nine other interdisciplinary senior medical professionals. In 2014, the Government of Kerala established its Centre for Integrated Medicine and Public Health in IAD under public–private partnership for furthering research and development activities and activities related to community dermatology. IAD is collaborating with seven institutions and universities to enhance the evidence, application, and impact of integrated medicine in dermatology.

The IAD, a nonprofit organization in Kasaragod, Kerala, devised a suitable program that employs locally available supervisors and simple technology that is easy to administer and teach, and most importantly at low cost. In 2004, the IAD launched an integrative treatment protocol to reduce Lymphatic filariasis (LF) morbidity by combining Ayurveda, yoga, and compression therapy supplemented when necessary by modern dermatology drugs to treat bacteria entry points (BEPs).

Subsequently, this was evaluated as a community-based intervention in two districts of India where filariasis is particularly prevalent and which have a high poverty index. A total of 408

patients in one district and 600 in the other, who had unilateral or bilateral lower limb lymphoedema (grade 2 late or grade 3), were treated.

Narahari et al. (2013) conducted a non-randomized interventional study at IAD that reflects the "whole system thinking" principle of Traditional, complementary and alternative medicine (TCAM) therapies. The aim of the study was to determine the efficacy of an integrative treatment protocol for morbidity control of lymphoedema in two lymphatic filariasis endemic districts of South India. The treatment included skin wash, *phanta* soaking (an Ayurvedic infusion made of *Rubia cordifolia* in hot water), yoga, and breathing exercises, before and after Indian manual lymph drainage (limb massage against the direction of hair growth using an oil specially prepared for lymph drainage), compression therapy, and bacterial entry points care using pharmaceutical medicines. 730 patients completed the 3.5 months follow up. The results demonstrate a statistically significant reduction in up to mid-thigh level volume measurement. Inflammatory episodes decreased from 37.5% to 28.3% in one district and from 37.6% to 10.2% in the second district. A lymphatic filariasis specific QOL questionnaire revealed an overall improvement in life quality in all domains.

The authors note that this cost-effective integrative treatment protocol has adapted all the principles of PHC, namely community participation, intersectoral coordination, appropriate technology and equitable distribution, and can be adapted globally. IAD is supported by the Bill and Melinda Gates Foundation and the Government of India, among others.

### **Foundation for Revitalization of Local Health Traditions**

Another example of harnessing local traditions to prevent and manage everyday health concerns is the Home Herbal Garden project. This was part of a wider program created by the Bangalore-based Foundation for Revitalization of Local Health Traditions to promote medicinal plant conservation and the forests that are home to medicinal plants. This was a partnership between NGOs and government departments, such as the Indian Forestry Service and the national Department of Science and Technology.

Based on national data that the third largest area of expenditure of poor families is spent on medicines, after food and shelter, a program in rural India involving indigenous (so-called 'tribal') communities and landless and marginal farmers has promoted the concept of home herbal gardens (HHG) as a means of decreasing family health problems and reducing high expenditures on health care (Hariramamurthi et al. 2007).

Medicinal plants were selected to address such common ailments as cold, cough, fever, diarrhea, dysentery, cuts and wounds, irregular menstruation and other menstrual conditions, joint pain, insect bites, indigestion and gastric complaints, mouth ulcer, and urinary infections and disorders. Community members were involved in identifying useful plants for the various conditions selected, and also in cultivating medicinal plants.

In each setting, a village resource person was trained in how to grow and use the medicinal plants, and, in turn, she trained the households. An independent evaluation showed that the HHG program was adopted by the poorest of the poor; namely, landless (33%), marginal

landholding (37%), and small landholding (21%) farmers; 86% of program adopters belonged to socially deprived communities, particularly indigenous communities.

HHGs benefited mainly women and children in poor communities as a first response to common conditions, such as cold, cough, and fever. HHG participants reported economic benefits in the form of savings from PHC-related expenses by use of home remedies. Health expenditures by non-HHG households was about five times greater than for HHG households.

The authors of the study concluded that: “In developing countries such as India, where mobilizing additional resources to provide effective health care coverage has remained a problem that has escaped solution thus far. The Home Herbal Gardens programme provides a sustainable strategy for enhancing health security in primary health care (p. 181).” It is also important to note that the HHG program is able to prevent medical problems and high medical expenditures by the poor. This is a model for pathways to wellness at the rural level in Asia.

## **Copper**

Microbially unsafe water is still a major concern in most developing countries. While many water-purification methods exist, these are expensive and beyond the reach of many people in rural areas.

India’s traditional health care system, Ayurveda, has long recommended the use of copper for storing drinking-water.

