

Analysis of dietary pattern and regional dietary structure in Sichuan

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Abstract: For the diet in Sichuan, its dietary habit and dietary pattern are different from those in other regions in China. The diets of the residents in Sichuan have unique regional features. Now, the dietary pattern in Sichuan is analyzed to investigate that whether the diet structure and nutrient intake can meet the requirements of The Chinese Dietary Guidelines. This paper analyzed the diet structure in Sichuan region, the main sources of calorie taken by residents in Sichuan; the components, proportion and indication results of the nutrients; the effects of the diets on the physical conditions of the residents in Sichuan are analyzed, how the dietary pattern controls the disease; contrastive analysis for the dietary pattern in Sichuan and the typical dietary pattern in other regions, such as the dietary pattern in the Mediterranean region and the dietary pattern in Northern Europe, etc. In conclusion, the dietary pattern or diet structure in Sichuan is not reasonable. The intake of most nutrients is insufficient, much lower than the intake recommended by the dietary guideline for the residents in Sichuan. The intake of the microelements of Ca, Zn, Se and vitamin C, etc., is seriously insufficient, and the intake of protein and dietary fiber is also insufficient. Therefore, the intake of beans, bean products, vegetables, fruits, fishes, shrimps, eggs, milk and dairy products shall be enhanced; In addition, the special dietary habits in Sichuan lead to excessive intake of livestock and poultry meat, edible oils and edible salts by the residents, therefore, the intake of these foods shall be controlled; at the same time, reasonable diet and healthy lifestyle shall be advocated. And the residents in Sichuan shall be encouraged to do more sports and take more exercises. Meanwhile, the education and propaganda for the nutritional knowledge shall be strengthened to make the dietary pattern and diet structure in Sichuan more scientific and healthier.

1. Introduction

Sichuan Province, Sichuan or Shu for short, is one of the 34 provinces in China, with Chengdu being its provincial capital. Sichuan is located in the southwest inland of China and the upper reach of Yangtze River, and it is called as "Land of Abundance". Sichuan has the most unique style of cooking in China, i.e., Sichuan cuisine. Sichuan has a long history, the unique dietary habit in Sichuan has gradually formed into a local dietary style, named as Sichuan cuisine later. Sichuan cuisine is one of the eight major components of Chinese cuisine, it is originated in Sichuan, and featured in spicy, hot, fresh and fragrant taste.

For the diet in Sichuan, the dietary habit and dietary pattern are different from those in other regions in China. The diets of the residents in Sichuan have unique regional features, the raw materials are from wide sources, the taste is clean, fresh, mellow and concentrated. Sichuan cuisine is famous for its spicy taste. The residents also take cured meat, sausage and other processed meat, as well as pickles (pickled vegetables and preserved Szechuan pickle, etc.) and animal oil [1]. Research finds that, the main dietary pattern of the residents in Sichuan included processed meat and animal oil, therefore, the current situation of the dietary nutrition and dietary structure of the residents are not reasonable, the nutritional collocation is unbalanced, therefore, analysis is conducted to the diets in Sichuan region. The results of report were shown in this paper.

2. The basic statistics data of Sichuan residents

2.1. Data of demographic statistics for Sichuan

In accordance with the results of the seventh National Census conducted by National Statistics Bureau, Sichuan has become the fifth largest province of population, its population size is only junior to Guangdong, Shandong, Henan and Jiangsu Province [2]. According to Figure 1, the resident population of Sichuan is 83,674,866, compared with the sixth National Census conducted in 2010, the population growth is 3,256,666, with a growth of 4.05%, and the average annual growth rate of population is 0.40%.

Permanent population in previous censuses of the province

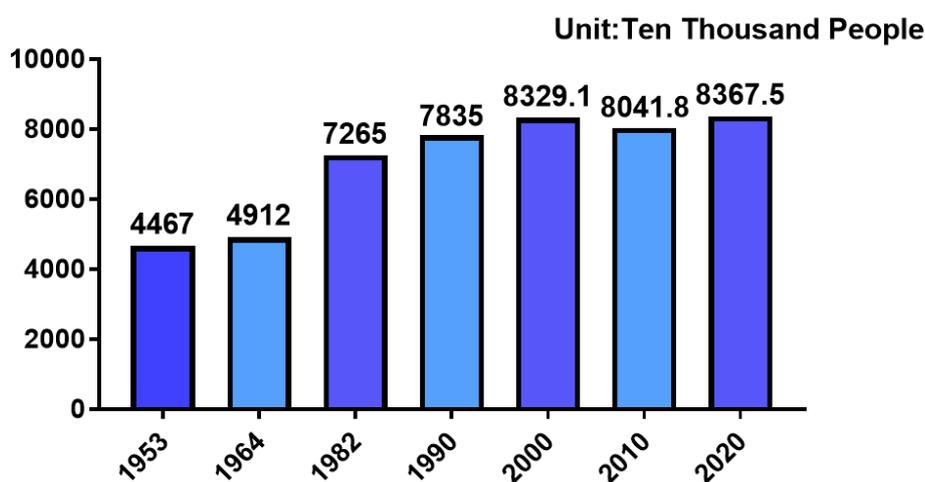


Figure 1. Permanent population in previous censuses of the province [2]

