

Traditional Chinese Medicine, Food Therapy, and Hypertension Control: A Narrative Review of Chinese Literature

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Abstract: Despite the lack of English literature about Traditional Chinese Medicine (TCM) food therapy, there is abundant Chinese literature about the application of food therapy for hypertension control. This paper summarizes basic concepts of TCM, the principles of food therapy and its application for hypertension control according to Chinese literature. In TCM, food is conceptualized according to both nutritional and functional aspects, and can be used to treat illnesses. Four principles of TCM food therapy including light eating, balancing the “hot” and “cold” nature of food, the harmony of the five flavors of food, and consistency between dietary intake and different health conditions, can be used to facilitate hypertension control. Based on a statistical analysis of antihypertensive foods recommended in 20 books on the application of food therapy for hypertension control, the 38 most frequently recommended are celery, tomato, banana, hawthorn, garlic, onion, seaweed, apple, corn, green beans, persimmon, laver, kiwi, watermelon, eggplant, carrots, mushroom, peanut, soy products, sea cucumber, buckwheat, garland chrysanthemum, spinach, honey, dairy products, vinegar, black fungus, jellyfish, green onion, shepherd’s purse, soybean, potato, pear, winter melon, bitter melon, oat, pea, and tea. Food therapy emphasizes the therapeutic effects of food, considering its nature, taste, and function on human balanced health, which leads to optimal blood pressure control. Current literature suggests that food therapy is effective in blood pressure control and can be incorporated into blood pressure self-management in the Chinese population.

Keywords: Food Therapy; Hypertension Control; Diet; Nutrition; Review.

Introduction

Traditional Chinese Medicine (TCM), with a history of more than 3000 years, is a well-established medical system that provides a unique theoretical and practical approach to the treatment of disease (Cheng, 2000; Maciocia, 2005). After the introduction of Western medicine into China, TCM became integrated with Western medicine, and continues to play an important role in the Chinese healthcare system (Li *et al.*, 2015). The arrival of Christian missionaries to China from the mid-seventeenth to the beginning of the 19th century marked the earliest introduction of Western medicine into China (Holden, 1964). After the Opium War of 1840, the skills and knowledge of Western medicine entered China on a larger scale, inducing a debate on the relationship between Western medicine and TCM. The idea of integrating TCM with Western medicine was initiated in this debate (Xu and Chen, 2008). After the foundation of the People's Republic of China in 1949, Chairman Mao emphasized the importance of the continuous application and improvement of TCM. He encouraged physicians to learn TCM and use modern science to develop a new type of medicine in China. With governmental policy support, integrated medicine (中西医结合) became the cornerstone of the national health policy in China (White, 1999; Zhang *et al.*, 2012). TCM is currently included within the healthcare system and is accessible to the entire population in hospitals and communities in China (Xu and Chen, 2008; Li and Lin, 2011; Liu *et al.*, 2014). In addition, more than 90% of the urban and rural Chinese population have sought TCM in their lifetimes (Xu and Chen, 2008; Jin *et al.*, 2014).

Given the limitation of technology in the history of TCM (Zha *et al.*, 2015), no instrument was used to measure blood pressure. Therefore, the terms blood pressure and hypertension do not exist within TCM classics. The term hypertension in Western medicine is very close to the illness of “Yunxuan” (晕眩) in TCM, which is characterized by the symptoms of dizziness and headache. Currently, TCM accepts the term hypertension but the pathophysiological conceptualization and treatment are different from Western medicine. According to TCM, the main pathogenesis of hypertension is excess of liver “Yang” (阳), deficiency of “Qi” (气) and blood (血), liver and kidney “Yin” (阴) deficiency, and stagnation of body fluids (津液) and blood (Wang and Xiong, 2012). TCM treats individuals with hypertension mainly by differentiating the syndromes according to the symptoms and signs caused by hypertension. According to TCM, hypertension can be classified as three syndromes: heat syndrome, fluid retention syndrome, and deficiency syndrome. The treatment principles for these three syndromes are clearing heat, dissipating excessive fluids, and reinforcing “Zang Fu” (脏腑) organs respectively (Wang and Xiong, 2013).