In tests of this water purification approach, water inoculated with 500–1,000 colony forming units per milliliter of *Escherichia coli*, *Salmonella Typhi* and *Vibrio cholerae* was stored overnight at room temperature in copper pots or in glass bottles containing a copper coil devised by us. The organisms were no longer recoverable when cultured on conventional media, by contrast with water stored in control glass bottles under similar conditions. It has been suggested by the researchers that this change in pH levels caused perforation of the cell membranes of the pathogens in the water. The amount of copper leached into the water after overnight storage in a copper pot or a glass bottle with a copper device was less than 475 parts per billion, which is well within the safety limits prescribed by the WHO (Preethi Sudha et al. 2009). From this research and its underlying Ayurvedic water-purification practice, a copper device has been produced that is inexpensive, reusable, easy to maintain, durable, does not need energy to run, and appears to be safe. It has the potential to be used as a household water purification method for removing enteric bacteria, especially in developing countries (Preethi Sudha et al. 2012). Copper has the potential to be used as a household water purification system, especially against waterborne pathogens such as rotavirus, which is the cause of 22% of diarrhoea hospitalizations in children less than 5 years of age in developing countries.

## **Apollo Hospitals Enterprise Limited, India**

While India's *Ayushman Bharat* program has begun rolling out tertiary care access to the poor of India, but has not yet included the AYUSH system, India's private sector, led by the Apollo hospital group, has moved quite a way down the road of integrated hospital services, offering Ayurveda alongside modern medicine for the treatment of a range of medical conditions, especially cancer.

Founded in 1983, the Apollo hospitals group is widely recognized for pioneering the private health care revolution in the country. As of 2016, the Apollo hospitals group had 43,557 employees and revenues of US\$840. Apollo's pharmacy group is India's pharmacy network with over 3,000 outlets in 20 states. In 2015, the Apollo hospitals group introduced a digital platform, Ask Apollo, which provides remote health care services. The platform connects patients with doctors remotely and provides such services as consultation with doctors via video, voice calls, and email.

It is an indicator of a sea change in health care in India that a group of such high standing in conventional medical care has recently created the Apollo Life Wellness Program, to be offered at Apollo clinics throughout India. These specialized clinics include gym, aerobics, sauna, steam, massage, diet counselling, stress management, yoga, and meditation. Apollo health professionals offer therapies from Ayurveda, naturopathy, acupressure, and other complementary traditions. The Apollo website states: "Our all-new state-of-the-art Clinics will be available for promoting fitness and holistic health to the community".<sup>20</sup>

This emphasis on promoting fitness and holistic health by a tertiary care hospital is an example of how, at the other end of the bimodal curve of traditional medicine usage in Asia, a prevention and wellness strategy can be promoted via traditional medicine.

## **People's Republic of China**

The PRC formally incorporated traditional Chinese medicine (TCM) into national health care in the late 1950s. However, this has been done on the basis of two parallel systems (modern medicine and Chinese medicine) rather than as an integrated system of health care delivery and case management. Integration has been very much left to the consumer who, depending on income level, has often chosen Chinese medicine based on its lower cost.

Over the past two decades, the PRC has taken a more proactive position in promoting TCM both within the PRC and internationally. In 2016, a State Council white paper reported that TCM was being practised globally in 183 countries and regions. The Central Committee of the Communist Party of China and the State Council issued the Outline of the Healthy China 2030 Plan, a guide to improving the health of the Chinese people in the coming 15 years,

---

<sup>20</sup> <https://www.apollolife.com/ApolloLifeWellnessPrograms/WellnessCentres.aspx>.

which sets out a series of tasks and measures to implement the program and develop TCM in this context.<sup>21</sup>

The WHO's Traditional Medicine Division has received funding from the PRC for many years and has developed standards for TCM diagnosis, clinical practice, and herbal formulation. A September 2018 report in *Nature* has announced that TCM disease classifications were to be included as chapter 26 in the WHO's International Statistical Classification of Diseases and Related Health Problems, 2019 (Cryanowski 2018).

At the present time, Beijing is in the process of establishing 30 overseas TCM centers in countries along the route of its massive infrastructure plan, the "Belt and Road Initiative". The Government of the PRC aims to register 100 TCM products and set up 50 international TCM cooperation model centers by the end of 2020. As TCM acquires legal status from Belt and Road Initiative countries, it is expected to evolve into a booming industry by 2030, according to the plan.

### **Guang'anmen Hospital of Traditional Chinese Medicine, Beijing**

One major area where the integration of TCM and modern medicine has advanced is in cancer care. In Beijing, the Guang'anmen Hospital of Traditional Chinese Medicine, is affiliated with the the PRC Academy of Chinese Medical Sciences. The Oncology Department of Guang'anmen Hospital was established in 1963 and from the outset has integrated Chinese and Western medicine. In February 1997, it became the National TCM Oncology Specialist Medical Center.

At present, the Oncology Department of Guang'anmen Hospital has integrated clinical medicine, scientific research, and teaching. There are outpatient clinics and wards with an average daily outpatient volume of about 280. There are 120 beds in the oncology ward. In addition to patients from all over the PRC, overseas patients also come to seek medical treatment. All patients are treated with TCM and integrated Chinese and Western medicine. Treatments include TCM, chemotherapy, radiotherapy, catheter intervention, biological therapy and acupuncture, and moxibustion (Guang'anmen 2015).

