

Traditional Dietary Habits of Different Regions in Mainland China and Their Impact on Health

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Abstract: The vastness of China's geography is reflected in its rich culinary traditions, which have evolved over centuries of history, with each region possessing unique ingredients, flavors, and cooking techniques, all of which quietly reflect local agricultural practices, climatic conditions, and cultural influences, resulting in distinctive regional cuisines. Well-known regional cuisines such as Cantonese, Lu, Szechuan and Zhejiang are not only the source of people's daily diets, but are also an integral part of shaping people's health and well-being. Different dietary habits and cultural backgrounds can directly affect people's dietary choices and even their health. This paper analyzes the nutritional structure and dietary habits of typical cuisines such as Cantonese, Lu, Sichuan, and Zhejiang cuisines from the perspectives of nutritional composition and epidemiology, and explores their relationship with chronic diseases (e.g., hypertension, diabetes mellitus, and cardiovascular diseases), with the aim of providing the public with scientific dietary health guidance. Literature research and data analysis were conducted to investigate this topic. It was found that the differences in the use of ingredients, cooking methods and seasoning habits of different cuisines significantly affect their potential effects on human health.

Keywords: Chinese traditional dietary habit, nutrition, different regions.

1. Introduction

There is an increasing amount of research on the relationship between food culture and health problems in China. Many people are beginning to research and discuss how traditional eating habits may affect people's health, especially the effects of certain regional cuisines. The lightness of Cantonese cuisine, with its emphasis on steaming and light seasoning, and its variety of ingredients, and its emphasis on the original flavors of the ingredients, helps to reduce the intake of fats, oils, and salts, which in turn reduces the risk of cardiovascular disease. In contrast, Lu Cuisine is known for its savory and rich flavors, and the diet emphasizes the preparation of soups, such as broths and thick soups, etc. However, the high salt and fat content of Lu Cuisine can lead to hypertension and cardiovascular disease risk. The heavy taste of Sichuan cuisine and its heavy reliance on oil and chili peppers as the main ingredient of the dish, although pitiful, has led to gastrointestinal and metabolic disorders. Meanwhile, Zhejiang cuisine focuses on the freshness and delicacy of the ingredients and often uses seafood and vegetables, but excessive intake of seafood can lead to status quo health problems. However, the study of these cuisines still needs to be further explored in order to better understand their specific effects on health.

The purpose of this article is to study and understand the traditional dietary practices and their associated health problems and effects among these four regions of inland China. From an epidemiological point of view, the characteristics and nutritional features of the major cuisines and their potential impact on chronic diseases are systematically analyzed in conjunction with nutritional data and disease surveys. By studying local diet and health related issues, the interactions between the results, we can better understand how food culture and eating habits affect people's health. This knowledge can help improve people's dietary habits and make them understand the importance of a balanced diet that promotes healthier eating habits while respecting and incorporating the wisdom of traditional diets. Understanding the dietary practices of different regions of inland China is important, as well as the characteristics and health risks associated with each region's distinctive diets, which can shed light on the complex relationship between culture, food, and health, and provide actionable insights into healthy eating. Ultimately, this study will help to promote healthy lifestyles and encourage enthusiasts to make smarter dietary choices that harmonize food and health.

2. Overview of the prevalence of major chronic diseases in China

2.1. National overview

The prevalence of chronic diseases such as hypertension, diabetes mellitus, obesity, and cardiovascular diseases is generally high in China compared to the global average. For example, the prevalence of diabetes mellitus among Chinese adults has reached 11.9% [1], significantly higher than the global average of 8.5% [2]. In addition, the stroke mortality rate is more than four times that of the United States, reflecting inadequate management of blood pressure and the prevalence of dietary risk factors. In addition, the incidence of malignant neoplasms is significantly higher than the global rate (Table 1)

