

Relationship between Dietary Habits and Nutritional Health, and the Characteristic Diseases of Indian Residents

Haotian Tan

Guangdong Experimental High school, Guangzhou, China

dunuoyi@ldy.edu.rs

Abstract. This article deeply explores the complex links between dietary habits, structure, nutritional health, and disease characteristics of Indian residents. It first details the living environment and dietary background based on India's agricultural traits, including geographical location and main cash crops. Then, it analyzes the causes of specific diseases in the field of nutritional health and their relationship with dietary practices, covering disease types, causes, and associations with dietary structure. Thirdly, the dietary intake and health status of the affluent and poor people in India are analyzed detailly. It also assesses the health status and common diseases of the local population, analyzing how these relate to dietary habits and structure, considering recommended nutrient intakes. Finally, by comparing India's overall diet with those of developed countries like the US and developing countries like China, the article highlights dietary differences. These analyses aid in developing more scientific dietary guidelines and agricultural policies to enhance national health levels.

Keywords: Dietary habits, Indian, Health status.

1. Introduction

India is a vast country with remarkable geographical, climate, cultural, and economic diversity. Together, these factors have shaped India's unique living environment, eating habits, and agricultural system.

It is well known that, India is located in the South Asian subcontinent, surrounded by the Bay of Bengal and the Arabian Sea. It is divided into seven geographical regions: the mountains in the north, the Deccan Plateau in the middle, the plateau in the south, the plains in the east and west, and the Himalayas in the northeast and their surrounding areas. India has diverse climates, from tropical rainforests to temperate grasslands, from deserts to high mountains. The environment of India comprises some of the world's most biodiverse ecozones. The Deccan Traps, Gangetic Plains and the Himalayas are the major geographical features. The country faces different forms of pollution as its major environmental issue and is more vulnerable to the effects of climate change being a developing nation. India has laws protecting the environment and is one of the countries that signed the Convention on Biological Diversity (CBD) treaty. The Ministry of Environment, Forest and Climate Change and each particular state forest departments plan and implement environmental policies throughout the country [1]. The monsoon has a significant impact on agriculture in India, especially the southwest monsoon in summer and the northeast monsoon in winter, which brings sufficient rainfall to India, but at the same time, the monsoon often causes floods and droughts, affecting agricultural production.

The geographical environment determines biological characteristics. Indian agriculture depends on monsoon rainfall, and the main crops include rice, wheat, corn, beans, cotton, and sugar cane. India is one of the largest producers of rice and wheat in the world. Among them, rice is mainly grown in the humid south and east, while wheat is more common in the arid areas of the north. In addition, India is also one of the world's largest cotton producers, and sugarcane cultivation is mainly concentrated in Karnataka and Maharashtra in the northeast. On one hand, crop diversity leads to Indian food diversity. Common staple foods include rice, noodles, beans, and various vegetables. Curry is the core element of Indian cuisine, and different regions have their unique spices and cooking methods. Most of the oils and fats in the Indian diet come from vegetable oils, such as mustard oil and peanut oil. On the other hand, the Indian food culture is rich and diverse, which is influenced by religious, historical, and cultural except for geographical factors. Vegetarianism is widespread in Indian society, and Hindus and other faiths have a strong preference for vegetarianism. These influence and determine the health and disease of Indian residents.

India has finely processed foods, such as white rice and white flour, which may lead to the loss of vitamins and minerals, especially B vitamins, iron, and calcium. Secondly, some spices in curry, such as chilly and ginger, can promote digestion, but excessive intake may cause problems such as excessive stomach acid. More serious, some characteristic diseases are caused by their diets. Firstly, a high-carbohydrate and high-sugar diet, especially refined grains and sugary drinks, is associated with obesity and type 2 diabetes. Secondly, insufficient iron absorption in the diet or lack of iron-rich foods can easily lead to anemia. Finally, the widespread consumption of spicy and fried foods, as well as poor sanitation, may increase the risk of gastritis and enteritis. In summary, India's living environment, eating habits, agricultural system, and nutritional health are closely related. Taking the example of rich and poor people in India, this article focuses on the relationship between nutrition, health issues, and characteristic diseases of Indian residents and their diets. Understanding these associations helps to develop healthier dietary guidelines and agricultural policies to promote national health.