The Oncology Department of Guang'anmen Hospital has specialized clinical treatment groups for lung cancer, gastrointestinal cancer, liver cancer, and breast cancer and has conducted in-depth research on comprehensive treatment of various cancers. TCM medicines are prepared in the hospital's pharmacies and are reported to have no obvious side effects. Doctors chose treatments according to the patient's condition and disease type. Treatments plans include:

- (i) Chinese medicine combined with radiotherapy and chemotherapy to enhance the efficacy of these treatments and reduce their side effects;
- (ii) following surgery, radiotherapy, and chemotherapy, the use of TCM medicine to prevent postoperative recurrence and metastasis, and to prolong survival;
- (iii) TCM for advanced cancer patients to improve clinical symptoms; and

---

<sup>21</sup> [http://english.gov.cn/archive/white\\_paper/2016/12/06/content\\_281475509333700.htm](http://english.gov.cn/archive/white_paper/2016/12/06/content_281475509333700.htm).

(iv) TCM treatment to improve QOL and prolong survival.

Ongoing research has shown that this program significantly improves the clinical outcomes of cancer patients, reduces pain, and prolongs survival time. The Oncology Department of Guang'anmen Hospital also runs regular training programs for both Chinese and international physicians in methodologies for integrating TCM into cancer care.

Presently, the hospital is collaborating with the WHO Center for Traditional Medicine Asia-Pacific to develop guidelines for standardized treatment of cancer with Chinese medicine and has cooperated with Malaysia's Tung Shin Hospital for 15 years in the treatment of more than 10,000 cancer patients every year. Other partnerships are with centers in the ROK, Japan, and Southeast Asian countries and regions such as Singapore, Indonesia, and the Philippines as well as with Canada, the United States, and Israel.

In a recent study on pancreatic cancer, clinical researchers from the Department of Oncology at Guang'anmen Hospital analyzed 174 patients with pancreatic cancer and evaluated the efficacy of TCM and integrative medicine (i.e., TCM and modern medicine combined) in treating patients with pancreatic cancer (Li et al. 2018).

In patients with early stage pancreatic cancer, the study found superior survival benefit of integrative medicine treatment compared with single TCM.

The researchers noted that this is consistent with a growing body of evidence suggesting that TCM is largely associated with an improved response to modern medical treatment. In this study, no TCM-related adverse events were observed. But in stages III and IV, chemotherapy was found to be an independent negative predictor of survival.

In other researches, reliable evidence has demonstrated the effectiveness of chemotherapy combined with TCM in QOL of postoperative non-small cell lung cancer patients. Thus, combinations of conventional TCM are promising strategies for patients at early stage of pancreatic cancer than single modern medicine treatments.

TCM treatment had fewer potential toxicity side effects than conventional chemotherapeutics like vomiting and myelo-suppression. As a result, it might provide a broader spectrum of performance status and provide a more comfortable QOL for pancreatic cancer patients. Those patients with bad performance status or have a serious reaction for chemotherapeutics might have a good toleration of TCM treatment. TCM has also been found to have parallels with immunotherapy, a new and effective form of cancer therapy (Bodeker 2012).

### **Fuda Cancer Hospital, Guangzho**

Another hospital specializing in integrative oncology is the Fuda Cancer Hospital in Guangzho, which draws both Chinese and international patients. Currently, about 40% of the Fuda Cancer Hospital's 400 beds are occupied by overseas patients. The Fuda Cancer Hospital uses a number of experimental modern medical approaches, including

photodynamic therapy (PDT). The hospital's website states that: "by combining a photosynthesizer and a specific light, PDT is able to be relatively selective and specific for certain types of tumors. They also employ other new procedures such as Nanoknife, Cryosurgery and Foundation-1 treatment. Along with this, Chinese medicine is used in patient treatment programs to enhance immunity, improve quality of life, reduce symptoms and to manage cancer progression".<sup>22</sup>

### **Traditional Chinese Medicine, Integrative Oncology, and Quality of Life**

Cancer patients suffer from diverse symptoms, including depression, anxiety, pain, and fatigue, and lower QOL during disease progression. A meta-analysis was conducted by researchers from the Dalian University in Dalian, the PRC, the Sun Yat-sen University Cancer Center in Guangdong, and researchers at the University of Illinois at Urbana-Champaign to evaluate the benefits of TCM psycho-behavioral interventions (TCM PBIs) on improving QOL.

The six TCM PBIs analyzed were acupuncture, Chinese massage, TCM five elements musical intervention, TCM dietary supplement, Qigong, and tai chi.

The meta-analysis found that although both TCM PBIs and non-TCM PBIs reduced functional impairments in cancer patients and led to pain relief, remission of depression, reduced time to flatulence following surgery, and sleep improvement, the TCM PBIs showed more beneficial effects as assessed by reducing both fatigue and gastrointestinal distress.