2.2. Resident income of Sichuan

In accordance with the data of National Bureau of Statistics, in recent years, the resident income in Sichuan increases significantly [3]. According to Figure 2, in 2017, the per capita disposable income in Sichuan exceeded CNY 20,000, reached CNY 20,580. In 2020, this figure was CNY 26,522, with a growth of CNY 9,301 and with a growth of 54% compared with that in 2015, resulting in an average annual growth rate of 9%. In recent years, the consumption and income of residents in Sichuan have achieved growth in the same pace. In 2020, the per capita annual living expenditure of the residents in Sichuan was CNY 19,783, achieving an increase of 44.6%, compared with 2015, and resulting in an average annual growth of 7.7% [4]. In addition, in accordance with the announcements issued by Department of Human Resources and Social Security of Sichuan Province, the median income of Sichuan was about 84.8% of the per capita disposable income, being CNY 54,700.

Per capita disposable income of Sichuan residents in five years

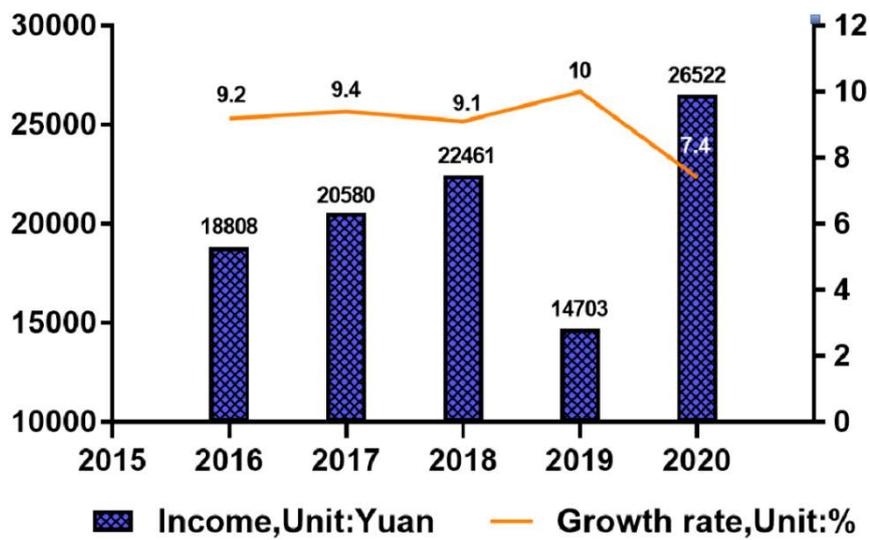


Figure 2. Per capita disposable income of Sichuan residents in five years [4]

2.3. Analysis for the main death cause of the population in Sichuan

In accordance with the analysis for the data of the dead residents in Sichuan from 2014 to 2018 in China Information System for Disease Control and Prevention - Death Registration Information Registration and Management System, in recent years, the death rate in Sichuan was basically the same, the average death rate was 703/100,000[5]. According to Figure 3 and in accordance with the analysis to the death reasons for the people died in Sichuan, the top five reasons were basically the same, being cardiovascular and cerebrovascular diseases, malignant tumor, respiratory system diseases, accidental injury and digestive system disease. Wherein, the top three accounted for 80.91%-93.06% of the total dead people. The main death reasons of the remaining residents in Sichuan were: internal secretion and nutrition metabolism diseases, infectious diseases and parasitosis, diseases of the genitourinary system, nervous system diseases and psychonosema. Wherein, most of the death reasons are related to chronic diseases. Four of the top five reasons are related to chronic diseases. The main hazardous factors of chronic diseases include smoking, drinking, hypertension, hyperglycemia, edible salt intake and obesity, etc. Especially, smoking, it has been verified to be a hazardous factor for multiple cancers, cardiovascular and cerebrovascular diseases and chronic obstructive pulmonary disease.

