

Traditional medicine, according to the World Health Organisation, is “the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, used in the maintenance of health and in the prevention, diagnosis, improvement or treatment of physical and mental illness”.

There are many different systems of traditional medicine, and the philosophy and practices of each are influenced by the prevailing conditions, environment, and geographic area within which it first evolved, however, a common philosophy is a holistic approach to life, equilibrium of the mind, body, and the environment, and an emphasis on health rather than on disease. Generally, the focus is on the overall condition of the individual, rather than on the particular ailment or disease from which the patient is suffering, and the use of herbs is a core part of all systems of traditional medicine.

Traditional Chinese medicine (TCM) is an important example of how ancient and accumulated knowledge is applied in a holistic approach in present day health care. TCM has a history of more than 3000 years. The book *The Devine Farmer’s Classic of Herbalism* was compiled about 2000 years ago in China and is the oldest known herbal text in the world, though the accumulated and methodically collected information on herbs has been developed into various herbal pharmacopoeias and many monographs on individual herbs exist.

Diagnosis and treatment are based on a holistic view of the patient and the patient’s symptoms, expressed in terms of the balance of yin and yang. Yin represents the earth, cold, and femininity, whereas yang represents the sky, heat, and masculinity. The actions of yin and yang influence the interactions of the five elements composing the universe: metal, wood, water, fire, and earth. TCM practitioners seek to control the yin and yang levels through 12 meridians, which bring and channel energy (Qi) through the body. TCM is a growing practice around the world and is used for promoting health as well as for preventing and curing diseases. TCM encompasses a range of practices, but herbal medicine is a core part. Three of the top-selling botanical products, namely *Ginkgo biloba*, *Allium sativum* (garlic), and *Panax ginseng*, can be traced back to origins in TCM and are today used to treat

various diseases.

Over the past 100 years, the development and mass production of chemically synthesized drugs have revolutionized health care in most parts of the world. However, large sections of the population in developing countries still rely on traditional practitioners and herbal medicines for their primary care. In Africa up to 90% and in India 70% of the population depend on traditional medicine to help meet their health care needs. In China, traditional medicine accounts for around 40% of all health care delivered and more than 90% of general hospitals in China have units for traditional medicine.

However, use of traditional medicine is not limited to developing countries, and during the past two decades public interest in natural therapies has increased greatly in industrialized countries, with expanding use of ethnobotanicals. In the United States, in 2007, about 38% of adults and 12% of children were using some form of traditional medicine. According to a survey by the National Center for Complementary and Alternative Medicine, herbal therapy or the usage of natural products other than vitamins and minerals was the most commonly used alternative medicine (18.9%) when all use of prayer was excluded. A survey conducted in Hong Kong in 2003 reported that 40% of the subjects surveyed showed marked faith in TCM compared with Western medicine. In a survey of 21,923 adults in the United States, 12.8% took at least one herbal supplement and in another survey, 42% of respondents used dietary or nutritional supplements, with multivitamins and minerals most commonly used, followed by saw palmetto, flax, garlic, and Ginkgo, at the time of the interview.

The most common reasons for using traditional medicine are that it is more affordable, more closely corresponds to the patient's ideology, allays concerns about the adverse effects of chemical (synthetic) medicines, satisfies a desire for more personalized health care, and allows greater public access to health information. The major use of herbal medicines is for health promotion and therapy for chronic, as opposed to life-threatening, conditions. However, usage of traditional remedies increases when conventional medicine is ineffective in the treatment of disease, such as in advanced cancer and in the face of new infectious

diseases. Furthermore, traditional medicines are widely perceived as natural and safe, that is, not toxic. This is not necessarily true, especially when herbs are taken with prescription drugs, over-the-counter medications, or other herbs, as is very common.

Regardless of why an individual uses it, traditional medicine provides an important health care service whether people have physical or financial access to allopathic medicine, and it is a flourishing global commercial enterprise. In 1990, expenditure associated with “alternative” therapy in the United States was estimated to be US\$13.7 billion. This had doubled by the year 1997, with herbal medicines growing faster than any other alternative therapy. In Australia, Canada, and the United Kingdom, annual expenditure on traditional medicine is estimated to be US\$80 million, US\$1 billion, and US\$2.3 billion, respectively. These figures reflect the incorporation of herbal and other forms of traditional medicine into many health care systems and its inclusion in the medical training of doctors in many parts of the developed world.

