

Benefit of Japanese Diet on Longevity and Chronic Diseases and Its Challenge

Boyu Fu

Department of Pharmacy, East China University of Science and Technology, Shanghai, 200237, China
Corresponding Author: 21013384@mail.ecust.edu.cn

Abstract:

Japanese life expectancy at birth in 2016 is the highest in G7 countries. The Japanese diet is renowned for its association with longevity and reduced risk of chronic diseases. Featured by a balance of fresh, seasonal ingredients, predominantly plant-based with moderate consumption of fish and meat, this diet offers various health benefits. Rich in nutrient-dense foods such as fish, seaweed, vegetables, and fermented soy products, it provides essential vitamins, minerals, and antioxidants crucial for people. The emphasis on fish, particularly fatty fish like salmon, welcomed best by Japanese, supplies omega-3 fatty acids, which are known widely because of their anti-inflammatory properties and cardiovascular benefits. Additionally, the inclusion of fermented foods promotes gut health, bolstering the immune system and reducing the risk of gastrointestinal issues. With less-processed foods and added sugars, the Japanese diet can effectively regulate healthy blood sugar levels and reduces the risk of obesity, diabetes mellitus, and cardiovascular diseases. Its holistic approach to nutrition underscores the profound impact of dietary choices on longevity and the prevention of chronic diseases.

Keywords: Japanese diet; Health benefit; Chronic disease.

1. Introduction

Longevity is always pursued by all the people around the world since ancients. According to the scientific research, researchers actually made some breakthrough. Technology, medicine, medical treatment, moderate physical exercise, etc., which are all beneficial for longevity. The Japanese diet is celebrated over the world span for its effect in promoting longevity and reducing the risk of chronic diseases. Rooted in centuries-old culinary traditions, this dietary approach emphasizes fresh, seasonal ingredients, and balanced meals. Core of the Japanese diet is an abundance of vegetables, fruits, and whole grains, providing necessary vitamins, minerals, and dietary fiber. These plant-based foods are not only nutritious but also low in calories, helping to maintain a healthy physique and reduce the risk of obesity-related diseases. For example, seafood has abundant omega-3 fatty acids, which are widely known for their anti-inflammatory properties and cardiovascular benefits. Lean protein sources support muscle health and overall well-being. The consumption of probiotic-rich foods like miso and pickled vegetables contributes to gut health, aids digestion, and may boost the immune system. The Japanese diet offers a holistic approach to nutrition, promoting longevity and reducing the

risk of chronic diseases through an appropriate combination of fresh, nutrient-dense foods and mindful eating habits. This paper will demonstrate the relationship between Japanese diet and longevity, chronic disease.

2. Components of the Japanese Diet

Japan is an island country in Pacific Ocean which determines Japanese people can rarely rely on land sources but have abundant marine sources. Traditional Japanese culinary practices and meal structure emphasize balance, aesthetics and simplicity. The sum of characteristic traditional Japanese foods (beneficial food components in the Japanese diet: rice, fish, soybeans, vegetables, eggs, and seaweeds; food components rarely used in the Japanese diet: wheat, milk, and red meat) was divided as tertiles (beneficial food components: -1, 0, 1; rarely used food components: 1, 0, -1)[1]. Researchers identified three dietary patterns by factor analysis: (1) a high-dairy, high-fruit and vegetable, high-starch, low-alcohol pattern; (2) an animal food pattern; and (3) a Japanese pattern. The Japanese dietary pattern was characterized by a higher intake of soybean products, seaweeds, pickles, green tea, vegetables, and fish; common to traditional Japanese food[2]. Japanese staple food is rice, which is deeply influenced by China. Rice was the largest contributor