In particular, acupuncture relieved fatigue, reduced diarrhea, and decreased time to flatulence after surgery in cancer patients, while therapeutic Chinese massage reduced time to flatulence and time to peristaltic sound (Tao et al. 2015).

### **Community-Level Intervention with Noncommunicable Diseases**

A study carried out by researchers from universities in Nanjing assessed the impact of both community-based integrated TCM and Western medicine approaches with metabolic syndrome among rural residents in Southern Jiangsu, the PRC.

According to The Global Burden of Disease Study 2010, in terms of the number of years of life lost because of premature death in the PRC, cerebrovascular disease, ischemic heart disease, and chronic obstructive pulmonary disease were the highest-ranking causes in 2010. The leading risk factor in the PRC is dietary risks (GBD 2010).

In the study on metabolic syndrome among rural residents in Southern Jiangsu, the research team designed a "healthy life self-help program" using TCM appropriate technologies for the subjects (Wang et al. 2015).

The researchers reported that, after 2 years of intervention using integrated traditional Chinese and Western medicine approaches, 57.0% (341 persons) of the subjects no longer suffered from metabolic syndrome. The recovery rate of BMI, blood pressure, FBG, TG, and

---

<sup>22</sup> [http://www.fudahospital.com/en\\_asp\\_new/show\\_info.asp?article\\_showid=34#.W7BZIC-Q2L8](http://www.fudahospital.com/en_asp_new/show_info.asp?article_showid=34#.W7BZIC-Q2L8).

high-density lipoprotein (HDL) cholesterol were 22.1%, 40.5%, 37.9%, 32.8%, and 62.4%, respectively. There were statistically significant differences in exercise, smoking, and alcohol drinking between baseline and 2 years later. This led to the conclusion that the integrated traditional Chinese and Western medicine metabolic syndrome intervention was effective in decreasing most of the parameters of metabolic syndrome, especially blood pressure, and helping people to do more exercise. They concluded that the program would be useful to implement in other similar populations.

Another emerging trend in Asia results from Asian researchers trained in Western biomedicine who are beginning to look deep into the theoretical constructs of their cultural medical traditions and to make linkages between these and leading discoveries in modern medical science. This includes insights from Asian traditional medicine theory into immunotherapy, into the role of the recently discovered *interstitium* (Benias et al. 2018), and into a genomic basis for the Ayurvedic and Chinese typologies of individual metabolic styles (Patwardhan and Bodeker 2008). This is frontier science and holds promise for a new understanding of how the body works and how it may be best healed and made whole.

From rural communities reducing their household expenditures on medicines to tertiary care hospitals offering combination traditional and modern medicine as well as traditional lifestyle guidelines to prevent recurrence of illness and to promote wellness, Asia is taking a global lead in forging models of integrative care that draw on traditions that have wellness and thriving at the heart of their philosophies and treatment regimens. Supported by the WHO policy, this is an area that can be rolled out further across Asia, backed by rigorous scientific evaluation and evidence, to create a wellness-based approach to health care, grounded in tradition.

## **VI. MENTAL WELLNESS**

As noted in the section on mental wellness in this issue of Asian Development Outlook Update, there is a wide range of individual and community approaches to reducing the burden of mental illness by promoting the adoption of evidence-based pathways which are familiar within Asia culturally and can prevent stress, reduce depression and anxiety, and promote mental wellbeing throughout the life span. The section on mental wellness presents new directions for improving mental wellness across Asia in accord with the principles of de-institutionalization, patient-centered care, personal responsibility for mental and physical health, community support systems, and evidence as the basis for strengthening the widespread adoption of culturally familiar pathways to mental wellness.

Meditation, massage, social support, music, dance, and laughter are all important pathways to mental wellbeing, and Asian cultural dimensions of these have been addressed in the section on mental wellness.

## VII. ENVIRONMENT

Clearly, a wellness agenda drawing on Asian traditions must address the growing problem of air pollution as Asia urbanizes. The WHO has noted:

“As the world gets hotter and more crowded, our engines continue to pump out dirty emissions, and half the world has no access to clean fuels or technologies (e.g. stoves, lamps), the very air we breathe is growing dangerously polluted: nine out of ten people now breathe polluted air, which kills 7 million people every year.”

“The health effects of air pollution are serious – one third of deaths from stroke, lung cancer and heart disease are due to air pollution. This is having an equivalent effect to that of smoking tobacco, and much higher than, say, the effects of eating too much salt.”<sup>23</sup>

A systematic review of global data has found that people living with air pollution have higher rates of depression and suicide (Braithwaite et al. 2019).

Research from the PRC, where 16 of the most polluted cities are listed in the United Nations’ top 20 most polluted cities in the world, has found that bad air quality contributes to poor mental health and unhappiness. The researchers looked at the impact of air pollution on several key dimensions, including mental health status, depressive symptoms, moment-to-moment happiness, and evaluative happiness (i.e., overall life satisfaction). What they found was that air pollution reduces all forms of happiness and increases the rate of depressive symptoms over time (Zhang et al. 2017).