Distribution of main causes of death of residents in Sichuan Province in 2018

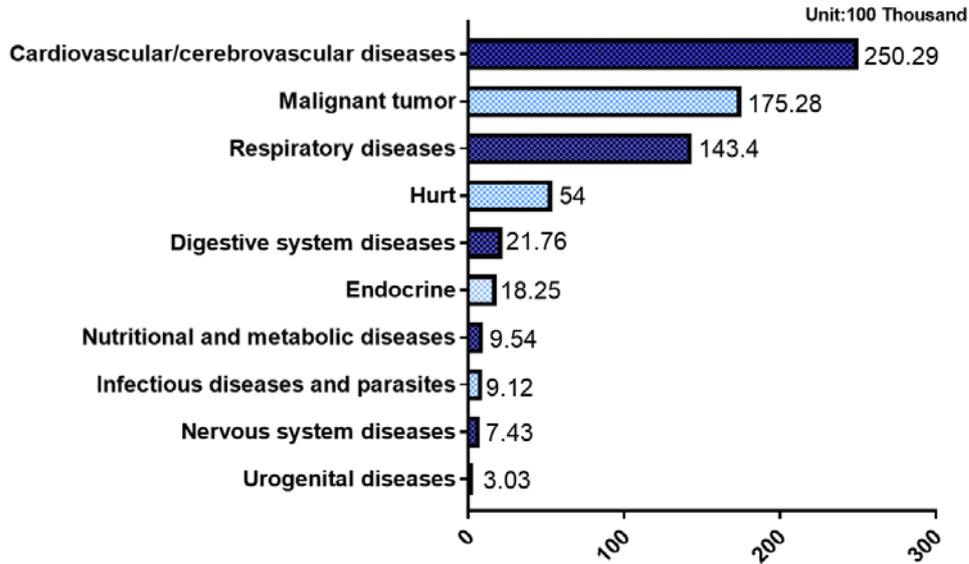


Figure 3. Distribution of main cases of death of residents in Sichuan Province in 2018[5]

3. Dietary pattern in Sichuan

3.1. Food sources of energy for residents in Sichuan Province

The standard average person-day energy intake of the residents in Sichuan is 1,920.75 kca, lower than the energy required by dietary guideline for the residents in Sichuan [6]. Secondly, according to Table 1 - Table 6, the energy taken by the residents in Sichuan mainly is mainly from cereal crop (39.19%); followed by animal foods and pure heat foods, accounting for 25.47% and 24.31%, respectively [7]. The main source of protein is animal fat (43.54%), followed by cereal crop and other foods, accounting for 35.3% and 15.91%, respectively; The lipid is mainly provided by animal foods and plant food, accounting for 44.37% and 55.63%, respectively.

Table 1. Food sources of energy for residents in Sichuan Province [7].

Source of energy	Proportion (/%)
Cereal crop	39.19
Peas and beans	1.88
Tubers	1.37
Animal food	25.47
Pure heat food	24.31
Other foods	7.78

Table 2. Food sources of protein for residents in Sichuan Province [7].

Source of energy	Proportion (/%)
Cereal crop	35.3
Peas and beans	5.24
Animal food	43.54
Other foods	15.19

Table 3. Food sources of fat for residents in Sichuan Province [7].

Source of energy	Proportion (/%)
Animal food	44.37
Plant food	55.63

3.2. Taken macronutrients and micronutrients

The protein intake of Sichuan residents is 54.23 g, lower than the recommended intake; The fat intake is 95.79 g [7]; The intake of carbohydrate is 211.46 g. The standard average intake of Ca, Zn, Se, Mg, K, vitamin A and vitamin C of the residents in Sichuan is lower than the average intake or the recommended intake. Wherein, the intake of Ca is 295.39 mg, accounting for 45.4% of the average intake, leading to the risk of insufficient Ca intake from diets; The intake of vitamin A is 479.05 mg, accounting for 59.9% of the recommended intake, resulting in the risk of insufficient vitamin A from diet; The intake of Na is 4,726.56 mg, accounting for 315% of the appropriate intake, resulting in the risk of excessive intake.

Table 4. Average intake of macronutrients in Sichuan Province [7].

Nutrient	Actual intake	Reference intake	Index result
Energy/ kcal	1920.75	2250	< EER
Protein/ g	54.23	65	< RNI
Fat/ g	95.79	20%-30%	> AMDR
Carbohydrate/ g	211.46	50%-60%	< AMDR
Dietary fiber/ g	8.44	25	< AI

Table 5. Average intake of micronutrients in Sichuan Province [7].