Food therapy is an essential component of TCM and has been acknowledged as a successful therapy for hypertension (Shen *et al.*, 2010). In Chinese culture, it is believed that food is a human's first necessity (民以食为天). Food therapy is a method of adjusting diet and using food to promote health, according to TCM theories. Food therapy suggests that different foods have different effects on “Zang Fu” organs, “Qi” and blood. A proper diet can nourish “Zang Fu” organs, while an improper diet leads to “Yin Yang”

(阴阳) imbalance and the unhealthy condition of “Zang Fu” organs. The purpose of food therapy is to supply proper nutrition, replenish essential “Qi”, and correct deviations of “Zang Fu” organs and “Yin Yang” balance, thus promoting health and postponing aging (Zhang and Wu, 2005; Liu, 2007).

Despite the lack of English literature about TCM food therapy, there is an abundance of Chinese literature about the application of food therapy for hypertension control. While TCM has been practiced in China for thousands of years and has accumulated a large number of documents, using scientific methodologies to summarize existing evidence is needed. In this paper, the basic concepts of TCM will be introduced to facilitate an understanding of the principles of food therapy. Then, four principles of TCM food therapy and their application on hypertension control will be described. Following that, antihypertensive food recommended by TCM food therapy will be summarized. Finally, compared with the dietary approach to stop hypertension (DASH) diet, an antihypertensive diet widely recommended in Western medical guidelines, the implications of TCM food therapy for hypertension control will be discussed.

Basic Concepts of Traditional Chinese Medicine

Different from Western medicine that emphasizes scientific evidence, TCM applies broad philosophical theories and laws of nature to the study of the physiological activities and pathological changes of the human body and their interrelationships (Wang *et al.*, 2014; Xiao *et al.*, 2015). In TCM, the understanding of the human body is based on a holistic understanding of the universe, and the treatment of illness is based primarily on syndrome differentiation guided by the “Yin Yang” theory. Basic concepts of TCM include “Yin Yang” theory, “Zang Fu” organs, Essence (精), “Qi”, blood (血) and body fluids, and syndrome differentiation (Maciocia, 2005; Liu, 2007).

The “Yin Yang” theory, which represents the philosophical guidance of TCM, is an ancient Chinese philosophy serving as a perspective and methodology to explain the origins and variation of the universe. “Yin Yang” is a general term for two opposite aspects of things or phenomena in nature, which are interrelated with one another. In general, anything that is moving, ascending, bright, progressing, and hyperactive pertains to “Yang”. The characteristics of stillness, descending, darkness, degeneration, and hypoactivity pertain to “Yin”. “Yin” and “Yang” can interact and combine with each other in the process of movement. Either “Yin” or “Yang” contains its opposite aspect. “Yin” and “Yang” are able to, and tend to, automatically maintain and re-establish the state of harmony and equilibrium. In TCM, the “Yin Yang” theory is used to explore relationships of opposition and restriction, as well as the coordination and unity existing in tissues, structure, physiological functions and pathological changes of the human body (Liu, 2007).

TCM considers “Zang Fu” organs as the core of the human body. Through long-term observation of the physiological and pathological changes of the human body, TCM established the “Zang Fu” theory, which explains the location, physiological functions, and pathological changes of human body organs, as well as the relationships among and between organs and external environments. TCM suggests that there are five “Zang”

organs: the heart, liver, spleen, lungs and kidneys. These “Zang” organs can generate and store Essence and serve as the centre of human life activities. TCM also suggests that there are six “Fu” organs: the gallbladder, stomach, small intestine, large intestine, bladder and triple energizer. These “Fu” organs can receive, transport and transform food and water. TCM treatment starts with a holistic analysis of a body system and then focuses on the correction of pathological changes through readjusting the functions of “Zang Fu” organs (Liu, 2007).

Essence (精), “Qi” (气), blood (血), and body fluids (津液) are the basic material that form and sustain the life activities of the human body. The generation, distribution, and discharge of Essence, “Qi”, blood, and body fluids depend on the “Zang Fu” organs. “Qi” has the function of promotion and warming, while Essence, blood, and body fluids all have the function of nourishing and moistening. Therefore, “Qi” pertains to “Yang”, and Essence, blood and body fluids pertain to “Yin” according to the “Yin Yang” theory (Liu, 2007).