Conversely, people tend to live longer when they have access to green space, and perceived neighborhood greenness is strongly associated with better mental and physical health (Tanako et al. 2002). Those living in highly green areas are much more likely to have better physical and mental health than those living near open areas that are not highly green (Sugiyama et al. 2008).

Nature near home is particularly important for children, increasing their ability to cope with stressful life events, directed attention, and cognitive function (Wells 2000). Exposure and connectedness to nature have been found to be associated with body appreciation and self-esteem in women and men (Swami et al. 2016).

New research has reported that gentle woodland sounds, such as birdsong and the breeze rustling leaves in the trees, are more relaxing than meditation recordings. Researchers exposed participants to three soundtracks: a woodland, a woman guiding a meditation session, and deep silence. When asked to listen to the woodland sounds for one minute, people felt 30% more relaxed, while stress and anxiety dropped. There was no change in the

---

<sup>23</sup> <https://www.who.int/airpollution/news-and-events/how-air-pollution-is-destroying-our-health>.

level of relaxation people felt after listening to the meditation or the silence (National Trust 2019).

Reducing pollution, building green cities, and creating access to nature for Asia's burgeoning population will need to be a foundational component of wellness planning and development throughout the 21st century.

## **VIII. CONCLUSION**

The majority of the world's population lives in Asia. From West Asia to East Asia, societies reflect an enormous array of cultural diversity. A capabilities approach to economic analysis highlights the power of individuals to do certain things, to obtain what they desire, to achieve desired states of being, to utilize the resources they have in the way they desire, and to be who they want to be. From this perspective, Asia has a varying landscape of wants, satisfactions, and aspirations that is different from country to country and across the vast subregions of Asia. What is common is that the desire to enhance QOL, not just the amount of goods possessed, is constant across Asian societies. Yet, modernization, which is largely Westernization, has created trends in health, environment, and mental health that reflect declining standards of wellbeing. Asia's own traditions offer nutritional pathways that are consistent with evidence-based optimal nutrition. The martial arts and exercise traditions of Asia all have their basis in integrated physical and mental wellbeing, many with evidence to support their claims of optimal physical benefits. The rest of the world is taking notice and investing in Asian wellness pathways, such as yoga, meditation, tai chi, chi gong, and martial arts.. India is now promoting meditation and yoga in the school system.

With the mounting body of evidence in support of the health value of Asia's wellness traditions, it is timely for governments, civil society, families, and community leaders to bring these heritage traditions to the fore as a way of preventing illness and promoting optimal wellbeing across Asian societies by use of what, in fact, is a patrimony for the region: deep traditions of wellness that can enhance the wellbeing of individuals and societies and create new commercial opportunities across the board, both domestically and internationally.

## **IX. SUMMARY POINTS**

1. With a focus on the daily lives and concerns of ordinary people across the region, the Asia Barometer (Inoguchi and Fuji 2013) has highlighted how very different the Asian countries and subregions are in how they value aspects of their life, their material status, and their personal and family values. This diversity in values and priorities across Asia underscores the benefit of activating traditions that have local meaning and familiarity, and that can serve as pathways to wellness that are trusted and can contribute to strengthening the fabric of local society. It also opens up new

commercial opportunities as novel offerings are developed and shared with Asia and the world.

2. Of primary importance in Asian wellness theories and practices is an individualized and balanced approach to nutrition based on body type and cultural food traditions. Asia does not need to follow the Mediterranean diet to achieve health and wellbeing. The pharmacologically potent herbs and spices used in Asia's culinary traditions offer "food as medicine". Rice is a source of optimal nutrition when heritage rice varieties are used, and a primary source of diabetes when commercial, polished rice is used. Heritage rice varieties along with local culinary traditions and ingredients are a sound way for Asia to transform the landscape of nutrition, sustainable agriculture, prevention of lifestyle diseases, and promotion of new markets and trends in global eating, given the international fascination with and demand for Asian foods.
3. Exercise is growing globally as a preferred pathway to wellness. But gym-based exercise is not the only way for Asia to go. Traditions of dance, martial arts, and integrative movement, such as yoga and tai chi, have all been shown through research to have profound benefits to human health and often to brain functioning and development. Give the global popularity of yoga, tai chi, kung fu, and other traditional forms of movement there is vast untapped potential for Asia to harness its array of movement traditions for local benefit as well as for the global wellness market that is always looking for new pathways to wellbeing.
4. Starting prior to conception, going through childhood, and through to old age, Asian health systems, such as Chinese Medicine and Ayurveda, have natural strategies for promoting optimal growth and development across the life span. These are now being evaluated scientifically and integrated with modern medicine in hospital settings, and also offered as prevention strategies at rural levels where expenditures on conventional medicines can be reduced for poor households if traditional solutions are activated. Meditation, yoga, and massage provide both physical and mental benefits. Friendship, social gatherings, music, and dance all have both physical and mental benefits towards overall wellbeing. Asia has rich traditions in all of these areas that can be harnessed for societal wellbeing.
5. The physical environment has a profound impact on human health and wellbeing. Polluted environments are associated with increased respiratory conditions, heart disease, poor mental health, and higher rates of suicide. The WHO has highlighted that one third of deaths from stroke, lung cancer, and heart disease are because of air pollution. By contrast, time spent in nature produces a sense of wellbeing, enhanced immunity, reduced blood pressure, and improvements in mental wellbeing, including reductions in depression and anxiety.