Table 1: Comparison of disease incidence between China and the world

Disease Name	China (incidence rate)	Global (Incidence)	Comparison
Hypertension	27.50%	22.00%	High
Diabetes mellitus (typeII)	11.9%	8.50%	Significantly higher
Overweight + obesity (adults)	50.70%	39.00%	Significantly higher
CVD mortality rate	0.31%	0.20%	High
Stroke mortality rate	0.15%	0.04%	Very high
Stomach Cancer Incidence Rate	0.03%	0.01%	NO.1 in the world
Liver Cancer incidence Rate	0.02%	0.01%	Significantly higher

2.2. Comparison of common diseases incidence rate

Disease incidence rates in China are geographically specific. In Sichuan, the incidence rate of hypertension, stomach cancer and cardiovascular diseases is relatively high, and the mortality rate of cardiovascular diseases is relatively high: in Shandong, the incidence rate of hypertension is slightly lower than the national incidence rate, but the incidence rate of diabetes is 12.1%, which is higher than the national average (11.9%): in Jiangsu, the incidence rate of diabetes is 11.8%, which is basically the same as the national average; in Guangdong, the incidence rate of several kinds of diseases are lower than the national average. It is initially hypothesised that the incidence of diseases is related to the dietary habits and cooking styles of different regions (Table 2).

Table 2: Comparison of the incidence rate of common diseases in different regions of China

City name		Hypertension%		Diabetes mellitus%		Obesity%		CVD mortality disease%		Stomach Cancer%	
1.	Sichuan	2.	28.5	3.	10.2	4.	16.9	5.	0.29	6.	0.025
7.	Shandong	8.	27.4	9.	12.1	10.	19.2	11.	0.26	12.	0.022
13.	Jiangsu	14.	26.9	15.	11.8	16.	18.3	17.	0.24	18.	0.021
19.	Guangdong	20.	26.1	21.	10.6	22.	17.4	23.	0.23	24.	0.019

(The data in the table2 are mainly obtained from "Report on Nutrition and Chronic Disease Status of Chinese Residents (2020)", "Report on Cardiovascular Health and Disease in China (2021)" and "GLOBAOCAN 2020").

3. Overview of nutritional composition and culinary styles of typical Chinese cuisines

3.1. Cantonese cuisine

Cantonese cuisine, as one of the four major Chinese cuisines, originated in Guangdong Province and has a long history and rich cultural connotation. Its roots can be traced back to the Tang and Song dynasties, when trade activities flourished in Guangdong, so the practice was also influenced by foreign countries and foreign influences. Over time, Cantonese cuisine has absorbed cooking techniques and ingredients from other regions and developed a unique style. During the Ming and Qing Dynasties, the golden age of Cantonese cuisine, Guangdong's economy flourished and so did its culinary culture. Cantonese cuisine, with its light, fresh and original flavours, gradually became an important part of China's culinary culture.

Guangdong Province is located in the south of China, the geographical location is relatively advantageous, with rich natural resources and diverse climatic conditions. Guangdong's climate is a subtropical monsoon climate, four distinct seasons, precipitation, especially suitable for a variety of crops, production. This climate promotes an abundant supply of fresh seafood and agricultural products. Guangdong's water resources provide unique conditions for seafood, which makes Cantonese cuisine more diversified in the selection of ingredients, and the freshness of the ingredients becomes the key to cooking.

Cantonese cuisine is characterised by its emphasis on freshness of ingredients, and usually does not use too much heavy seasoning. Cooking techniques mainly include steaming, boiling, stir-frying, stewing, etc. These methods can preserve the original nutrients and flavours of the ingredients to the greatest extent possible. The representative dishes of Cantonese cuisine include steamed fish, roasted goose, fried rice with shrimp, etc. These dishes are not only fresh and tasty, but also exquisite in the pursuit of presentation, harmonious colour combinations, so that people's appetites are greatly increased.

In addition, purine metabolism study pointed out that hypoxanthine in Cantonese-style old-flame soup accounted for 62% of the total purines, and its bioavailability was 1.8 times higher than that of purines associated with meat. The Mendel randomised study confirmed that for every 1 mg/dL increase in serum uric acid levels, the risk of gout increased by 32%

(OR=1.32, 95% CI:1.25-1.39. Intervention tests have shown that reducing the simmering time of old-flame soups from 4 to 2 hours reduced purine levels by 43% ($p<0.01$)[3,4].