Different from Western medicine that focuses on disease diagnosis, TCM treats an individual based on syndrome differentiation, which is a holistic and overall analysis of an individual’s health condition according to the “Yin” and “Yang” theory. For example, “Yin” deficiency, “Yang” deficiency, and “cold” condition are common syndromes reflecting the “Yin” and “Yang” imbalance of an individual. Although symptoms are the basis for syndrome differentiation, TCM treatment is based on the differentiation of syndromes rather than a single symptom. Therefore, those with an identical disease may be treated in different ways, and those with different diseases caused by the same syndrome are treated in similar ways (Liu, 2007).

Four Principles of the Food Therapy and Hypertension Control

In TCM, food is conceptualized according to both nutritional and functional aspects. First, food is considered a diet because it provides the necessary substances for life and health. Second, food is considered as medication. TCM believes that food and medication are equally important in preventing and curing diseases since food is the same as medication in terms of origin, nature, taste, and function. Like medication, food can be used to maintain health, prevent and treat diseases, and facilitate rehabilitation (Cao, 2001; Xu, 2001; Dahl, 2004). Third, food is considered tonic. It is believed that food can help individuals smooth body mechanisms, build up resistance against disease, and slow down the aging process (Zhang and Wu, 2005). Lastly, some foods are considered barriers to health recovery. Therefore, food abstention, which is the practice of avoiding certain foods during certain disease conditions that would deteriorate an illness or cause imbalance in the body, is recommended by TCM (Dahl, 2004).

There are four major principles of the food therapy in TCM. The first principle is light eating (食宜清淡). Light eating refers to a dietary pattern which encourages grain intake supplemented with legumes, vegetables, fruits, and vegetable oils, and discourages the excess intake of alcohol, meat, and other fatty and sweet food (Zhang and Wu, 2005). TCM affirms the benefits of vegetarian food and balanced intake. For example, *Huangdi’s*

Internal Medicine, the first Chinese medical classic written in 745 to 221 BC, suggests that five cereals (五谷为养 rice, sesame seeds, soya beans, wheat and millet) would provide nourishment; five fruits (五果为助 jujube, plum, chestnut, apricot and peach) would supplement nutrition; meats from five animals (五畜为益 beef, dog meat, pork, mutton and chicken) would give advantage; and five vegetables (五菜为充 marrow, chive, bean sprouts, shallot and onion) are for recuperating (Wang, 1997). Excess intake of meat could produce excess heat in the body and stagnation of body fluids, resulting in “Yin” and “Yang” imbalance and impairment of “Qi” movement (Zhang and Wu, 2005).

Consistent with the principle of light eating, TCM practitioners suggest that in order to prevent or treat hypertension an individual should (a) have a balanced intake of different kinds of food to promote “Yin Yang” balance in the body; (b) eat grain regularly as the staple food to provide basic nourishment for the body; (c) eat fruits and vegetables as much as possible to provide supplemental nourishment; (d) frequently eat beans and peas to provide supplemental nourishment; (e) eat an appropriate amount of meat because it can nourish “Qi” but excess intake can cause excess heat in the body; (f) not to drink alcohol excessively, which can cause “Yin Yang” imbalance; and (g) not to eat greasy food, which can cause stagnation of body fluids and impairment of “Qi” movement.

The second principle of food therapy focuses on balancing the “hot” and “cold” nature of food (寒温中适). Consistent with the “Yin Yang” theory, TCM suggests that food has three different natures (“warm” and “hot”, neutral, “cool” and “cold”). “Hotness” and “coldness” in TCM are related to the nature of the food according to the “Yin Yang” theory, rather than to the temperature. Foods of different natures have different functions. For example, “cold” food lowers “fire” and calms the “hot” situation in the body, while “hot” food dispels “cold”. Foods with different natures should be coordinated with each other to promote health. To treat a disease, the nature of food should be appropriately selected. Overeating “hot” food may damage body fluids within the spleen and stomach, while overeating “cold” food can lead to the damage of the “Qi” of the spleen and stomach. Such an imbalance between “Yin” and “Yang” may cause limb coldness, abdominal pain, diarrhea, constipation, hemorrhoids, and other health problems (Liu and Ma, 2007). Foods frequently consumed, as well as their nature, are provided in Table 1.

Drawn from the principle of food nature, TCM practitioners suggest that in order to prevent or treat hypertension an individual should (a) have a balanced intake of foods with “hot” and “cold” nature; (b) mainly eat foods with neutral nature to promote “Yin Yang” balance; (c) eat foods with “cold” nature in an appropriate amount to treat the “hot” condition related to hypertension; (d) seldom eat foods with “hot” nature to prevent excess heat accumulation in the body; and (e) avoid eating foods with very “hot” nature, which can deteriorate the “hot” condition of hypertension.