6. Education is key in getting out the wellness messages associated with Asia's heritage foods and lifestyle practices. This should be accompanied by evidence that is richly available after decades of research into Asian traditions by both Asian and Western researchers. Commitment by governments, civil society, enterprises, and families is needed across all levels of society to reclaim and apply Asia's rich offerings of wellness from its many and varied traditions.

## REFERENCES

- Balick, M. and P. Cox. 1996. Plants, People and Culture: *The Science of Ethnobotany*. First edition. New York: Scientific American Library.
- Benias, P.C., R.G. Wells, B. Sackey-Aboagye, et al. 2018. Structure and Distribution of an Unrecognized Interstitium in Human Tissues. *Scientific Reports* 8, 4947 doi:10.1038/s41598-018-23062-6.
- Bhat, FM. 2015. Health Benefits of Traditional Rice Varieties of Temperate Regions. *Medicinal and Aromatic Plants Research Journal*, 4:3 <http://dx.doi.org/10.4172/2167-0412.1000198>.
- Bhuchar, S et al. 2012. Complementary and alternative medicine in dermatology: an overview of selected modalities for the practicing dermatologist. *American Journal of Clinical Dermatology*; 13 5.
- Bodeker, G. 2012. Integrative Oncology meets Immunotherapy: New prospects for combination therapy grounded in Eastern medical knowledge. *Chinese Journal of Integrative Medicine*, (18) 9. 652–662.
- Bodeker G and F. Kronenberg. 2015. Tackling obesity: challenges ahead. *Lancet* 386: 740-741.
- Bodeker G, C-K Ong, C Grundy, G Burford, S Kin S. et al. 2005. *WHO Global Atlas of Traditional, Complementary and Alternative Medicine*. Kobe, Japan: WHO Centre for Health Development.
- Braithwaite, I, S Zhang, JB KirkbrideB, DPJ Osborn, and JF Hayes. 2019. Air Pollution (Particulate Matter) Exposure and Associations with Depression, Anxiety, Bipolar, Psychosis and Suicide Risk: A Systematic Review and Meta-Analysis. *Environmental Health Perspectives*, Vol. 127, No. 12. CID: 126002. <https://doi.org/10.1289/EHP4595>.
- Cassman, KG and PL Pingali. 1995. Intensification of irrigated rice systems: Learning from the past to meet future challenges. *GeoJournal* 35:299–305.
- Crocker DA. 1992. Functioning and Capability: The Foundations of Sen's and Nussbaum's Development Ethic. *Political Theory* 20(4):584-612.
- Cryanoski, D. 2018. Why Chinese medicine is heading for clinics around the world. *Nature* 561, 448–450, doi: 10.1038/d41586-018-06782-7.
- Denham, J. 2017. Exercise and epigenetic inheritance of disease risk. *Acta Physiologica*. Oxford. doi:10.1111/apha.12881.
- Dohrn, Ing-Mari, Lydia Kwak, Pekka Oja, Michael Sjostrom, and Maria Hagstromer. 2018. Replacing sedentary time with physical activity: a 15-year follow-up of mortality in a national cohort. *Clinical Epidemiology*, Volume 10: 179 doi: [10.2147/CLEP.S151613](https://doi.org/10.2147/CLEP.S151613).