2. Common nutritional health diseases in India and their relationship with dietary habits

Nutrition is a cornerstone of a healthy society, yet India faces substantial challenges when it comes to nutritional well-being. Despite progress in various sectors, common nutritional problems in India persist and impact a substantial portion of the population. These problems encompass a wide variety of challenges, from malnutrition to overnutrition. It is vital to understand 'what are the nutrition problems in India' due to their direct impact on the well-being and quality of life of individuals and their families [2]. And also, nutrition health issues and characteristic diseases in India are closely related to the country's dietary structure, socio-economic conditions, population distribution, and traditional lifestyle. The following will discuss some common nutritional health diseases in India and their relationship with dietary habits.

There is a serious food security problem in India, especially in rural areas, which leads to nutritional deficiency. In addition, the lack of a diverse diet, especially iron-rich foods, can easily lead to anemia. The high proportion of vegetarians and low food diversity are the main factors leading to such nutritional problems.

The pathogenesis of diabetes is mainly due to insufficient insulin secretion in the body or reduced sensitivity of cells to insulin, resulting in an abnormal increase in blood sugar levels. Diabetes is closely related to poor eating habits, including excessive consumption of refined sugar, high-fat foods, and processed foods, and lack of physical exercise. Diet is related to a high-sugar diet, unbalanced carbohydrate intake, and low-fiber diet are important reasons for the high incidence of diabetes. What's more, these eating habits lead to weight gain, which in turn aggravates insulin resistance and increases the incidence of diabetes. Excessive intake of high-calorie, high-sugar, and high-fat foods, as well as reducing the intake of dietary fiber, are the reasons for the increase in obesity and related chronic diseases (such as diabetes and hypertension) for people who are well-off in India. Obesity and related diseases are mainly caused by the accelerated urbanization in India, accompanied by changes in diet

patterns, from traditional grains to sugary drinks, fast food, and high-fat foods. In addition, the sedentary lifestyle also aggravates the problem of obesity.

Hyperlipidemia is mainly manifested as excessive cholesterol and triglycerides in the blood. Excessive intake of saturated fat and trans-fat (common in fast food, baked goods, etc.), as well as a low-fiber and high-salt diet, can promote the occurrence of hyperlipidemia. This will lead to atherosclerosis and increase the risk of heart disease and stroke. Hypertension is caused by a decrease in the ability of blood vessels to withstand blood pressure, resulting in greater pressure when the heart pumps blood, which promotes blood flow. A high-sodium diet is an important factor in hypertension. Excessive salt intake will cause water retention in the body, thus increasing blood volume and blood pressure. In addition, a high-sugar and high-fat diet is also related to high blood pressure, which may indirectly affect blood pressure through weight gain and insulin resistance.

Cardiovascular disease is also a common disease in India. Bad eating habits, such as high salt, high saturated fat, high cholesterol intake, and lack of fresh vegetables and fruits, can increase the risk of cardiovascular disease.

In summary, India's health status is complex and diverse, affected by many factors, among which eating habits play a key role in overall health and the occurrence of specific diseases. The following will explore in depth the health status of the Indian population, focusing on diabetes, hyperlipidemia, and hypertension, analyzing the relationship between these diseases and eating habits, and discussing how the nutrients recommended by the human body affect these health problems.