The third principle focuses on the harmony of the five flavors of food (谨和五味). TCM classifies the taste of food by five flavors: sour, sweet, bitter, pungent and salty (Table 2). Different flavors have different effects on the human body and pertain to the different “Zang Fu” organs, respectively. With a dispersion effect, the pungent flavor relates to the lungs and large intestine. This flavor can enter the lungs, diffuse the lung “Qi”, and help to move the “Qi” and blood. Therefore, the pungent flavor can induce

Table 1. Three Natures of Food

Nature	Function	Examples
“Warm-hot”	Dispel “cold”	Beef (牛肉), chicken (鸡肉), coriander (香菜), dog meat (狗肉), garlic (大蒜), ginger (生姜), goat’s milk (羊奶), green onion (葱), kumquat (金橘), leek (韭 菜), longan (桂圆), lychee (荔枝), mutton (羊肉), pigeon meat (鸽子肉), red date (红枣), and yellow croaker (黄鱼)
Neutral	Harmonize and stabilize current health status	Barley (薏米), Chinese cabbage (大白菜), Chinese yam (山药), cow’s milk (牛奶), hen’s egg (鸡蛋), kidney bean (菜豆), lotus seed (莲子), lotus root (莲藕), pea (豌豆), pig’s liver (猪肝), pork (猪肉), radish (萝卜), red bean (红豆), spinach (菠菜), tomato (西红柿), and tremella (银耳)
“Cool-cold”	Calm “hot” in the body	Algae (海藻), bamboo shoot (竹笋), banana (香蕉), bean curd (豆腐), black fungus (黑木耳), cucumber 黄瓜), duck meat (鸭肉), honey (蜂蜜), kelp (海带), lettuce (生菜), mung bean (绿豆), pear (梨), persimmon (柿子), watermelon (西瓜), and wax gourd (冬瓜)

Table 2. Five Flavors of Food and Their Functions

Flavor	Function	Related “Zang Fu” Organs
Sour (酸)	Constriction: e.g. controls diarrhea and perspiration	Liver and gallbladder
Sweet (甘)	Moderation: e.g. helps digestion and neutralizes toxic effect of other foods	Spleen and stomach
Bitter (苦)	Strengthening: e.g. reduces body heat and excessive fluids and induces diarrhea	Heart and small intestine
Pungent (辛)	Dispersion: e.g. induces perspiration and promotes energy circulation	Lungs and large intestine
Salty (咸)	Softening: e.g. softens hardness of muscles or glands	Kidney and bladder

perspiration and promote “Qi” and blood energy circulation. With constriction and emollient effects, the sour flavor relates to the liver and gallbladder. The sour flavor can emolliate the liver and control diarrhea and perspiration. With discharging, drying, and strengthening effects, the bitter flavor relates to the heart and small intestine. The bitter flavor can purge the heart “fire”, reduce excessive fluids, induce diarrhea, and reinforce the heart “Yin”. With softening effects, the salty flavor relates to the kidney and bladder. The salty flavor can soften and dissipate hard masses, nourish the kidney, and consolidate kidney “Qi”. With moderation effects, the sweet flavor relates to the stomach and spleen.

The sweet flavor can help digestion, neutralize the toxic effect of other foods, and replenish “Qi” (Wang, 1997; Dahl, 2004; Zhang and Wu, 2005). The harmony of five flavors, which is the proper combination of food with different flavors, facilitates digestion assimilation, provides nutrition to the “Zang Fu” organs, and promotes the “Qi” and blood movement. Each of the five flavors has its own effects and should be balanced and used properly. Excess intake of any single flavor can lead to an imbalance in the five flavors intake, which can harm the essential “Qi” and health (Zhang and Wu, 2005). For example, overeating spicy food will lead to damp-heat in the body. Overeating sweet and greasy food can assist dampness to produce phlegm, or transform heat to generate “fire” (Liu, 2007).