- Evenson, R. 2003. In R Evenson and D Gollin (eds). *Crop Variety Improvement and Its Effect on Productivity: The Impact of International Agricultural Research*. Cambridge, Massachusetts: CABI Publishing (pp 447–472).
- FAO. 2004. *The State of Food and Agriculture 2003–2004*. Rome.
- GBD. 2010. *GBD Profile: China*.  
[https://www.healthdata.org/sites/default/files/files/country\\_profiles/GBD/ihme\\_gbd\\_country\\_report\\_china.pdf](https://www.healthdata.org/sites/default/files/files/country_profiles/GBD/ihme_gbd_country_report_china.pdf) (accessed 18 October 2018).
- GBDa. 2018. The increasing burden of diabetes and variations among the states of India: the Global Burden of Disease Study 1990–2016. *The Lancet Global Health*, doi: [https://doi.org/10.1016/S2214-109X\(18\)30387-5](https://doi.org/10.1016/S2214-109X(18)30387-5).
- GBDb. 2018. The changing patterns of cardiovascular diseases and their risk factors in the states of India: the Global Burden of Disease Study 1990–2016. *The Lancet Global Health*, doi: [https://doi.org/10.1016/S2214-109X\(18\)30407-8](https://doi.org/10.1016/S2214-109X(18)30407-8).
- GBDc. 2018. The burden of cancers and their variations across the states of India: the Global Burden of Disease Study 1990–2016. *The Lancet Oncology*, doi: [https://doi.org/10.1016/S1470-2045\(18\)30447-9](https://doi.org/10.1016/S1470-2045(18)30447-9).
- GBDd. 2018. The burden of chronic respiratory diseases and their heterogeneity across the states of India: the Global Burden of Disease Study 1990–2016. *The Lancet Global Health*, doi: [https://doi.org/10.1016/S2214-109X\(18\)30409-1](https://doi.org/10.1016/S2214-109X(18)30409-1).
- Guang'anmen. 2015.  
[https://translate.googleusercontent.com/translate\\_c?depth=1&hl=en&prev=search&rurl=translate.google.co.uk&sl=zh-CN&sp=nmt4&u=http://www.gamhospital.ac.cn/kssz/lcks/zlk/2252.html&xid=17259,1500000,15700022,15700124,15700149,15700186,15700191,15700201,15700214&usg=ALkJrhifVrAIRU5r37F-QlZCxq\\_nN4UM3A](https://translate.googleusercontent.com/translate_c?depth=1&hl=en&prev=search&rurl=translate.google.co.uk&sl=zh-CN&sp=nmt4&u=http://www.gamhospital.ac.cn/kssz/lcks/zlk/2252.html&xid=17259,1500000,15700022,15700124,15700149,15700186,15700191,15700201,15700214&usg=ALkJrhifVrAIRU5r37F-QlZCxq_nN4UM3A) (accessed 8 January 2020).
- Hariramamurthi G, P. Venkatasubramaniam, PM Unnikrishnan, and D Shankar. 2007. *Home Herbal Gardens: A Novel Health Security Strategy Based on Local Knowledge and Resources*. In G Bodeker and G Burford. *Traditional, Complementary and Alternative Medicine: Policy and Public Health Perspectives*. London: Imperial College Press.
- Hay, R, N Johns, H Williams, et al. 2013. The Global Burden of Skin Disease in 2010: an analysis of the prevalence and impact of skin conditions. *Journal of Investigative Dermatology*. 134:1527–1534.
- Harvey, AL, RA Edrada-Ebel, RJ Quinn. 2015. The re-emergence of natural products for drug discovery in the genomics era. *Nature Reviews: Drug Discovery*. 14, 111–129.
- Huang, ZG, YH Feng, YH Li, and CS Lv. 2017. Systematic review and meta-analysis: Tai Chi for preventing falls in older adults. *BMJ Open*, Vol 7, Issue 2.
- Inoguchi, T. 2015. Multiple Modes of Wellbeing in Asia. In W. Glatzer, L. Camfield, V. Møller, and M. Rojas (eds). *Global Handbook of Quality of Life. International Handbooks of Quality of Life*. Dordrecht: Springer Science + Business Media.

- Inoguchi, T and S Fujii. 2013. *The Quality of Life in Asia: A Comparison of the Quality of Life in Asia*. The Quality of Life in Asia 1. Dordrecht: Springer Science + Business Media.
- Kearney, J. 2010. Food consumption trends and drivers. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 365(1554):2793–2807.
- Lear, SA et al. 2017. The effect of physical activity on mortality and cardiovascular disease in 130 000 people from 17 high-income, middle-income, and low-income countries: the PURE study. *The Lancet*, DOI: [http://dx.doi.org/10.1016/S0140-6736\(17\)31634-3](http://dx.doi.org/10.1016/S0140-6736(17)31634-3).
- Li, M, M Wang, W Guo, C Wu, D Li, X Zhang, and P Zhang. 2018. Different Survival Benefits of Chinese Medicine for Pancreatic Cancer: How to Choose? *Chinese Journal of Integrative Medicine*. Volume 24, Issue 3, pp. 178–184.
- Mohammed, AJ, and T.A. Ghebreyesus. 2018. Healthy living, well-being and the sustainable development goals. *Bull World Health Organ*, 96(9):590–590A. doi:10.2471/BLT.18.222042.
- Narahari, S. et al. 2013. Community level morbidity control of lymphoedema using self care and integrative treatment in two *Lymphatic Filariasis* endemic districts of South India - A non randomized interventional study. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, doi: 10.1093.
- National Trust. 2019. *Woodland sounds boost wellbeing, according to new study*. <https://www.nationaltrust.org.uk/press-release/woodland-sounds-boost-wellbeing-according-to-new-study>
- Niles, BL, DL Mori, CP Polizzi, AP Kaiser, AM Ledoux, and C Wang. 2016. Feasibility, qualitative findings and satisfaction of a brief Tai Chi mind–body programme for veterans with post-traumatic stress symptoms. *BMJ Open*, Vol 6, Issue 11.
- Patwardhan, B and G Bodeker. 2008. Ayurvedic Genomics. *Journal of Alternative and Complementary Medicine*, 14, 5, 571–576.
- Pingali, P. 2007. Westernization of Asian diets and the transformation of food systems: Implications for research and policy. *Food Policy*, 32(3):281–298.
- Preethi Sudha, VB, K. Ojit Singha, S.R. Prasad, and Padma Venkatasubramanian. 2009. Killing of enteric bacteria in drinking water by a copper device for use in the home: laboratory evidence. *Transactions of the Royal Society of Tropical Medicine and Hygiene* Volume 103, Issue 8, pages 819–822.
- Preethi Sudha, VB, Sheeba Ganesan, GP Pazhani, T Ramamurthy, GB Nair, S.R. Prasad, and Padma Venkatasubramanian. 2012. Storing Drinking Water in Copper Pots Kills Contaminating Diarrhoeagenic Bacteria. *Journal of Health, Population and Nutrition*, 30(1): 17–21. doi: 10.3329/jhpn.v30i1.11271.
- Richharia, RH and S Govindasamy. 1990. *Rices of India*. Karjat: Academy of Development Science.