3. The diet of rich people in India

As we know that in northern part of India the food is semi variable for even upper middle-class people, like rice and roti/chapati/Indian flat bread remains constant only thing that changes are what people eat with it. However, very rich people (>100 cr) eat like Bollywood stars, Ambani's, cricketers, Jindal's from people who are first in their generation to be rich, to people with generational wealth. What's more, like do they also eat roti- with lauki/bhindi ki sabji or daal chawal fir something which middle class mind is not even considering [3]. India's nutrition and health are deeply influenced by its socio-economic background and food culture. With the acceleration of urbanization and modernization, traditional eating habits are gradually changing, and this change has had a profound impact on public health. The key to improving nutrition and health is to educate the public about the importance of a healthy diet, promote a diversified and balanced diet structure, and take measures to improve food safety, especially for poor and marginalized groups. In addition, policy-level support, health orientation in the food industry, and public health intervention are also indispensable parts of improving nutrition and health. Through comprehensive strategies including but not limited to health education, nutrition guidance, policy adjustment, and socio-economic development, the people can effectively respond to the nutritional and health challenges faced by India and promote the improvement of national health.

India's food culture is rich and diverse, and eating habits vary depending on the region and family's economic situation. But in general, Indians tend to eat plant-based food, especially in relatively wealthy families.

3.1. Daily food intake and structure

Humans require macronutrients and micronutrients to provide energy and meet functional needs. Carbohydrates, protein, and fats are three main macronutrients for people. In India, rice (such as fragrant rice, glutinous rice, etc.), whole wheat noodles (such as roti, and chapati), and various grains are the main sources of staple food. These foods are rich in carbohydrates and provide energy for the body. However, excessive intake of high-sugar, and high-calorie foods, especially large consumption of processed foods and sugary drinks, will increase the risk of diabetes.

Common plant protein sources in the Indian diet include beans, lentils, tofu, and dairy products (such as cream or milk). Beans (such as chickpeas, black beans, and soybeans) are rich in dietary fiber and unsaturated fat, as also rich in protein, especially lysine, which make important contributions to health. For example, chickpeas are not only high in protein but also iron and a variety of vitamins. Wealthy

families may consume more meat, such as chicken, fish, mutton, or beef. Animal proteins usually provide more trace elements than plant proteins, such as iron, zinc, and vitamin B12.

Coconut oil, sesame oil, peanut oil, etc. are common edible oils, that provide essential fatty acids, including unsaturated fatty acids, which are conducive to healthy heart function. In wealthy families, high-quality animal oils, such as butter, sheep fat, or vegetable oil (fry, butter) can be used.

Vegetables (such as kale and kale) and fruits (such as mango and citrus) provide rich vitamins C, A, K, and various B vitamins, which are essential for the immune system, vision, and skin health. Beans, green leafy vegetables, and nuts are rich in iron, calcium, magnesium, and other minerals. Children and pregnant women need to promote healthy bone development and meet nutritional needs.

3.2. The health status and initiatives for balance of rich people in India

In general, the diet of wealthy families in India focuses on balance and diversity to ensure adequate nutrition from multiple sources. However, attention should be paid to the diversity of diets to avoid the problem of overnutrition or deficiency. Complex carbohydrates (such as whole grains and beans) should take precedence over refined sugar to provide a stable source of energy and reduce blood sugar fluctuations. High-quality protein sources, such as beans, nuts, fish, and lean meat, are conducive to maintaining muscle health and repairing tissues. Polyunsaturated fat and monounsaturated fat (such as olive oil and fish oil) replace saturated fat, which helps to maintain heart health and reduce the risk of inflammation. By improving the diet structure, reducing the intake of high-sugar, high-fat, and high-salt foods, and increasing the intake of fiber-rich, whole grains, fresh fruits, and vegetables, it can effectively reduce the risk of the above health problems and promote overall health. At the same time, regular exercise and healthy lifestyle choices are also key factors that cannot be ignored.