Developed from the principle of harmony of the five tastes, TCM practitioners suggest that in order to prevent or treat hypertension an individual should (a) have a balanced intake of foods with different tastes to promote “Yin Yang” balance in “Zang Fu” organs; (b) mainly eat foods with a light taste to maintain “Yin Yang” balance; (c) eat a proper amount of bitter food to reduce body heat and promote heart health; (d) eat a proper amount of sour food to promote liver health; (e) abstain from eating spicy food, which can cause excess heat in the body; (f) abstain from eating very sweet foods to prevent excess burden on the spleen and stomach; and (g) abstain from eating very salty foods to prevent excess burden and harm on the kidneys.

The fourth principle of food therapy is that a diet should be consistent with an individual’s health condition and physical problems (辨证施膳). The treatment principles of food therapy are applying food of a “cold” nature to treat cases of “hot” conditions, applying food of a “hot” nature to treat cases of “cold” conditions, applying food with a reinforcement effect to treat cases of deficiency, and applying food with a purging method to treat cases of excess syndromes (Kung, 2006). For example, to treat “Yin” deficiency, “cold” and neutral food such as pork, yolk, Sangshen (fruit of mulberry), and turtle, can be used to replenish “Qi” and blood. To treat “Yang” deficiency, sweet and warm food, such as round-grained, non-glutinous rice, millet, Chinese yam, soybean, and big dates, can be used to nourish “Yang”. To treat abdominal pain due to the “cold” condition, “hot” food such as dried ginger, pepper, fennel mutton, and brown sugar, can be used to expel the “cold” and re-establish “Yin Yang” balance (Liu and Ma, 2007).

According to the principle that diet should be consistent with different health conditions, TCM practitioners suggest that, in order to prevent or treat hypertension, an individual should (a) eat according to his/her health status, (b) know what kind of food can lower blood pressure, (c) know what kind of food can increase blood pressure, (d) eat food that can lower blood pressure, and (e) abstain from eating food that can increase blood pressure.

Food with Antihypertensive Functions

In China, healthcare professionals have published a variety of books to guide individuals with hypertension using TCM food therapy to control hypertension. In order to find out what kinds of food are currently recommended by healthcare professionals for hypertension control in China, the author reviewed these books. The author included books which (a)

Table 3. Books on the Application of TCM Food Therapy for Hypertension Control (Chinese)

Author	Year	Title	Author	Publisher	ISBN
Li, Yaping	2000	TCM for Hypertension Care	Tongde Hospital of Zhejiang Province, Chinese medicine practitioner	Beijing: People's Medical Publishing House	7-117-08212-7
Liu, Guanglong	2000	Food Therapy for Hypertension	Taiwan, Chinese medicine practitioner, nutritionist	Shanghai: Shanghai Science and Technology Press	7-5323-5600-0
Chen, Xunping and Zhu, Mei	2002	Illustrated Manual for Self-Treatment and Food Therapy for Hypertension	Affiliated Hospital of TCM Research Institute of Shaanxi Province, Chinese medicine practitioner	Xi'an: World Book Publishing Company	7-5062-5011-X
Li, Xiucai	2002	Food Therapy and Medicated Diet for Hypertension	Affiliated Hospital of Cardiovascular Disease of Medical College of Qingdao, physician	Beijing: People's Military Medical Publishing House	7-80157-507-5
Ma, Yijie and Liu, Xuefa	2002	Food Therapy for Hypertension Control	Qingdao City Chinese Medicine Hospital, Chinese medicine practitioner, professor	Qingdao: Qingdao Publishing House	7-5436-2656-x
Zhao, Yuhao	2002	Diet to Restore Health for Patients with Hypertension	Capital Medical University School of Chinese Medicine, professor	Beijing: Golden Shield Press	7-5082-1718-7
Qian, Yuesheng	2004	Health Proverbs for Patients with Hypertension with Self-Management	Shanghai Institute of Hypertension, clinical expert	Beijing: People's Medical Publishing House	7-80194-275-2
Dou, Guoxiang	2005	Healthy Recipes for Hypertension Control	Zhongda Affiliated Hospital for Southeast University, Chinese medicine practitioner	Nanjing: Jiangsu Science and Technology Press	7-5345-4540-4
Hu, Yuanhui	2005	Chinese Medicine Teaches You How to Control Hypertension	Guang An Men Hospital of China Academy of TCM, physician	Beijing: People's Military Medical Publishing House	7-80194-843-2
Xu, Run	2007	Application of Functional Food to Control Hypertension	Beijing TCM Hospital, physician	Beijing: People's Military Medical Publishing House	978-7-5091-1213-7
Li, Qingya and Zhang, Song	2008	Best Care Plan: Anti-hypertension Diet and Chinese Medicine Health Maintenance	PLA 261 Hospital, Chinese medicine practitioner, nutritionist	Beijing: People's Military Medical Publishing House	978-7-5091-1662-3