- Ryan, TJ. 2015. The wow factor as a determinant of funding for disorders of the skin. *Military Medical Research*. 2015; 2: 14. doi: 10.1186/s40779-015-0040-7 PMCID: PMC4479063 PMID: 26110067.
- Sen, A. 1999. Sen's Capability Approach. *Internet Encyclopedia of Philosophy*. <https://www.iep.utm.edu/sen-cap/>.
- Solloway, MR, SI Taylor, PG Shekelle, IM Miake-Lye, JM Beroes, RM Shanman, and S. Hempel. 2016. An evidence map of the effect of Tai Chi on health outcomes. *Systematic Reviews*, 5:126
- Stephenson, J, N Heslehurst, J Hall, D Schoenaker, J Hutchinson, JE Cade, L Poston, G Barrett, S Crozier, M Barker, K Kumaran, CS Yajnik, J Baird, and GD Mishra. 2018. Before the beginning: nutrition and lifestyle in the preconception period and its importance for future health. *The Lancet*, DOI: [https://doi.org/10.1016/S0140-6736\(18\)30311-8](https://doi.org/10.1016/S0140-6736(18)30311-8).
- Sugiyama, T. et al. 2008. Associations of neighbourhood greenness with physical and mental health: Do walking, social coherence and local social interaction explain the relationships?. *Journal of epidemiology and community health*. 62. e9. 10.1136/jech.2007.064287.
- Sun, Q, D Spiegelman, RM van Dam, et al. 2010. White rice, brown rice, and risk of type 2 diabetes in US men and women [published correction appears in *Archives of Internal Medicine*. 170(16):1479]. *Archives of Internal Medicine*, 170(11):961–969. doi:10.1001/archinternmed.2010.109.
- Swami, V. et al. 2016. Bodies in nature: Associations between exposure to nature, connectedness to nature, and body image in U.S. adults. *Body Image* 18:153-61. doi: 10.1016/j.bodyim.2016.07.002. Epub 2016 Jul 29.
- Tao, W, X Luo, B Cui, D Liang, C Wang, Y Duan, X Li, S Zhou, M Zhao, Y Li, Y He, S Wang, KW Kelley, P Jiang, Q Liu. 2015. Practice of traditional Chinese medicine for psycho-behavioral intervention improves quality of life in cancer patients: A systematic review and meta-analysis. *Oncotarget*. 24;6(37):39725-39. doi: 10.18632/oncotarget.5388.
- Umadevi, M, R Pushpa, KP Sampathkumar, and D Bhowmik. 2012. Rice-traditional medicinal plant. *Journal of Pharmacognosy and Phytochemistry*, 1(1):6–12.
- Vandevijvere, S, CC Chow, KD Hall, E Umalia, and BA Swinburn BA. 2015. Increased food energy supply as a major driver of the obesity epidemic: a global analysis. *Bulletin of the World Health Organization*, 93:446–456
- Wahlqvist, ML and MS Lee, 2007. Regional food culture and development. *Asia Pacific Journal and Clinical Nutrition*, 16 (Suppl 1):2–7.
- Wang, Y, B Xie, Y Tao, Y Ma, and K Zhang. 2015. Impact of Community-Based Integrated Traditional Chinese and Western Medicine Metabolic Syndrome Intervention Technology in Rural Residents in Southern Jiangsu, People's Republic of China. *Medical*

*Science Monitor*. 21: 2163–2169. doi: 10.12659/MSM.893972 PMCID: PMC4520418  
PMID: 26210819.

Wells, Nancy. 2000. At Home with Nature Effects of “Greenness” on Children’s Cognitive Functioning. *Environment and Behavior* 32:775-795. 10.1177/00139160021972793.

Zhu, YY et al. 2000. Genetic diversity and disease control in rice. *Nature* 406: 718–722.