(45.3%) for carbohydrates, followed by miso soup (3.4%) [3]. Other traditional diet like seafood (especially fish), sorts of vegetables, tofu, miso soup and soybeans. These mentioned above occupy a large market share. Another common ingredient include noodles (like soba and udon), soy sauce and green tea. Expect seafood, Japanese people also consumed meat particularly pork chicken and beef. However, the proportion cannot compare to the percentages of seafood and vegetables. Table 1 presents the percentage contributions of dish/recipe items to the total intake of energy and macronutrients (protein, fat, carbohydrates) [3]. The traditional Japanese diet typically has a balanced macronutrient composition, which builds on a appropriate standard of carbohydrates, protein and relatively low fat intake. For Japanese, the main source of carbohydrate intake is rice, which is usually served with every meal. Additionally, fish and seafood are always consumed sources of protein. They are always cooked in various ways like grilled, simmered or served as sushi or sashimi to remain the taste of the ingredients furthest. Vegetables with lightly cooked or served raw also play a significant role in Jap-

anese cuisine, which are full of fiber and other nutrition. What’s more, soy products like tofu, miso, and soy sauce are widely used for flavoring and protein. They are also seen as perfect sources of vegetable protein. Although people also get protein from meat, they have different benefits for physical health, and both essential. Another point, Japanese always emphasis deeply on seasonality and presentation. To ensure freshness and manner, they are highly valued in Japanese cooking. Using seasonal ingredients is basic but also necessary. In Japanese meal structure, drinking is also the one cannot be ignored. Miso soup always comes to beginning in Japanese meals, made from fermented soybean paste mixed with dashi and various ingredients like tofu and seaweed. Besides soup, tea is also a popular beverage which almost throughout Japanese history served with meals or enjoyed during the day. The last but not least, meals are often served on small plates or bowls, with attention to color, texture and arrangement. Overall, the Japanese meal structure tends to be well-balanced, incorporating amount of foods and flavors while promoting health and mindfulness.

Table 1. Dietary sources of nutrient consumption in a rural Japanese population [3].

Energy				Protein			
Rank	Description	%to the total	Cumulative%	Rank	Description	%to the total	Cumulative%
1	Rice	29.8	29.8	1	Rice	13.0	13.0
2	Miso soup	4.8	34.6	2	Miso soup	8.7	21.7
3	Milk	3.2	37.8	3	Roast fish	7.5	29.3
Carbohydrate				Fat			
1	Rice	45.3	45.3	1	Miso soup	7.1	7.1
2	Miso soup	3.4	48.7	2	Milk	6.7	13.8
3	Sweets	3.3	52.0	3	Roast fish	4.9	18.7

3. Health Benefits of the Japanese Diet

In an international comparison of recent mortality statistics among G7 countries, Japan had the longest average life expectancy, primarily due to remarkably low mortality rates from ischemic heart disease and cancer (particularly breast and prostate)[4]. Although since 1981, the leading cause of death in Japan has been cancer, which accounted for 27% of total deaths in 2018, followed by heart disease

at 15% [5]. The truth of Japanese longevity still can’t be ignored. Table 2 shows changes in life expectancy in the G7 countries (chosen 3 from 7) according to health statistics generated by the Organization for Economic Cooperation and Development (OECD) [6]. Japanese have the longest life expectancy and the lowest rate of all cause compared to UK and US . It can be attributed to the well-balanced culinary practise and meal structure.

Table 2. Mortality statistics in selected countries [6].

	Japan	UK	US
Life expectancy at birth in 2016			
Men	81.1	76.0	79.7

	Japan	UK	US
Women	87.1	81.0	83.2
Healthy life expectancy at birth in 2016			
Men	72.6	66.9	70.9
Women	76.9	70.1	72.9
Age-standardized death rates per 100,000 world standard population in 2016			
All causes	299	390	493
Cancer	103	122	114
Lung	20	27	28
Breast	5	10	9
Prostate	3	8	6
Cardiovascular disease	73	91	133
Ischemic Heart	32	48	79

4. Chronic Diseases

The Japanese cuisines are usually associated with lower risk of chronic diseases, and this part will explain several factors contribute to its health benefits. First of all, traditional Japanese culinary is rich in nutrient-dense foods such as seafood, vegetables and soybean products, which provide the necessary daily protein, carbohydrates and fiber to support overall health and prevent chronic disease. What's more, the Japanese diet always has low content of Saturated Fat. It comes to the reason that relies less on red meat and dairy products and more on lean sources of protein like fish and tofu. The low saturated fat intake diet may effectively reduce the risk of getting heart-related disease and stroke. Substitution of a serving of total red meat intake with alternative protein food consumed in a combination of poultry, fish, legumes, and nuts was associated with a healthier biomarker profile of inflammation