Table 3. (Continued)

Author	Year	Title	Author	Publisher	ISBN
Liu, Keling	2008	A Complete Manual for Food Self-Treatment for Hypertension	Chinese Health Education Association, physician	Beijing: Beijing Publishing House	978-7-200-07174-0
Ma, Fang	2009	Diet Program for High Blood Sugar, Hypertension, and High Cholesterol	Beijing Union Hospital, nutrition expert, physician	Beijing: China Light Industry Press	978-7-5019-6733-9
Chen, Wei	2010	Expert Guided Antihypertensive Recipes	Beijing Union Hospital, nutrition expert, physician	Beijing: Electronic Industry Press	978-7-121-12066-4
Wang, Xingguo	2010	Hypertension Diet and Chinese Medicine Health Maintenance	Dalian Institute of Nutrition, nutrition expert, professor	Beijing: People's Military Medical Publishing House	978-7-5091-3060-5
Xie, Liangdi and Lin, Zhihong	2010	Food Therapy for Hypertension Control	First Affiliated Hospital of Fujian Medical University, physician	Fuzhou: Fujian Science and Technology Press	978-7-5335-3668-8
Wang, Qianghu	2011	Daily Prevention and Treatment of Hypertension: 128 Details	National Research Centre of Clinical Acupuncture, physician	Beijing: Fourth Military Medical University Press	978-7-81086-840-2
Wu, Qiang and Li, Zhi Sheng	2011	Experts Opinions: Medicated Diet for Hypertension	PLA General Hospital International Medical Center, physician; China Xiyuan Hospital, physician	Beijing: Fourth Military Medical University Press	978-7-5662-0032-7
Yang, Tianquan	2011	Hypertension and Food Therapy	First Affiliated Hospital of Shanghai Jiaotong University School of Medicine, professor, physician	Beijing: Science Press	978-7-03-032212-8
Xin, Bao and Dong, Sheng	2012	Hypertension Diet Taboo and TCM Health Maintenance	Shanxi Chinese Medicine College, professor, nutritionist	Beijing: Chemical Industry Press	978-7-122-10580-6

were currently available in the book markets of China, (b) were published on or after 2000, (c) were published by known publishers, (d) were written by authors with healthcare professional credentials, and (e) recommended specific foods with antihypertensive functions. The author excluded books which (a) had no authors, (b) were written by authors whose healthcare professional background was unknown, or (c) did not have an ISBN number. There were 20 books eligible to be included (Table 3).

After retrieving the name of foods recommended in these 20 books for hypertension control, the author used Microsoft EXCEL to calculate the frequency of each recommended food. There were 38 foods recommended in at least nine books. These foods and their frequency of recommendations were celery (芹菜, 20), tomato (西红柿, 20), banana (香蕉, 17), hawthorn (山楂, 17), garlic (大蒜, 17), onion (洋葱, 17), seaweed (海带, 17), apple (苹果, 16), corn (玉米, 15), green beans (绿豆, 15), persimmon (柿子, 14), laver (紫菜, 14), kiwi (猕猴桃, 13), watermelon (西瓜, 13), eggplant (茄子, 13), carrot (胡萝卜, 13), mushroom (香菇, 13), peanut (花生, 12), soy products, including tofu, soy milk, and bean-curd sticks (黄豆制品, 包括豆腐, 豆浆, 及腐竹, 11), sea cucumber (海参, 11), buckwheat (荞麦, 11), garland chrysanthemum (茼蒿, 11), spinach (菠菜, 11), honey (蜂蜜, 11), dairy products, including milk, yogurt, and skim milk (奶制品, 包括牛奶, 酸奶, 及脱脂牛奶, 10), vinegar (醋, 10), black fungus (黑木耳, 10), jellyfish (海蜇, 10), green onion (葱, 10), shepherd's purse (荠菜, 10), soybean (黄豆, 10), potato (土豆, 9), pear (梨, 9), winter melon (冬瓜, 9), bitter melon (苦瓜, 9), oat (燕麦, 9), pea (豌豆, 9), and tea (茶, 9).

