Review Article
International Journal of Basic and Clinical Studies (IJBCS)
2015; 4(2): 1-10, Celik MY

Traditional Medicine and Modern Medicine with Information Technology

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Abstract

Although modern medicine is well developed in most of the world, large sections of the population in developing countries still rely on the traditional practitioners, medicinal plants and herbal medicines for their primary care. Moreover during the past decades, public interest in natural therapies has increased greatly in industrialized countries, with expanding use of medicinal plants and herbal medicines.

Traditional medicine is a part of traditional East Asian medical systems and has been used for treating various kinds of diseases including cancer for thousands of years, and, recently, increasing emphasis has been focused on the research on traditional medicine. Modern medicine practices are currently criticized by traditional specialist because emphasis is given to modern theories instead of traditional values, to modern concepts instead of human beings, to modern efficiency rather than traditional consciousness. Education system of the world is also operated in this direction. Today prevalent medicine of the world is modern medicine.

Medicine isn't science, because if it were science, we would get the same diagnosis and treatment from every doctor. Of course it isn't a pure science; it's an applied science.

Science is a systematic acquisition of knowledge especially the knowledge that can be precisely measured. Health information system based on computer science. Computer Science is about problem solving. Recent studies continue to support the findings of the systematic reviews that health information (IT) technology improves quality and safety. Health IT will continue to improve the quality and safety of health care beyond the accomplishments realized to date.

Key worlds: Modern Medicine, Information Technology, Traditional Medicine

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Introduction

Medicine is not an art like painting. Neither is it a science like physics. It's an applied science. **Since patients are not all identical, it can be very tricky to decide how to apply the science to the individual.** Every chemist gets the same product when he mixes two chemicals under standard conditions. Every physicist gets the same answer when he measures the speed of light. One critic of modern medicine told me medicine isn't science, because if it were science, we would get the same diagnosis and treatment from every doctor. Of course it isn't a pure science; it's an applied science (1).

Traditional Medicine (TM) is usually practiced outside of allopathic medicine (commonly known as modern or Western medicine), which is the dominant system of medicine in the developed world. Some of the well-known TM systems include traditional Indian (Ayurveda) medicine, traditional Chinese medicine (TCM), and traditional Arabic (Unani) medicine (2). The World Health Organization (WHO) defines Traditional Medicine as "the sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health, as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses"(3).

According to Ayurvedic theory, everything in the universe -- living or not -- is connected. Good health is achieved when your mind, body, and spirit are in harmony with the universe. A disruption of this harmony can lead to poor health and sickness.

For followers of Ayurveda, anything that affects your physical, spiritual, or emotional well-being can cause you to be out of balance with the universe. Some things that can cause a disruption include:

- Genetic or birth defects
- Injuries
- Climate and seasonal changes
- Age
- Emotions

How your body works to keep you healthy and your unique physical and psychological characteristics combine to form your body's constitution, or prakriti. Your prakriti is believed to stay the same for your entire life. However, how you digest food and eliminate waste can influence it.

Every person is made of a combination of five basic elements found in the universe:

- Space
- Air
- Fire
- Water
- Earth

These elements combine in the human body to form three life forces or energies, called doshas.

They control how your body works.

The three doshas are:

- Vata dosha (space and air)
- Pitta dosha (fire and water)
- Kapha dosha (water and earth)

Everyone inherits a unique mix of the three doshas. One dosha is usually more dominant. Each dosha controls a different body function. It is believed that your chances of getting sick are linked to the balance of your doshas (4).

Traditional Medicine (TM) changes from country to country. The Kingdom of Thailand has its own system of traditional medicine called "Thai Traditional Medicine" (TTM) (5):

It originated during the Sukhothai period (1238-1377) and developed in parallel with the country as a means of national health care until the early 20th century. The spread of modern medicine from the Western world to the East then led to a decline in the practice of traditional medicine in Thailand. According to TTM, the human body is composed of four elements i.e., earth, water, wind and fire. When the four elements of the body are in equilibrium, it will be healthy. In contrast, if an imbalance in these elements occurs, i.e., if there is a deficit, an excess, or disability in any of the four elements, a person will become ill.