Nutrient	Actual intake	Reference intake	Index result
Calcium / mg	295.39	650	< EAR
Iron / mg	20.13	9	> EAR
Zinc / mg	9.66	10.4	< EAR
Selenium / μ g	37.86	50	< EAR
Copper / mg	1.31	0.6	< EAR
Manganese / mg	4.56	4.5	\geq AI
Magnesium / mg	237.85	330	< RNI
Sodium / mg	4726.56	1500	> AI
Potassium / mg	1369.41	2000	< AI
Phosphorus / mg	816.78	720	> RNI
vitamin A / μ gRE	295.39	650	< RNI
vitamin E / mg α -TE	20.13	9	> AI
vitamin C / mg	9.66	10.4	< RNI
nicotinic acid /mgN	37.86	50	< RNI

Note:

EER: energy requirement;

EAR: average requirement;

RNI: recommended intake;

AI: appropriate intake;

AMDR: acceptance range of macronutrients

Table 6. Average food intake of residents in Sichuan Province / g · standard man day-1[7].

Food Type	Actual intake	Recommended amount of Sichuan balanced diet pagoda
Grain and potato B	254.5	250-400
Vegetables	265.67	300-500
Fruits	16.58	200-350
Livestock and poultry meat	136.38	50-75
Fish, shrimp and aquatic products	7.31	40-75
Eggs	17.08	40-50
Milk and its products C	29.80	300
Soybean and its products	9.08	30-50
Edible oil	48.42	25-30
Salt	7.8	6

Note:

- a) standard person-day is converted into an 18-year-old man with light physical activity according to age, gender and labor intensity;
- b) cereals and potatoes are converted into raw rice and raw noodles according to energy;
- c) milk is calculated according to protein converted into fresh milk.

3.3. Effects of dietary habit in Sichuan on the health of the residents

3.3.1. Effects of chili on health

The people in Sichuan like spicy foods naturally, the spicier, the better. Chili pepper is an important component of the diets for the residents in Sichuan. Chili is a good food that rich in nutrition, especially, its vitamin-C content is the highest among all the vegetables. Chili contains carotene, vitamin B, citric acid and malic acid, etc., these components are good for human body in pharmacologically and in clinic. In accordance with the statistical data, the incidence rate of the diseases of Type II diabetes, obesity and cancer, etc. of the residents in Sichuan is much lower than that in other regions of China, which greatly relates to the intake of chili. By research, Kiran DK Ahuja, et al., found that, regular taking of chili can relieve hyperinsulinemia after meals, while hyperinsulinemia was the common basis for the onset of coronary heart disease, hypertension, hyperlipidemia, Type II diabetes, obesity and cerebral stroke [8], etc. By adding the quantity or appetency of the liver insulin receptors, the chili adds the clearance rate of insulin, so as to lower the insulin concentration in serum to affect the liver insulin receptors. Hyperinsulinemia can be lowered by this way. In addition, chili has vanilla amide, an alkaloid, and capsaicin, mainly existing in the fruits of capsicum, having the pharmacological effects of weight loss and alleviating pain. In accordance with the research of Maria de Lourdes Reyes-Escogido, capsaicin had protective effects for the gastropathy related to ethyl alcohol and indometacin, and adipose tissue can be reduced by enhancement of energy and lipid metabolism [9]. The mechanism may be that, sympathetic was stimulated to secrete catecholamines from adrenal medulla, so as to further control the effects of obesity. Surinder Kumar Sharma, et al., also sorted out the pharmacological effects of capsaicin in different physiological systems [10]. Wherein, the pathological features to weight, cancer, cardiovascular system and gastrointestinal system were regulated by diet. Capsaicin controls weight by pyrogenicity of diet, lipid oxidation, and reduction of triglyceride, etc.; At the same time, capsaicin has a certain resistance to pancreatic cancer, colon cancer, breast cancer, prostatic cancer, lung cancer, leukemia and hepatocellular carcinoma; However, capsaicin will also increase the probability of suffering from liver cancer, gastric cancer and skin cancer; In addition, capsaicin has a certain pathological effects on the cardiovascular system. It can reduce the scope of infarction, enhance the protection to reperfusion and resist against platelet aggregation, etc. In the report of Yang, et al.,

Capsaicin could relieve damage caused by hyperlipemia and atherosclerosis by reducing oxidative stress and endothelium dysfunction.

3.3.2. Effects of Chinese prickly ash on health

The same as chili, Chinese prickly ash is also one of the featured spices in the cooking culture of Sichuan, and it is beloved by people in Sichuan. Chinese prickly ash plays important roles in the aspects of food seasoning, dye, preservation and medication.