A randomized controlled trial demonstrated that TCM food therapy was effective in helping individuals with hypertension control blood pressure, reduce antihypertensive medication, and improve health-related quality of life (Shen *et al.*, 2010). In this trial ($n = 85$), the intervention group received specific dietary instructions according to TCM food therapy and brief hypertension health education, while the control group received routine support involving only brief hypertension health education. The intervention group had a reduction in the amount of antihypertensive medication taken ($p < 0.05$), improvement in most of the “Yin” deficiency symptoms after 12 weeks of Chinese food therapy ($p < 0.05$), and higher mean scores of several SF-36 dimensions at the 12 and 16 weeks follow-up ($p < 0.05$), compared with the control group. In addition, a significant difference was found in systolic blood pressure in the intervention group when comparing blood pressure from baseline to four weeks post-intervention (mean difference 5.89 mmHg, $p < 0.005$) and eight weeks post-intervention (mean difference 3.87 mmHg, $p < 0.008$) respectively (Shen *et al.*, 2010). This study suggests that TCM food therapy could restore body constitution with “Yin Yang” imbalance, reduce blood pressure, and improve individuals' quality of life.

Comparison of the DASH Diet and the Food Therapy

The DASH diet is a dietary intervention aimed at preventing and controlling blood pressure. Sponsored by the National Heart, Lung, and Blood Institute, the DASH intervention was developed in four medical centers in the United States in the 1990s. Although

observational studies suggest associations between nutrition and blood pressure, clinical trials of the effects of individual nutrients, including calcium, potassium, magnesium, fat, carbohydrates, protein, fiber, and fish oil, on blood pressure have yielded limited and inconsistent evidence (Appel *et al.*, 1997; Van Horn *et al.*, 2008). Different from clinical trials that emphasize individual nutrients, the DASH intervention focuses on the effectiveness of a dietary pattern, including comprehensive food groups. For example, based on 2000 calories a day, the DASH intervention is designed to include seven to eight servings of grains and grain products; four to five servings of vegetables; four to five servings of fruits; two to three servings of low fat or fat-free dairy foods; and two servings or less of meats, poultry, and fish daily. The DASH intervention also includes four to five servings of nuts, seeds and dry beans weekly (Karanja *et al.*, 1999). The number of servings can be adjusted to different calorie levels, such as 1600, 2000, 2600 and 3100 calories per day (United States Department of Health and Human Services, 2006).

The DASH intervention includes foods high in protein, fiber, potassium, magnesium, and calcium; and low in sodium, total fat, and cholesterol. While grains, fruits, and vegetables are suggested to be the main foci of a meal, the DASH intervention emphasizes inclusion of foods from all food groups, appropriate serving sizes to meet energy needs, limited amounts of fats and added sugars, and variety within food subgroup categories (Duyff, 2002). Increased servings of vegetables, nuts, seeds, and legumes in the DASH intervention contribute to the increase in the percentage of energy from plant protein in the diet. The calorie allowances and number of recommended servings from each food group can be adjusted to meet weight loss or weight gain goals (Karanja *et al.*, 1999). The American Association of Dietitians rated the DASH intervention as Grade One evidence (Van Horn *et al.*, 2008), and Canadian Hypertension Education Program guidelines rated the DASH intervention as Grade B evidence, which is the highest grade in this guideline (Hackam *et al.*, 2013; Dasgupta *et al.*, 2014). The DASH intervention has been recommended in a variety of countries for blood pressure control, including Canada, Japan, the United Kingdom, and the United States of America (Zhao *et al.*, 2011), by a wide range of healthcare practice guidelines, including the National High Blood Pressure Education Program; the National Heart, Lung and Blood Institute; National Institute of Health; the United States Department of Health and Human Services; and Canadian Hypertension Education Program.