According to TTM, human illness can be caused by the following factors:

1. Supernatural power, e.g., ancestor's soul, powerful spirits of the forest, evil spirits, punishment from a heavenly spirit of those who misbehave.
2. Power of nature, e.g., imbalance in the four elements of the body, imbalance of heat and cold, and imbalance of the body's equilibrium.
3. Power of the universe, e.g., positive and negative influences from the sun, the moon and the stars on human health.
4. Kimijati, which may be considered the equivalent of microorganisms or parasites in modern medicine (5).

" Differences between modern medicine and traditional medicine was presented by Table 1. (6).

Table 1 – Differences between modern medicine and traditional medicine (4).

Areas	Modern Medicine	Traditional Medicine
Mode of treatment	Primarily through medicine or surgery with additional information about precautions and side effects.	Includes polyherbal and mineral preparations, surgery, and guidelines encompassing the whole lifestyle (diet, mental attitude, physical activity, and even spiritual beliefs).
Standardization	Well standardized so that it can be comprehended all over the world.	TM remains unstandardized. There are differences within a healing method; hence detailed descriptions are essential.
Training of practitioners	A well-defined system has been developed in each country.	There are differences in training programme with respect to their content and duration.
Quality of medicines	The medicines undergo rigorous testing and have to meet predetermined standards for safety which are set in each country.	Some of the codified medical systems, such as Ayurveda, do undergo testing for quality control and component analysis. However this is not rigorous and also it is not uniform within a country.
Involvement of the healer	The healer who would be a trained physician or surgeon would need to know the detailed medical history of the patient and other details relevant to the disease before deciding and completing a course of treatment.	A healer of TM most often has to be involved closely with the patient's case history including the physical, mental, and even spiritual aspects. Diagnosis also involves interacting with the patient as do the treatments, which require the healer to participate in the treatment.
Involvement of the patient	The patient has to be cooperative in the diagnosis, treatment, and follow up. Most often this involves taking specified medicines at specified times.	The patient actively participates in TM healing systems during the diagnosis, treatment, and follow up. While some TM methods such as massage require passive cooperation of the patient, others, such as yoga practiced as therapy, require the patient's active participation.
Safety	The safety of CM is based on rigorous drug trials which go through several levels, from trials on experimental animals to final trials after approval on human subjects.	A few systems such as Ayurveda and TCM have had rigorous trials. However most TM preparations are not scrutinized with rigour.
Adverse effect	Adverse effects for all medicines and surgical procedures are reported and made available to the medical community globally.	Adverse effects of TM systems are often not systematically documental or reported. This is an area in which considerable work remains to be done so that TM systems can have adequate legitimacy and be used widely.
Efficacy and dosage	MM has details of the efficacy of the medicines and surgical procedures. Also, the dosages have been worked out taking into account factors such as age, body weight, and liver and kidney functions.	TM systems often decide the type and quantum of treatment based on individual factors. In some cases trying to apply the CM model to TM may reduce the usefulness of the TM system. Nonetheless there has to be a definite description of the factors which could determine TM efficacy and dosage.
Mechanisms of actions	The mechanisms of action of many MM methods of treatment are known.	Many TM are effective in healing but little is known about their mechanism of action. Research in this area is often made difficult by the fact that TM systems include subtle concepts such as "spiritual wellbeing," "energy medicine," and others which are not described in conventional medicine.

A typical instance for epilepsy is as follows; epilepsy is one of the most common neurological disorders which affect about 50 million people worldwide. Ineffectiveness of the antiepileptic drugs in nearly 20% of the cases and the serious side effects and chronic toxicity of these drugs lead to the use of complementary and alternative medicine as a new method for treatment of epilepsy. TIM consists of the sum total of all the knowledge and practices used in diagnosis, prevention, and elimination in BioMed Research. There are some medicinal plants in TM for the treatment of epilepsy which their anticonvulsant effect have been confirmed by scientific studies in experimental or clinical studies (Table 1).