Chinese prickly ash is native to China, distributed in the southwest provinces of China. Its scientific name is *Zanthoxylum bungeanum* Maxim. The peels and leaves of Chinese prickly ash have been widely used for cooking in China and East Asian countries. There has been a history of more than 2,000 years for the Chinese prickly ash being used as a typical aromatic flavoring in Sichuan cuisine. Chinese prickly ash can stimulate the cells of trigeminal to generate a sense of piercing pain and a feeling of numbness in oral cavity, as it contains an unsaturated alkyl amide, therefore, it is called as triol. In addition, in accordance with the research of Deng, et al., the polyphenols contained in Chinese prickly ash can cure more than 30 diseases of chronic and acute pain, vomiting, roundworm, itching and trauma, etc. Chinese prickly ash is of a certain medicinal value for clinic.

Long-term eating of Chinese prickly ash by the residents in Sichuan also benefits health a lot. Firstly, in the aspect of anti-obesity and lipid metabolism, Kim, et al., found that, for the mice with hyperlipidemia, the extraction of Chinese prickly ash can obviously lower the blood lipid [11]. Other follow-up research found that, the key component for blood lipid lowering by Chinese prickly ash is hydroxyl- α -sanshool, it is the key for Chinese prickly ash to adjust obesity and lower blood lipid. In addition, Chinese prickly ash also has the function of reducing the blood sugar. In a research, the researcher found that, alkyl amide of Chinese prickly ash can regulate the fasting plasma glucose and contents of fructosamine of the mice for diabetes model; Ren, et al., also found that, zanthoxylum alkylamides can improve protein synthesis [12]. At the same time, Hameed, et al. Found that, tumbulin from *Z. armatum* can promote the secretion of insulin by KATP -independent Ca^{2+} -dependent amplifying pathway to lower the blood glucose [13]. A clinical survey of Tang, et al., indicated that, the Chinese prickly ash consumption 187 was negatively correlated with right v [14]; In addition, in the case-control study conducted by Zhou, et al., with 527 patients, zanthoxylum bungeanum diet may be a protection factor for coronary heart disease [15]. Chinese prickly ash also has the potential to treat gastrointestinal motility, increase intestinal motility and colonic motility.

3.3.3. Effects of high salt diet on health of residents in Sichuan

As one of the necessary seasoners for the daily life of contemporary residents, edible salt has become an essential part of people's life. There are masses of sodium ions in edible salt. After being taken by human body with food, sodium ions will accumulate in human bodies. At present, Chinese people take too many edible sodium salts, being an important reason for increase of death rate of hypertension and coronary heart disease. The indicators of China's Medium-and-long Term Planning for Chronic Disease Prevention and Treatment (2017-2025) indicated that, the death rate caused by cardiovascular and cerebrovascular diseases in China at present is 241.3/100,000[16]. At the same time, the population with high-sodium diet has a higher risk of suffering from gastropathy, related to the diseases of osteoporosis, stroke and gastric cancer, etc. In accordance with a public health survey conducted in China in 2017, in 2011-2015, the standard dietary sodium intake per capita in China estimated by 24h urine was 5403.5 mg (equal to 13.51 g salt), relatively high. The edible salt intake in China is much higher than the standard of World Health Organization (WHO). WHO suggests that, the sodium intake shall not exceed 2 g, and edible salt intake shall not exceed 5 g. However, at present, the sodium intake from the diets by the residents in China is too high, being more than 2.5 times of the intake recommended by WHO (5 g/day). In addition, the daily salt intake of the residents in China is also 2.1 times of the value recommended by WHO.

For Sichuan, the dietary habits of the residents in Sichuan are mainly the foods with middle and high salinity. The residents in Sichuan prefer the special Sichuan foods with high salinity, such as Sichuan sausage, cured meat and Sichuan pickle vegetables, etc. which are unique in Sichuan. These

foods are the important sources of sodium intake for the residents in Sichuan. The research conducted by Xiaobo Huang, et al., for the hypertension prevalence rate in Tibetan areas of Sichuan pointed it out that, 20.4% of the people here had the dietary habit of high salinity, and the hypertension prevalence rate in the Tibetan areas of Sichuan was 45.7%, much higher than 21.5%, the average level of China [17].

3.3.4. Effects of high-sugar and high-fat on diets

Sugar is a necessary nutritional content for the life of residents, it is a source of the main energy for the life of the residents. At the same time, sugar plays an important role in the aspect of health. In western countries, the diets are high-saturated fat. However, in Sichuan and other provinces of China, the dominate dietary habit is still starch, cereal and sugar with high carbohydrate. In accordance with a research comparing traditional Chinese diets and western diets, it was indicated that, traditional Chinese dietary pattern was negatively correlated with the risks of osteoporosis, and it could keep a healthy body mass index (BMI); western diets aggravated the risks of surplus weight or obesity, and high-fat diet would worsen the parameters of osteoporosis [18]. However, some researches also indicated that, high-fat diet facilitated peak bone mass and the most stable bone structure at a young age. Therefore, high-sugar and high-fat have both advantageous and disadvantageous effects on body health and bone metabolism. At present, great nutrition transition has been conducted in Sichuan and other regions in China, more western dietary pattern has been introduced on the basis of traditional Chinese dietary pattern, with Chinese diet as the principal, and having western diet limited, forming a relatively healthy dietary pattern at present.