The total commercial value of the ethnobotanicals market cannot be ignored. For example, in 1995, the total turnover of nonprescription-bound herbal medicines in pharmacies was equal to almost 30% of the total turnover of nonprescription-bound medicines in Germany, and in the United States, the annual retail sales of herbal products was estimated to be US\$5.1 billion. In India, herbal medicine is a common practice, and about 960 plant species are used by the Indian herbal industry, of which 178 are of a high volume, exceeding 100 metric tons per year. In China, the total value of herbal medicine manufactured in 1995 reached 17.6 billion Chinese yuan (approximately US\$2.5 billion). This trend has continued, and annual revenues in Western Europe reached US\$5 billion in 2003-2004. In China, sales of herbal products totaled US\$14 billion in 2005, and revenue from herbal medicines in Brazil was US\$160 million in 2007. It is estimated that the annual worldwide market for these products approached US\$60 billion.

Currently, herbs are applied to the treatment of chronic and acute conditions and various ailments and problems such as cardiovascular disease, prostate problems, depression,

inflammation, and to boost the immune system, to name but a few. In China, in 2003, traditional herbal medicines played a prominent role in the strategy to contain and treat severe acute respiratory syndrome (SARS), and in Africa, a traditional herbal medicine, the African flower, has been used for decades to treat wasting symptoms associated with HIV. Herbal medicines are also very common in Europe, with Germany and France leading in over-the-counter sales among European countries, and in most developed countries, one can find essential oils, herbal extracts, or herbal teas being sold in pharmacies with conventional drugs.

Herbs and plants can be processed and can be taken in different ways and forms, and they include the whole herb, teas, syrup, essential oils, ointments, salves, rubs, capsules, and tablets that contain a ground or powdered form of a raw herb or its dried extract. Plants and herbs extract vary in the solvent used for extraction, temperature, and extraction time, and include alcoholic extracts (tinctures), vinegars (acetic acid extracts), hot water extract (tisanes), long-term boiled extract, usually roots or bark (decoctions), and cold infusion of plants (macerates). There is no standardization, and components of an herbal extract or a product are likely to vary significantly between batches and producers.

Plants are rich in a variety of compounds. Many are secondary metabolites and include aromatic substances, most of which are phenols or their oxygen-substituted derivatives such as tannins. Many of these compounds have antioxidant properties. Ethnobotanicals are important for pharmacological research and drug development, not only when plant constituents are used directly as therapeutic agents, but also as starting materials for the synthesis of drugs or as models for pharmacologically active compounds.

About 200 years ago, the first pharmacologically active pure compound, morphine, was produced from opium extracted from seed pods of the poppy *Papaver somniferum*. This discovery showed that drugs from plants can be purified and administered in precise dosages regardless of the source or age of the material. This approach was enhanced by the discovery of penicillin. With this continued trend, products from plants and natural sources (such as

fungi and marine microorganisms) or analogs inspired by them have contributed greatly to the commercial drug preparations today. Examples include antibiotics (e.g., penicillin, erythromycin); the cardiac stimulant digoxin from foxglove (*Digitalis purpurea*); salicylic acid, a precursor of aspirin, derived from willow bark (*Salix spp.*); reserpine, an antipsychotic and antihypertensive drug from *Rauwolfia spp.*; and antimalarials such as quinine from *Cinchona* bark and lipid-lowering agents (e.g., lovastatin) from a fungus.

Also, more than 60% of cancer therapeutics on the market or in testing are based on natural products. Of 177 drugs approved worldwide for treatment of cancer, more than 70% are based on natural products or mimetics, many of which are improved with combinatorial chemistry. Cancer therapeutics from plants include paclitaxel, isolated from the Pacific yew tree; camptothecin, derived from the Chinese “happy tree” *Camptotheca acuminata* and used to prepare irinotecan and topotecan; and combretastatin, derived from the South African bush willow.

It is also estimated that about 25% of the drugs prescribed worldwide are derived from plants, and 121 such active compounds are in use. Between 2005 and 2007, 13 drugs derived from natural products were approved in the United States. More than 100 natural product-based drugs are in clinical studies, and of the total 252 drugs in the World Health Organization’s (WHO) essential medicine list, 11% are exclusively of plant origin.

**Adapted from:**

Wachtel-Galor S, Benzie IFF. *Herbal Medicine: An Introduction to Its History, Usage, Regulation, Current Trends, and Research Needs*. In: Benzie IFF, Wachtel-Galor S, editors. *Herbal Medicine: Biomolecular and Clinical Aspects*. 2nd edition. Boca Raton (FL): CRC Press/Taylor & Francis; 2011. Chapter 1. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK92773/>

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