Traditional medicine is a part of traditional East Asian medical systems and has been used for treating various kinds of diseases including cancer for thousands of years, and, recently, increasing emphasis has been focused on the research on traditional medicine. Particularly, many herbs and medicinal plants have been reported to prevent and inhibit various kinds of diseases (7,8). Despite the fact that numerous researches were performed on prevention and treatment of inflammation related diseases, the overall incidence has not changed remarkably. This requires new approaches to overcome inflammation mediated diseases, and thus traditional medicine could be an efficacious source for prevention and treatment of these diseases. The contribution of traditionalmedicine, especially *Rhus verniciflua* Stokes, tomodernmedicine against diverse inflammation mediated diseases is known. Traditionally, this remedy has been used in Eastern Asia for the treatment of gastric problems, hepatic disorders, infectious diseases, and blood disorders. Modern science has provided the scientific basis for the use of *Rhus verniciflua* Stokes against such disorders and diseases. Various chemical constituents have been identified fromthis plant, including phenolic acid, and flavonoids. Cell-based studies have exhibited the potential of this as antibacterial, antioxidant, neuroprotective, anti-inflammatory, growth inhibitory, and anticancer activities. Enormous animal studies have shown the potential of this against proinflammatory diseases, neurodegenerative diseases, diabetes, liver diseases, and chemical insults. At the molecular level, this medicinal plant has been shown to modulate diverse cell-signaling pathways. In clinical studies, *Rhus verniciflua* Stokes has shown efficacy against various cancer patients such as colorectal, gastric, hepatic, renal, pancreatic, and pulmonary cancers. Thus, this remedy is now exhibiting activities in the clinic (9). Medicinal plants are used to treat sick animals, not just humans, and some of these practices continue today (10).

Modern medicine practices are currently criticized by traditional specialist because emphasis is given to modern theories instead of traditional values, to modern concepts instead of human beings, to modern efficiency rather than traditional consciousness. Education system of the world is also operated in this direction. Today prevalent medicine of the world is modern

medicine. This dominance of modern medicine is based on a long history and scientific advances. In this process a struggle has took place between science and tradition. Especially, since the eighteenth century modern sciences have proved clearly their dominance in every field (11).

TM has maintained its popularity in all regions of the developing world and its use is rapidly spreading in industrialized countries (12):

- In China, traditional herbal preparations account for 30%-50% of the total medicinal consumption.
- In Ghana, Mali, Nigeria and Zambia, the first line of treatment for 60% of children with high fever resulting from malaria is the use of herbal medicines at home.
- WHO estimates that in several African countries traditional birth attendants assist in the majority of births.
- In Europe, North America and other industrialized regions, over 50% of the population have used complementary or alternative medicine at least once.
- In San Francisco, London and South Africa, 75% of people living with HIV/AIDS use TM/CAM.
- 70% of the population in Canada have used complementary medicine at least once.
- In Germany, 90% of the population have used a natural remedy at some point in their life. Between 1995 and 2000, the number of doctors who had undergone special training in natural remedy medicine had almost doubled to 10 800.
- In the United States, 158 million of the adult population use complementary medicines and according to the USA Commission for Alternative and Complementary medicines, US $17 billion was spent on traditional remedies in 2000.
- In the United Kingdom, annual expenditure on alternative medicine is US$ 230 million.
- The global market for herbal medicines currently stands at over US $ 60 billion annually and is growing steadily

Scientific evidence from randomized clinical trials is only strong for many uses of acupuncture, some herbal medicines and for some of the manual therapies.

Unregulated or inappropriate use of traditional medicines and practices can have negative or dangerous effects.

For instance, the herb “Ma Huang” (Ephedra) is traditionally used in China to treat respiratory congestion. In the United States, the herb was marketed as a dietary aid, whose over dosage led to at least a dozen deaths, heart attacks and strokes.

In Belgium, at least 70 people required renal transplant or dialysis for interstitial fibrosis of the kidney after taking a herbal preparation made from the wrong species of plant as slimming treatment.

- 25% of modern medicines are made from plants first used traditionally.
- Acupuncture has been proven effective in relieving postoperative pain, nausea during pregnancy, nausea and vomiting resulting from chemotherapy, and dental pain with extremely low side effects. It can also alleviate anxiety, panic disorders and insomnia.
- Yoga can reduce asthma attacks while Tai Ji techniques can help the elderly reduce their fear of falls.
- TM can also have impact on infectious diseases. For example, the Chinese herbal remedy Artemisia annua, used in China for almost 2000 years has been found to be effective against resistant malaria and could create a breakthrough in preventing almost one million deaths annually, most of them children, from severe malaria.
- In South Africa, the Medical Research Council is conducting studies on the efficacy of the plant Sutherlandia Microphylla in treating AIDS patients. Traditionally used as a tonic, this plant may increase energy, appetite and body mass in people living with HIV.