3.4. Sichuan resident dietary guidance and Sichuan dietary pattern

Sichuan Resident Dietary Guidance is the dietary guidance compiled by the experts of Sichuan Nutrition Institute based on the newest scientific evidences, taking food as the basis, considering the supply and sustainability of local foods and combining with feasibility and practicability (Figure 4) [19, 20]. Wherein, the current situation and existing problems of the diets and nutrition of the residents in Sichuan are combined, and corresponding solutions and suggestions are recommended.

Sichuan Resident Dietary Guidance points it out that, since of the establishment of the People's Republic of China for more than 70 years, the ability of China to guarantee nutrition and supply has been significantly improved, the health level of people has been continuously improved, the average life expectancy has been improved to 77.3 years old from 35 years old, and the oligotrophy and physical development of the residents have been continuously improved, mainly manifested in sufficient intake of dietary energy and macronutrient, ever increasing high-quality protein intake, continuously increased average height of residents, sufficient lowering of rate of growth retardation for the children younger than 5 years old in rural area. Sufficient food supply and dietary quality improvement area the main reasons.

In accordance with Sichuan Resident Dietary Guidance, there are six core recommendations for the diets of the residents in Sichuan. Core recommendation 1: Diverse foods, with cereal as the principal, combining coarse food grains with refined grains; Core recommendation 2: Eating and moving balance, outdoor activity, healthy weight; Core recommendation 3: Having more vegetables, dairy foods, bean or bean products; Core recommendation 4: Having appropriate fish, poultry, egg and lean meat, having fewer barbecues; Core recommendation 5: Having fewer salt and oil, having appropriate spicy and hot tastes, controlling sugar and alcohol; Core recommendation 6: Hygeian diet, eliminating waste, new food fashion. However, affected by the factors of unbalanced social economic development levels, aging of population and unhealthy diet and lifestyle, etc., there are still nutrition and health problems demanding prompt solution. First, outstanding problem of unbalanced diet, it has become a main hazardous factor for the onset of chronic diseases. High-oil and high-salt intake is a problem commonly existing in Sichuan. For the youth, the consumption of sugared beverages increases year by year, the intake of whole grains, dark vegetables, fruits, dairy products, fish and shrimp, and bean products is commonly insufficient. Second, the lifestyle of the residents in Sichuan has obviously changed, the total body movement lowers, energy intake and consumption

control are unbalanced, which lead to that surplus weight and obesity have become important public problems, and the chronic diseases related to diet lead more and more serious problems. Third, unbalanced urban and rural development, the food structure in the rural areas needs to be improved. The intake of dairy products, fruits, aquatic products and other foods by the residents in rural area is obviously lower than that of the urban residents. The science popularization education of nutrition for oil & salt intake and food diversification needs to be conducted for the grass roots. Fourth, the nutrition of the infants, pregnant women, the elderly and other focus groups shall be paid specially. Fifth, the food wastage is serious, and resident literacy for nutrient needs to be improved.

In accordance with the analysis of Sichuan Resident Dietary Guidance, the diet structure of the residents in Sichuan is not reasonable, the education and propaganda for the nutritional knowledge shall be strengthened, and reasonable diets and healthy lifestyle shall be advocated. Specifically, the intake of grain, cereal and potato by the residents in Sichuan is appropriate; the intake of livestock, poultry, meat, edible oil and edible salt is excessive; the overall intake of beans, bean products, vegetable, fruits, fishes, shrimps, eggs, milk and dairy products is relatively low. The intake of fat from the diets are higher than the recommended intake scope, and the intake of the energy, protein and carbohydrate is lower than the recommended value. The intake of Ca from diets is 295.39mg/standard person-day, only reaching 45.4% of the average demand, having the risk of insufficient intake. The intake of Na is 4726.56mg, much higher than the appropriate intake, resulting in the risk of excessive intake.