Intestinal flora studies have found that insufficient dietary fibre in the Cantonese dietary pattern resulted in a 27% reduction in the abundance of short-chain fatty acid-producing bacteria (e.g., Roseburia) [5]. A case-cohort study ($n=1,842$) showed that the risk of colorectal cancer was increased by 1.8-fold (HR=1.82, 95% CI :1.45-2.29) in people with a dietary fibre intake of < 15 g/d. However, EPA+DHA from Cantonese seafood showed anti-inflammatory effects by inhibiting the NF-KB pathway. A meta-analysis confirmed that daily intake of 250 mg of marine w-3 fatty acids reduced cardiovascular mortality by 11% (RR=0.89, 95%CI : 0.82-0.96) [6].

3.2. Sichuan Cuisine

Sichuan Cuisine originated from Sichuan Province, which has a long history and has formed a unique style. The geography and climate of the Sichuan region played an important role in the development of Sichuan Cuisine, especially the abundant resources of spices and chilli peppers, which made Sichuan Cuisine unique in flavour. The development of Sichuan cuisine can be traced back to the Ming and Qing dynasties, when the economic prosperity of Sichuan also promoted the exchange of culinary culture [7].

Located in southwestern China, Sichuan has a diverse natural environment that includes mountains, plains and lakes. Climatically, Sichuan's diverse climate is particularly suited to the growth of chill peppers and spices, which allows the spicy character of Sichuan cuisine to flourish. Sichuan's rich source of ingredients provides the perfect conditions for Sichuan cuisine.

Sichuan cuisine is heavy and spicy, using peppercorns, chilli peppers and a variety of spices, and making good use of a variety of cooking methods such as stir-frying, boiling and braising. Representative dishes of Sichuan Cuisine include spicy hot pot, kung pan chicken and boiled fish, which are rich in flavour, mouth-watering, and often have a unique spicy flavour!

Studies have shown that the average sodium intake in Sichuan cuisine is as high as 8-10 g per day, far exceeding the WHO recommended standard of 5 g per day [8]. This high sodium dietary pattern is closely associated with hypertension, and according to the results of the 2018 China Hypertension Streaming Survey, the prevalence of adult hypertension in Sichuan Province is 28.5%, which is higher than the national average (27.5%) and also on the high side among the western provinces [8].

In addition, Sichuan cuisine commonly used in the red oil, bean paste and other seasonings higher fat content, may increase the risk of obesity and cardiovascular disease. For example, Sichuan cuisine in the common "red oil hot pot", "boiled pork" and other dishes, the fat intake of a single serving is often more than 50g, and most of them are saturated fatty acids and animal fats, which is likely to lead to dyslipidemia and cardiovascular problems, which is closely related to excessive intake of fats and oils. This is closely related to excessive intake of fats and oils.

In addition, traditional pickled foods in Sichuan cuisine (e.g. kimchi, preserved meat, fish in black bean sauce, etc.) are thought to increase the risk of gastric cancer due to the presence of nitrite and salt accumulation. According to GLOBOCAN 2020, the annual incidence rate of stomach cancer in Sichuan Province is about 25 per 100,000 people (0.025%), which is higher than the national average (0.021%) and ranked as a medium-high incidence area. These "red" dishes are very attractive in taste, but their high salt and high fat characteristics constitute a long-term burden on the cardiovascular system, and the higher oil temperature, together with the preserved ingredients and the heavy spicy seasoning, greatly increase the incidence of gastric cancer [9,10].

3.3. Lu Cuisine

As one of the four major cuisines in China, Lu Cuisine originated in Shandong Province and has a long history and a profound cultural background. The formation of Lu Cuisine can be traced back to the Spring and Autumn Period and the Warring States Period, when the culinary culture of the Shandong region gradually matured. Over time, Lu Cuisine absorbed the cooking techniques and ingredients from the surrounding areas, forming a unique style characterised by freshness and savoury aroma. During the Ming and Qing Dynasties, Lu Cuisine became an important representative of court and governmental cuisine and occupied an important position in Chinese culinary culture.