Comparing the DASH diet and TCM food therapy, both encourage a balanced intake and both have demonstrated their effectiveness on blood pressure control. However, the DASH intervention focuses on dietary patterns, such as low-sodium, low-fat, low-cholesterol, high-potassium, high-magnesium, high-calcium and high-fiber diets in order to lower blood pressure for individuals with hypertension (Appel *et al.*, 1997; Ard *et al.*, 2004). TCM food therapy emphasizes the therapeutic effects of food, considering its nature, taste, and function on human balanced health, which leads to optimal blood pressure control. The DASH studies, a series of rigorous randomized controlled trials, provide scientific quantitative evidence from the perspective of Western medicine. Alternatively, the majority food therapy evidence comes from TCM classics and provides a qualitative theoretical understanding about the relationship between diet and blood pressure from a

Table 4. Comparison of the DASH and TCM Food Therapy

Items	The DASH	TCM Food Therapy
Background	In the 1990s, while clinical trials of the effects of individual nutrients on blood pressure yielded inconsistent findings, new research approach switching from single nutrient to balanced diet was proposed.	A component of TCM with 3000 years of application in Chinese history
Evidence	A series of Western medicine randomized controlled trials	Most are TCM classics; modern randomized controlled trials are emerging.
Research methodology	Modern rigorous scientific quantitative research	Traditional qualitative inquiry using “Yin Yang” theory and observation of food nature and functions
Research setting	Most DASH evidence are feeding studies, where participants are provided with prepared food and required to eat all meals in a research centre.	In the community and people’s daily lives in China historically and currently
Intervention characteristics	Balanced intake, consisting of eight food groups with specific servings	“Yin Yang” balance, considering food nature, taste, and individual health status
Effectiveness	Evidence suggests that the DASH diet is effective in reducing blood pressure and helpful in diabetes and weight control.	Inadequate scientific measurement of its effectiveness. Preliminary findings suggest that the food therapy may reduce blood pressure, reduce the use of antihypertensive medication, and improve health-related quality of life.
Application	Recommended in current hypertension care guides in the United States of America, Canada, the United Kingdom, Japan, etc.	Prevalent in China and the global Chinese population as a folk therapy and a component of TCM therapy

traditional medicine perspective. While the DASH and TCM food therapy are complementary to each other, it is possible to combine them and provide comprehensive care for hypertensive patients (Table 4).

Understanding TCM food therapy and its application to hypertension control will facilitate the people living in mainland China as well as those who have immigrated to other countries to better control their blood pressure. In mainland China, the hypertension prevalence rate in the adult population is 18.8% (Wang and Li, 2012). In Canada, the hypertension prevalence rate in Chinese adults is 15.1% (Chiu *et al.*, 2010). Thus, hypertension is highly prevalent among the Chinese population and they are at high risk of cardiovascular disease and its associated morbidity and mortality (Rhee *et al.*, 2014; Xu *et al.*, 2014). In the United States, numbering approximately 2.4 million, the Chinese population comprises the largest population in the Asian subgroup, and 69% of Chinese Americans are foreign-born (Lv and Cason, 2003; Taylor *et al.*, 2007). Chinese Americans share traditional health beliefs and have used TCM for many health problems (Wu *et al.*, 2007). In Canada, 1.3 million Chinese comprise approximately 3.9% of Canada’s

population and roughly 24% of the country's visible minorities (Statistics Canada, 2006). Most Chinese Canadians retain their traditional health beliefs, which influence individuals' health behaviors and illness management practices (Lu *et al.*, 2008; Kwok *et al.*, 2009; Lai and Surood, 2009). While the Chinese population, including those who immigrated to other countries, rely strongly on TCM for chronic illness management (King *et al.*, 2007), incorporating DASH with TCM food therapy could better facilitate dietary behaviors and blood pressure control in the Chinese population.

Research on TCM is necessary to meet the healthcare needs of both Chinese immigrants and other ethnicity populations in Western countries. Since Chinese immigrants tend to use TCM for chronic illness management (Siow *et al.*, 2005; Lai and Chappel, 2007; Lai and Surood, 2009), accountable, scientific and rigorous research on complementary therapies will benefit both healthcare providers and patients (LaValley and Verhoef, 1995). While TCM has been practiced in China for thousands of years and has accumulated a large number of documents and experiences, using scientific methodologies to summarize existing evidence is needed. The popularity of TCM in immigrant populations and strategies of integrating TCM services into Western healthcare systems might be important to explore. Since China has successfully integrated TCM into current healthcare services (Hesketh and Zhu, 1997; Zhang *et al.*, 2011), international research networks might provide a platform for constructive discussions on TCM research in the world (Ghayur, 2009; Zhang *et al.*, 2011; Wang *et al.*, 2015). As more and more ethnic populations use TCM in their healthcare (Quan *et al.*, 2008), knowledge-translation research in other non-Chinese groups is necessary.

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