Chinese Food Guide Pagoda(2016)

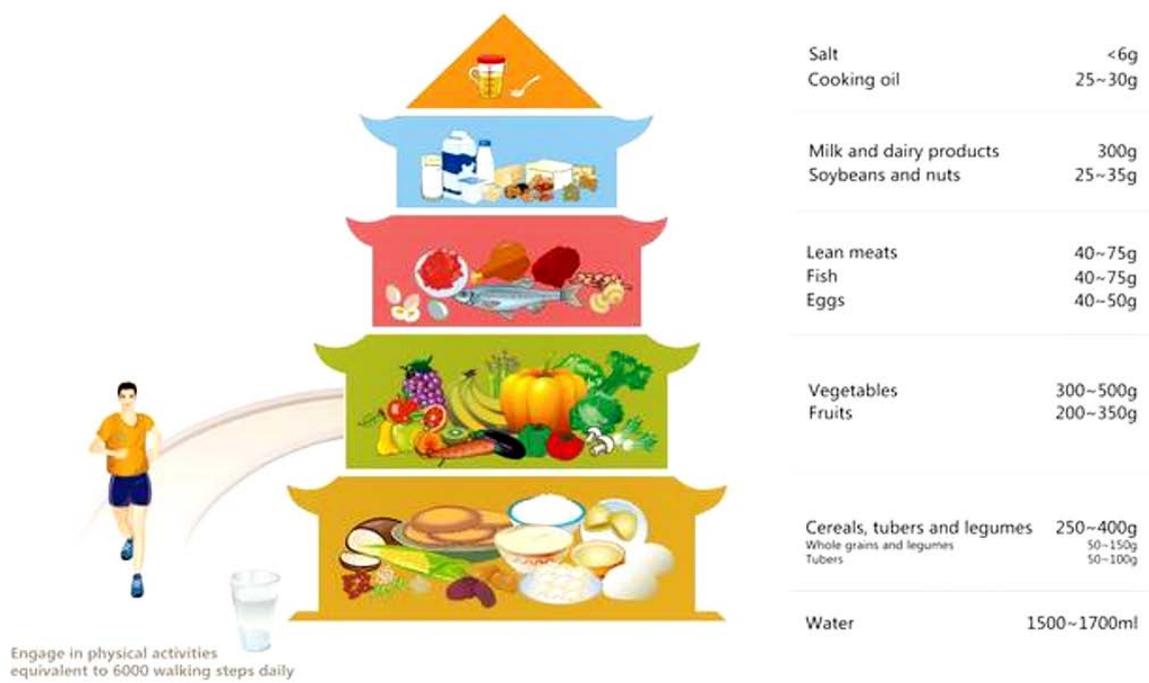


Figure 4. Chinese Food Guide Pagoda [19]

4. Comparison with the dietary pattern in other regions

4.1. Diet in the Mediterranean region

Diet in the Mediterranean region are considered to be one of the healthiest dietary patterns in the world, benefit by the food combination rich in antioxidants and anti-inflammatory nutrients, i.e., low saturated fat and high vegetable oil [21]. The biggest feature of the diet in the Mediterranean region is the large intake of vegetables, beans, fresh fruits, coarse food grains, butts and olive oils, the appropriate consumption of fishes and dairy products, and appropriate drinking of alcohol (mainly

red wine). The diet in the Mediterranean region is only referring to food intake, but also the traditional habits of foods and regular diet. For example, every day, people here will have olive oil, and take vegetables and beans as the main courses. After the main courses, they will also have some fresh fruits. Red meat is only for the foods in special occasions. Therefore, it can be seen that there are big differences between the diet in the Mediterranean region and the traditional dietary patterns of Sichuan. As shown in the Figure 5 below, the food pyramid of the Mediterranean region reports the category of the main foods of the diets in the Mediterranean region and the intake frequency of each food [22]. It can be known that, the dietary pattern of the Mediterranean region encourages the residents to take masses of whole wheat cereals, fruits and vegetables; appropriate dairy products, poultries and fishes; fewer candies and less red meat. In addition, the diet in the Mediterranean region also plays the roles of preventing cancers and diseases of cardiovascular system [23]. Due to the high contents of antioxidants and nutrients in the foods of beans, vegetables, fruits, fishes and olive oils, etc. in the diet of the Mediterranean region, the foods have a certain protective effects on the growth and appreciation of anti-cancer cells and cardiovascular cells. In addition, a large-scaled study conducted in Spain also proofed that, the diets in the Mediterranean region lowered the risk of Type 2 diabetes (T2D) and the incidence rate of breast cancer.