Informatics in healthcare

Many aspects such as data recovery, ethics, patient care, decision support systems, human-computer interaction, information systems, imaging informatics, computer science, information science, security, electronic patient records, intelligent systems, e-learning and tele nursing have been added to the field (13).

Medical and health care systems are dynamic and under pressure. Over the past few decades, the aim of many health care systems to improve consistency and safety in patient care has prompted considerable investment in the development of evidence-based clinical guidelines. However, the effective dissemination of these guidelines has remained a challenging task, and health information technology (HIT) has been proposed as an effective means to implement guidelines in practice. HIT has also shown effectiveness in preventing medical errors by enforcing clinical guidelines and care protocols. In terms of quality of medical and health care, we examined specifically clinicians' adherence to evidence-based guidelines and the corresponding impact this had on patient clinical outcomes (14).

Health Informatics is a combination of information science and computer science within the realm of healthcare. There are numerous current areas of research within the field of Health Informatics, including Bioinformatics, Image Informatics (e.g. Neuroinformatics), Clinical Informatics,

Public Health Informatics, and also Translational BioInformatics (TBI). Each of the studies done in a particular subfield of Health Informatics utilizes data from a particular level of human existence: Bioinformatics uses molecular level data, Neuroinformatics employs tissue level data, Clinical Informatics applies patient level data, and Public Health Informatics utilizes population data (either from the population or on the population) (15).

Science is a systematic acquisition of knowledge especially the knowledge that can be precisely measured. Health information system based on computer science. Computer Science is about problem solving. Thus, the qualities of a good computer scientist include a passion for finding elegant solutions, an ability to use mathematical analysis and logical rigor to evaluate such solutions, creativity in modeling complex problems through the use of abstractions, attention to details and hidden assumptions, an ability to recognize variants of the same problem in different settings, and being able to retarget known efficient solutions to problems in new settings (16).

Recent studies continue to support the findings of the systematic reviews that health IT improves quality and safety. Health IT will continue to improve the quality and safety of health care beyond the accomplishments realized to date (17).

Yet evidence-based medicine relies on high quality medical research. Moreover, as we enter an increasingly digital world, the amount of health data that will be available to medical researchers will be increasing substantially. While past medical researchers had only a few limited data points recorded on paper on which to base their hypotheses, in the future researchers will have massive online databases containing terabytes of data for their analysis (18).

Another fast-emerging technology is nanotechnology, basically the design of technology at the molecular level. A Greenpeace report identified two broad classes of nanotechnology production technologies: top-down and bottom-up. Topdown includes optical techniques, lithographics, and the "scanning probe microscope", which are used to create elaborate surface patterns on a nanometer scale. Bottom-up processes are molecular engineering and may include self-organization and self-assembly of molecules. Perhaps the most well known examples of nanomaterials are "buckyballs", or fullerenes, and "buckytubes", or nanotubes, which are curved carbon-carbon surfaces wrapped into a sphere or a tube, respectively, with remarkable properties, especially for absorption and lubrication (19).

In terms of medical theories and ways of thinking, traditional medicine has a significant contribution to modern medicine. For example, the theory of the "correspondence between man and universe" in traditional Chinese medicine is the unified outlook of body and environment. What are known as the "biological life" theory and the "biological clock" theory in modern medicine refers to the patterns of hormone secretion,

and treating diseases according to the place of origin are all the embodiment of "correspondence between man and universe." The views of "unity of opposites" and "balance amongst dynamic forces" indicate the existence of universal laws in human life. Although these views are emphasized in modern life science, both approaches differ from traditional Chinese medicine because traditional Chinese medicine always considers these views as its guiding ideology and as fundamental law. Structure and characteristic of traditional medicines, they can be divided into three parts: the knowledge and facts in agreement with modern medicine, the knowledge and practices not recognized in modern medicine that may be valuable in the future practice of modern medicine, and finally, the component of traditional medicine that has been adequately disproven and should be abandoned from future medical practice (20).

Finally, information technology will increase gradually as a result of modern medicine. Completing a mutually updates, they will lead to new solutions for the future they aim to recover. To avoid mistakes and the correct use of information technology are important in modern medicine. Therefore there is a need well-trained staff and specialists.

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