Located in eastern China, Shandong Province is blessed with vast plains and abundant water resources, which have led to the development of its agriculture and fishery industries. Shandong has a temperate monsoon climate with four distinct seasons, which is suitable for the growth of a wide

variety of crops and aquatic products. This geographical environment provides a fresh source of ingredients for Lu Cuisine, including seafood, meat and vegetables.

Lu Cuisine is characterised by its fresh, savoury flavour and its emphasis on the original taste and texture of the ingredients. The cooking techniques of Lu Cuisine include stewing, boiling, deep-frying, and shabu-shabu, which can preserve the freshness of the ingredients to the greatest extent possible. Representative dishes include sweet and sour carp, nine-turned large intestine, and Shandong dumplings, which are not only layered in flavour, but also beautifully presented, with colour and aroma.

As a representative of northern cuisine, Lu Cuisine is characterised by "salt dishes", focusing on fire control and thick oil and red sauce. Its "stir-frying technique" requires 60-80 ml of cooking oil/500 g of ingredients, resulting in fat intake of more than 30 g in a single meal [11]. Nutritional surveys show that the average daily salt intake of Shandong residents is 12.4g (95% CI: 11.7-13.1), which is the highest in the country [12]. This ultra-high sodium dietary pattern led to a prevalence of hypertension of 31.2% in the province, which was 13.6% higher than the national average. And high salt diet increased the risk of stroke by 42% in Shandong residents [13].

The cholesterol content of typical dishes, such as nine-turned large intestine, amounted to 380 mg/serving, which exceeded the daily recommended amount (300 mg) by 126%, and was associated with the current situation of Shandong, which has the third highest coronary heart disease (CHD) mortality rate in the country [14]. And fried food intake was positively associated with metabolic syndrome (MetS) (RR=1.31), which may explain the obesity rate of 12.9% (exceeding the national average) in Shandong. However, it is worth noting that the use of seafood in Lu cuisine brings some nutritional value, such as the high-quality protein (18.2 g/100 g) provided by sea cucumber with scallions and fucoidan (3.4 mg/g) with immune modulators effects [15].

3.4. Zhejiang Cuisine

Zhejiang Cuisine originated in Zhejiang Province and has a long history, influenced by the culture and eating habits of the Jiangnan region. Zhejiang is located in the southeast coast of China, with rich natural resources and unique geographical environment, which makes Zhejiang Cuisine occupy a place in the Chinese cuisine. The development of Zhejiang Cuisine has been influenced by the geography and climate of the region, especially the abundance of aquatic products, which has provided Zhejiang Cuisine with a variety of sources of ingredients.

Zhejiang Province has a warm and humid climate with four distinct seasons, which makes the local crops and aquatic products rich and diverse. Zhejiang's rivers and lakes provide fresh aquatic products, which are an important source of ingredients for Zhejiang cuisine. Zhejiang's geography allows its unique ingredients to fully express their fresh flavours.

Zhejiang cuisine is light and fresh, emphasising the freshness and natural flavour of the ingredients. Commonly used cooking methods include steaming, boiling, and stewing, which preserve the original flavour of the ingredients to the greatest extent possible. Representative dishes of Zhejiang Cuisine include West Lake Vinegar Fish, Longing Shrimp and Dognap Pork, which are attractive in colour and flavour, and focus on the combination and presentation of the dishes.

Su cuisine, with Huaiyang cuisine as its core, emphasises "fine knife work and harmony of native flavours", and its sugar use (8-12g/100g) is significantly higher than that of other cuisines [16]. Classic dishes such as Wuxi spare ribs can contain up to 15.6% reducing sugars, which is significantly positively correlated with the prevalence of diabetes in Jiangsu Province (9.7%) [17,18]. It was noted that the risk of diabetes increased by 28% in those with daily sugar intake >50 g [19].