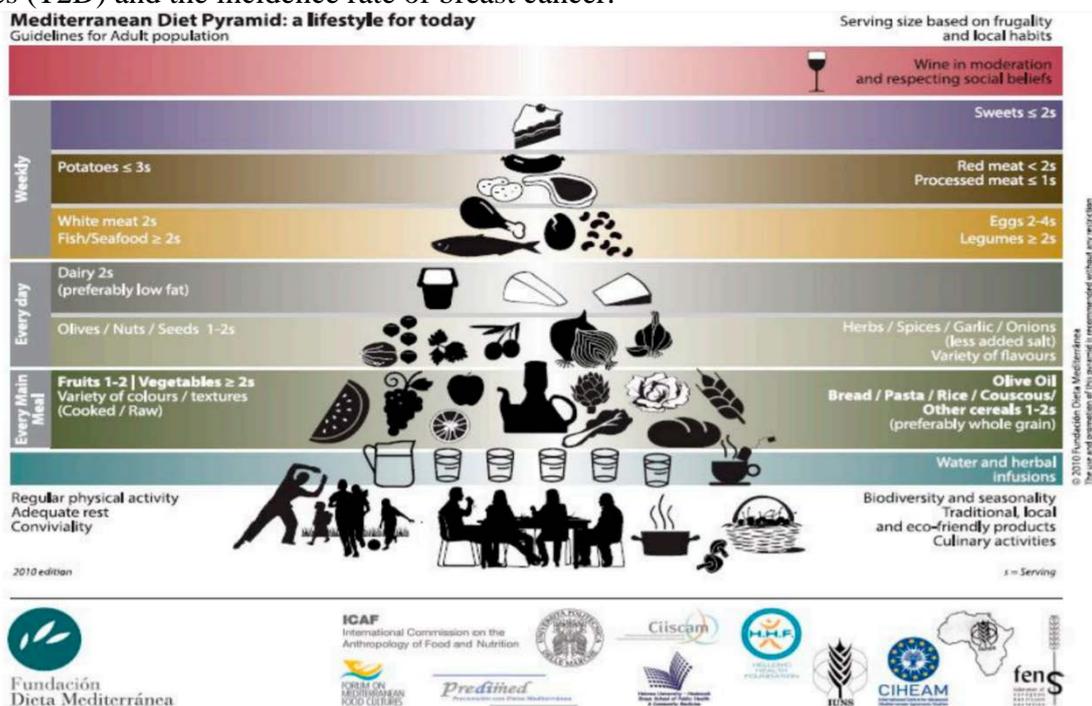


Figure 5. Mediterranean diet pyramid. Source: Fundación Dieta Mediterránea [22]

4.2. Diet in Northern Europe

In the past few years, the diet in Northern Europe has been one of the healthy diets which have been researched most. Therefore, the diet in Northern Europe has been the first choice for a healthy regional dietary pattern. It consists of healthy foods, including apple, pear, berry, root vegetable and crucifer, etc.; Wholewheat and brown bread is taken in as cereals; At the same time, fishes, low-fat dairy products, potatoes and vegetable fat, etc. are also taken in a large quantity [24]. However, there are also unhealthy foods in the diet of Northern Europe, including oleomargarine and sugar; At the same time, the intake of meat in the countries of Northern Europe is also the highest in the world. Therefore, the diet in Northern Europe greatly increases the risks of obesity, surplus weight and other diseases, especially, for the people who are of excessive sitting and who are slightly overweight. Therefore, Northern Europe has also proposed New Northern Europe Diet Guidance, the overall policies are shown below: Requiring for more heat from plant foods, reducing heat from meat products; Requiring for more foods from ocean and lake; Requiring for more foods from rural area; At the same time, three principles shall be followed: (i) health; (ii) gastronomic potential and Nordic

identity; and (iii) sustainability [25]. In accordance with the report of Ola K. Magnusdottir, et al. , it can be seen that, the diet of Northern Europe had good effects on lowering blood fat and low-grade inflammation; the diet in Northern Europe also lowers antioxidant lowered plasminogen activator, insulin resistance ceramide and blood fat; In addition, the diet in Northern Europe also relieves type 2 diabetes and reduce the effects of its complication, at the same time, it is also an important component for nutritional therapy and diabetes treatment[26].

5. Conclusions

Generally, the dietary pattern or diet structure in Sichuan is not reasonable sufficiently. The intake of most nutrients is insufficient, much lower than the dietary guideline for the residents in Sichuan. The intake of the microelements of Ca, Zn, Se and vitamin C, etc., is seriously insufficient, and the intake of protein and dietary fiber is also insufficient. Therefore, the intake of beans, bean products, vegetables, fruits, fishes, shrimps, eggs, milk and dairy products shall be enhanced; In addition, the special dietary habits in Sichuan lead to excessive intake of livestock and poultry meat, edible oils and edible salts by the residents, therefore, the intake of these foods shall be controlled; at the same time, reasonable diet and healthy lifestyle shall be advocated. And the residents in Sichuan shall be encouraged to do more sports and take more exercises. Meanwhile, the education and propaganda for the nutritional knowledge shall be strengthened to make the dietary pattern and diet structure in Sichuan more scientific and healthier.

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