and glucose metabolism[7]. Then the Japanese diet is usually high in fiber from foods like vegetables, rice and seaweed. Fiber supports digestive health, helps regulate blood sugar levels and may reduce the risk of unhealthy conditions like obesity, type2 diabetes and colorectal cancer. A recent meta-analysis of 13 prospective studies has shown that lower blood adiponectin levels are associated with a higher risk for type 2 diabetes. Survey suggested that higher intake of coffee, vegetables and lower intake of alcohol may result in higher adiponectin[8]. Lastly, Japanese meal portions tend to be smaller compared to Western dishes, promoting moderation in food intake and helping to prevent overeating and obesity-related diseases. Fig. 1 showed the trend in systolic blood pressure (SBP) level for men and women. The figure for both men and women show that SBP levels have declined since around 1965 for men aged 50 years and older and for women in all age groups[9].

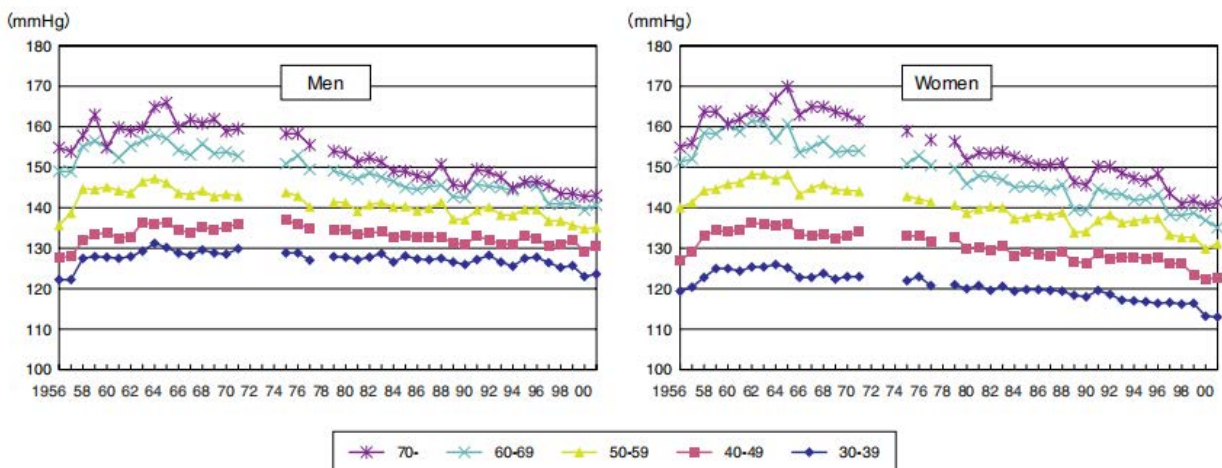


Fig. 1 Trends in systolic and diastolic blood pressures for men and women in Japan (1956-2001) [9].

5. Anti-Inflammation and Anti-Oxidant

To explore the health benefits of the Japanese diet, scientists finally draw conclusions attributed to several mechanisms related to inflammation and oxidative stress. This part will demonstrate some included primary factors. Macronutrient consumption and habitual overconsumption of food have the consequence of producing chronic levels of inflammation and the upregulation of adhesion molecules, leading to infiltration of the adipose tissue with macrophages. Over time the accumulation of macrophages and monocytes in the tissue alter the nature of the tissue, and the extensive tissue remodeling turns the adipose tissue into an endocrine organ that can mediate further levels of inflammation[10,11]. And Overconsumption of food leads to dysmetabolism a state where energy intake exceeds energy expenditure, and cellular oxidative stress ensues [12,13]. As a result, Japanese diet actually makes a positive difference in the health benefits. Japanese diet is actually composed of fruits, vegetables, tea and seafood, all of which are rich in antioxidants. These chemical substances help neutralize free radicals and reduce oxidative stress, which make benefits for inflammation and various disease. Seafood, particularly fatty fish like salmon, mackerel and sardines, is a staple of the Japanese diet and full of Omega-3 fatty acids, particular EPA and PHA. The anti-inflammatory properties of Omega-3s can help reduce inflammation in the body. These fatty acids are also proved to link to a lower risk of cardiovascular disease. What's more, traditional Japanese cuisine is always low in processed foods, which are often high in inflammatory ingredients like refined sugars and unhealthy fats. Instead, the diet mainly emphasizes fresh, whole foods, which can effectively reduce inflammation and oxidative stress. In addition, fermented foods like miso, natto and pickled vegetables are commonly consumed in the Japanese diet. These foods contain probiotics and prebiotics, which promote a healthy gut microbiome. A balanced gut microbiome can help regulate inflammation and oxidative stress. Lastly, Japanese cuisine emphasizes portion control and a balance of macronutrients. Meals typically include a variety of foods. This appropriate approach to eating can help maintain stable blood sugar levels and reduce inflammation. Japanese diet patterns also improved metabolic health, further enhancing the diversity and function of gut microbiota.