Cooking styles with thick oils and sauces (e.g., braised pork) led to an overweight rate of 34.1% among adults in Jiangsu. A diet high in sugar and fat was shown to be associated with an increased risk of colorectal cancer (HR=1.19). However, Su cuisine has advantages for the combination of

aquatic products and seasonal vegetables, such as stir-fried shrimp with n-3 PUFA content of 1.2 g/100 g. The incidence of cognitive dysfunction among the elderly in Yangzhou region was 23% lower than that of the whole country (OR=0.77,95% CI: 0.65-0.91), which may be related to the long-term intake of lecithin-rich (1.8mg/g) dishes such as wenxifu [20].

4. Epidemiological analysis of the relationship between chronic diseases and cuisine

Szechuan cuisine is characterised by high salt, heavy spiciness, and much fat. High sodium intake will activate the renin-angiotensin-aldosterone pathway and raise blood pressure; high cholesterol is easy to hoard in the blood vessel wall, which further induces high blood pressure; and studies have shown that irritating factors such as capsaicin induce chronic inflammation of the gastrointestinal mucosa. Therefore, too spicy easily make the body's inflammatory response increase, gastritis frequently. Long-term infiltration of inflammatory factors may induce cancerous cells and increase the incidence of gastric cancer.

Lu Cuisine is characterised by high carbon and fat, long-term high sugar diet can trigger insulin resistance and increase the risk of type II diabetes; Lu Cuisine has more deep-fried food and higher content of animal fat and cholesterol, which can easily affect the bile metabolism and fat absorption, and increase the rate of obesity; in addition, deep-frying and cooking will produce acrylamide and polycyclic aromatic hydrocarbons, which are carcinogenic chemical compounds.

Compared with Szechuan and Lu Cuisines, Su Cuisine uses less oil, but it is still a high-sugar cooking, and long-term consumption is likely to lead to type II diabetes mellitus.

Cantonese cuisine is mainly made of seafood, and the cooking is lighter and less salty, so it can effectively reduce the risk of cardiovascular disease and high blood pressure. However, due to insufficient intake of vegetables and fibre, intestinal peristalsis is slower, which can easily lead to colon cancer (Table 3).

Table 3: Analysis of the association between different cuisines and diseases

Cuisine	Main Nutritional Characteristics	Associated Chronic Diseases	Typical regional incidence rate
Sichuan Cuisine	High salt, high oil, spicy	High blood pressure, cardiovascular disease, stomach cancer	Sichuan high blood pressure 28.5%, stomach cancers/100k
Lu cuisine	High carbon, high fat	Diabetes, obesity	Shandong Diabetes 12.1%, Obesity 19.2
Suzhou cuisine	High sugar, fine cooking	Diabetes ,metabolic syndrome	Jiangsu Diabetes 11.8%, Obesity 18.3%
Cantonese cuisine	Light, seafood, less salt	Low cardiovascular disease risk, high incidence of colorectal cancer	Guangdong CVD Mortality Rate 230/100,000

5. Health intervention recommendations

There is a significant correlation between the incidence of chronic diseases in different regions of China and the nutritional characteristics of local cuisines. In the future, public health policies should take into account regional food cultures and formulate targeted interventions.

5.1. Governmental level: policy guidance and healthy ecology construction

To improve public health and promote healthier eating habits, a multi-faceted approach at the policy and community level is essential. Firstly, the formulation and implementation of nutrition-related policies should be strengthened by supporting nationwide initiatives such as the “salt, oil, and sugar reduction” campaign, and promoting public health programs like the “Salt Reduction Action” and “Healthy Canteens.” These initiatives can help guide the public toward healthier dietary choices. Secondly, the nutrition labeling system should be widely adopted and standardized. Catering

establishments should provide clear nutritional information on menus, including calorie counts, sodium levels, sugar content, and protein values for each dish. Additionally, a sugar classification system should be introduced for beverages and packaged foods, with clear sugar-level labels on product packaging to guide consumer choices. Thirdly, health education and awareness campaigns play a vital role in changing dietary behavior. This can be achieved through public service announcements and community engagement activities that highlight the risks of high-salt, high-fat, and high-sugar diets. Cooking methods such as steaming, boiling, and stewing should be encouraged over high-temperature techniques like deep-frying. Public awareness should also emphasize balanced eating habits, such as combining meat with vegetables, reducing salt and sugar intake, and opting for seafood instead of red meat. Finally, the promotion of a “fitness for all” lifestyle further supports overall health and well-being.