6. Cultural and Lifestyle Factors

The Japanese diet has deep relationship with cultural and

lifestyle factors, especially regarding social aspects of mealtime. These social rituals surrounding food not only support the enjoyment of having meals but also contribute to overall well-being by promoting mindfulness, reducing stress and strengthening social relationship within the community. Thus, the social perspectives of mealtime are integral to the holistic understanding of the Japanese diet and its cultural significance. In addition to the dietary components, the social perspectives surrounding mealtime contribute to the health and longevity observed in Japanese culture. Regular physical activity, such as running or cycling as part of daily routines, complements the nutrient-rich diet. Yojo kun showed how illness could be prevented through lifestyle changes, for example, “don't make your stomach full and reduce meat in diet, walk after the meal and don't sit at one place for long time, get up early and work hard, don't be lazy”[14]. Moreover, Japanese lifestyle habits emphasize moderation and balance, including portion control and mindful eating practices. The social perspective of mealtime further enhances these habits, as meals are often shared with family or friends, fostering a sense of community and connection. This communal dining experience encourages slower eating and conversation, allowing Japanese to enjoy their food and recognize feelings of fullness, which may prevent over-eating. Additionally, the tradition of expressing gratitude before meals promotes mindfulness and appreciation for the nourishment provided by food. Overall, these social perspectives of mealtime in Japanese culture contribute to healthier eating habits, improved digestion, and enhanced overall well-being.

7. Challenge and Chance

7.1 Changing Dietary Patterns in Japan

Changing dietary patterns in Japan are facing several challenges and chances. One challenge is the influence of Westernization, making the consumption of over-processed foods, sugary beverages and fast food increased greatly these years. The current changing conditions provide an opportunity to examine more closely some important health conditions associated with the changed lifestyle and concentrations of dietary total fat and saturated fatty acid, and the ratio of n-3 to n-6 polyunsaturated fatty acids in the diet[15], which may increase the risk of obesity and chronic diseases. Additionally, economic factors such as busy lifestyles and the high cost of fresh, traditional foods may deter individuals from adhering to healthier dietary parts. Cultural factors also play a significant role, as

traditional Japanese meals often involve intricate preparation techniques and specific ingredients that may have some difficulties to replicate or access in modern times. Moreover, generational shifts and globalization have led to changes in food preferences in the young, further complicating efforts to promote traditional dietary patterns. Furthermore, there may be resistance to change among individuals who are accustomed to certain eating habits or the people perceive Western dishes as modernity or symbols of success. Addressing these challenges requires comprehensive approaches that encompass education level, public health campaigns, policy interventions, and promotion of local and traditional foods. Additionally, efforts to make people affordable and accessible to choose more healthy options can help facilitate dietary changes and promote long-term health in Japan.

7.2 Globalization and Potential Impact on Traditional Diet

Globalization also brings both challenges and chances for the traditional Japanese diet. Globalization can affect the accessibility and affordability of traditional Japanese ingredients, particularly in nonnative regions. As a result, there may be a decline in the consumption of fresh fish, tofu, seaweed, and other staple foods, impacting both dietary diversity and nutritional intake. Cultural influences from other countries through media, advertising, and international cuisines may also influence food preferences and eating habits among Japanese populations. This can lead to a loss of culinary traditions and practices associated with the traditional Japanese diet. However, there are also opportunities for the traditional Japanese diet to adapt and evolve within the context of globalization. Increased awareness of the health benefits of Japanese cuisine, such as its emphasis on fresh, seasonal ingredients and umami-rich flavors, may lead to its increasing global popularity. Moreover, efforts to promote Japanese culinary heritage through initiatives list can help preserve traditional dietary practices amidst globalizations. Overall, while globalization poses challenges to the traditional Japanese diet, there are also opportunities for its continued relevance and adaptation in an increasingly interconnected world. How to balance the preservation of culture heritage with the advantages of globalization remains an important consideration in ensuring the sustainability and healthfulness of dietary practices in Japan and beyond.

7.3 Adapting Japanese Dietary Principles to Other Cultures

There are also several challenges and considerations can't be ignored for other countries to adapt Japanese dietary principles. Firstly, it is not completely sure that availabil-

ity and accessibility of traditional Japanese ingredients can circulate in all regions, making it challenging for individuals to replicate the exact diet. Additionally, cultural preferences and tastes vary widely, so certain aspects of the Japanese diet, such as raw fish or fermented foods, may not be widely accepted or appealing to everyone. Moreover, the traditional Japanese diet emphasizes smaller portion sizes and an appropriate variety of foods, which may differ from the larger portion sizes and dietary habits of other cultures. Adapting to the Japanese approach to portion control and food selection requires a shift in mindset and eating habits, which can be challenging for individuals accustomed to different culinary traditions. Furthermore, cultural norms and mealtime practices differ across societies, impacting the social aspect of dining. For example, the emphasis on communal eating and shared dishes in Japanese culture may not be consistent with the dining customs of other cultures. Finally, while the Japanese diet is closely related to various kinds of health benefits, its effectiveness in preventing chronic diseases may vary depending on other lifestyle elements like physical activity levels and overall dietary patterns. In conclusion, while adopting Japanese dietary principles can offer health benefits, it requires careful consideration of cultural differences, food availability and individual preferences to ensure successful integration into other cultures.

8. Conclusion

In conclusion, the Japanese diet offers a wealth of health benefits supported by numerous necessary findings. Its emphasis on fresh, minimally processed foods. The implications for public health stemming from the Japanese diet are significant and multifaceted. The evidence found to support the health benefits of this dietary pattern underscores the importance of incorporating similar principles into public health initiatives and dietary guidelines worldwide. Overall, the Japanese diet offers valuable insights into promoting public health through dietary interventions, emphasizing the importance of whole foods, balance, and cultural aspects of mealtime. By integrating these principles into public health policies and dietary guidelines, governments can empower individuals to make informed choices that support their overall well-being and contribute to a healthier society.

While the promising results in promoting longevity and reducing the risk of chronic diseases of Japanese diet can be seen directly, there are several avenues for future research to further explore and validate its health benefits. Firstly, longitudinal studies tracking individuals' adherence to the Japanese diet over time can provide deeper research into its long-term influence on health outcomes,

including mortality rates, incidence of chronic diseases, and overall quality of life. Understanding the basic logic of how dietary patterns evolve and influence health outcomes over the lifespan is crucial for informing public health policies and interventions. Secondly, researches focusing on specific components of the Japanese diet, such as individual food groups or nutrients, can help explain the mechanisms underlying its protective effects against chronic diseases. Additionally, studies examining the cultural, socioeconomic, and environmental factors that make influence on dietary behaviors and food choices in Japan and other countries can provide valuable insights into promoting healthier eating habits on a global scale. Understanding how cultural traditions, food availability, and socioeconomic status intersect with dietary patterns can inform targeted interventions to improve public health outcomes. Furthermore, research exploring the feasibility and effectiveness of adapting the Japanese diet to diverse cultural contexts and dietary preferences can help tailor dietary recommendations to different populations while preserving its core principles of balance, moderation, and whole foods. In general, future research directions should put emphasis on longitudinal studies, mechanistic investigations, cultural influences and adaptation strategies to further elucidate the health benefits of the Japanese diet for longevity and chronic disease prevention and to inform evidence-based dietary guidelines and public health interventions.

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