5.2. Individual level: attention to daily habits and nutritional nutrition

To promote both physical and mental well-being, a holistic approach to lifestyle improvement is essential. First, dietary habits should be optimized by emphasizing thorough chewing and swallowing, eating to about 70% fullness, maintaining regular meal times, and avoiding erratic patterns such as overeating or skipping meals. It is important to eliminate the habit of watching shows while eating and refrain from consuming late-night snacks, allowing the digestive system adequate time to rest. Ensuring sufficient sleep and maintaining a regular daily routine are also crucial to prevent metabolic imbalances and appetite disturbances. Secondly, reducing psychological stress plays a key role; emotional eating or overeating as a way to cope with stress should be avoided. Instead, healthy stress-relief activities such as hiking, walking, yoga, or playing musical instruments can be encouraged. Lastly, maintaining a balanced diet and staying well-hydrated is fundamental. It is recommended to drink no less than 1500 ml of water daily, while minimizing the intake of sugar-sweetened beverages and milk tea in favor of plain water, light tea, or sugar-free drinks. Dietary diversity should also be promoted by exploring various cuisines and ingredients to ensure balanced nutrition and support overall health.

5.3. Social level: encourage the participation of social organisations and product innovation by enterprises

To further support healthy eating habits and public health awareness, collaborative efforts from both public interest organizations and the food industry are essential. Public interest organizations have taken the lead in launching educational campaigns to spread knowledge about the health benefits of various dishes and promote healthy cooking techniques. These efforts are often amplified through partnerships with independent health experts on social media, who produce engaging short videos to encourage healthy cooking practices among wider audiences. On the industry side, innovation in food products plays a critical role. Catering enterprises are encouraged to develop and offer healthier product alternatives, such as sugar substitutes, zero-calorie soft drinks, fiber-enriched beverages, low-salt soy sauce, and low-glycemic-index cereals. These innovations aim to satisfy consumer taste preferences while aligning with growing health consciousness. However, it is important to recognize that health interventions should not adopt a “one-size-fits-all” approach. Instead, strategies must be tailored to local conditions and cultural contexts to ensure effectiveness and meet the real expectations of different communities.

6. Conclusion

Chinese cuisine is rich and diverse, and its unique culinary culture is not only a national treasure, but also a challenge in the modern health context. From nutritional composition to disease risk, the health values of different cuisines deserve in-depth study and guidance. Choosing the right ingredients and cooking methods, trying different cuisines, and eating a balanced diet are the keys to

realising a balance between traditional cuisine and modern health. In the future, nutritional intervention and dietary education should be strengthened while preserving the culinary culture, so as to realise the goal of "delicious and healthy".

6. Conclusion

This study analyzed the dietary structure, nutritional components and their association with chronic diseases of the four representative cuisines of China - Cantonese, Shandong, Sichuan and Zhejiang cuisines - to reveal the profound impact of traditional dietary culture on human health. The study found that the significant differences in food selection, cooking methods and seasoning habits among different cuisines have an important impact on the occurrence of chronic diseases such as hypertension, cardiovascular disease and diabetes. For example, Cantonese cuisine is light and original, which can effectively control oil and salt intake and is beneficial to cardiovascular health; while Shandong and Sichuan cuisines may increase the risk of disease due to high salt, high fat and heavy seasonings; although Zhejiang cuisine is characterized by freshness, excessive seafood intake should also be vigilant. Through a systematic analysis of diet and health, this study emphasizes that while respecting traditional dietary culture, a scientific and reasonable dietary structure should be advocated to guide the public to form healthier eating habits, so as to achieve a balance between cultural inheritance and health promotion. This not only helps to improve people's health level, but also provides a theoretical basis for the formulation of regional dietary health intervention strategies.

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