4. The diet of poor people in India

Researches finds that often the poor eat only rice. They cannot afford vegetables, fish or meat. As a result, most of the children are anemic. Many of the villagers obtain their meals from poorly maintained road side shops as the women of the home work from morning to evening outside the house and cannot prepare meals [4]. The diet of the poor in India reflects various challenges and complex socio-economic backgrounds. These situations are affected by many factors, such as geography, culture, traditional customs, economic conditions, and infrastructure.

4.1. Daily food intake and structure

In rural and urban slums in India, most people's diet is mainly carbohydrates, especially wheat, rice, beans (such as red beans, and black beans), corn, and various tuber foods. The consumption of vegetables, fruits, and meat is relatively low, especially for low-income families. Meat and fish are often considered food for special festivals or celebrations. In the Indian diet, the consumption of dairy products is also gradually increasing, especially in the northern and central regions.

The sources of carbohydrates are wheat and rice: these are the most common staple foods for Indians, providing a lot of energy. Beans not only provide protein but are also an important source of carbohydrates, iron, and other micronutrients. Tuber plants, such as sweet potatoes and potatoes, as part of the diet can supply carbohydrates. The protein mainly comes from beans for poor people in India. In addition to rice, beans such as soybeans, black beans, chickpeas, etc. are the main sources of protein. Another main protein source is dairy products, milk. Milk is becoming more and more popular in families with poor financial conditions. Fat-based vegetable oil, such as soybean oil, sunflower oil, or mustard oil commonly used in Indian families, which can supply them with fats. Additionally, although nuts and seeds are not a regular food, in some areas, such as northern India, nuts and seeds occasionally provide fat and protein as snacks.

4.2. The health status and initiatives to improve poor people's health in India

India's population health dynamics are multifaceted, with many social, economic, and environmental factors affecting the overall health of its people. India's health landscape is characterized by a two-sided

disease burden, with a long-term prevalence of communicable diseases and a fast-growing prevalence of NCDs (non-communicable diseases) such as cardiovascular disease, diabetes, and respiratory diseases. Infectious diseases such as tuberculosis, malaria and HIV/AIDS continue to be major public health threats, especially in poor and rural areas. Maternal and child health indicators continue to be worrying, with high rates of maternal and neonatal mortality, and child malnutrition [5]. Vitamin A and iron deficiency are relatively common in poor areas, affecting the growth, development, and immunity of children. Micronutrient deficiency, including vitamins B, C, D calcium, zinc, etc., are common health problems for poor people, especially children and pregnant women. With the change in diet structure and the modernization of lifestyle, the incidence of diabetes, hypertension, and heart disease has increased. Infectious diseases Although modern health care has improved, malnutrition is still one of the main factors leading to diarrhea, respiratory infections, and other infectious diseases in children.

To improve poor people's nutrition and health, a series of measures need to be taken. This includes public nutrition programs, agricultural education and promotion, and improving health awareness. Public nutrition programs aim to increase nutritional intake through school lunch programs, nutritional support for pregnant women, and other programs [6]. Agricultural education and promotion provide training on crop diversity and efficient farming methods to increase food self-sufficiency. Improve citizens' awareness of healthy diets and balanced nutrition through community health education activities. In short, the diet of the poor in India reflects complex socio-economic challenges, and improving this situation requires multi-faceted efforts, from improving food supply to raising health awareness and providing nutrition education. India's eating habits are largely influenced by its long history, geographical diversity, religious beliefs, climatic conditions, and the level of economic construction, forming a rich and diverse food culture.

5. Comparison of Indian diet with other developed and developing countries

To provide recommendations for improving the health of Indians. Some characteristics of the Indian diet and its comparison with developed and developing countries (such as China) are summarized. The average daily calorie consumption in India is below the recommended 2503 kcal/capita/day across all groups compared, except for the richest 5% of the population. Calorie share of whole grains is significantly higher than the EAT-Lancet recommendations while those of fruits, vegetables, legumes, meat, fish and eggs are significantly lower. The share of calories from protein sources is only 6–8% in India compared to 29% in the reference diet. The imbalance is highest for the households in the lowest decile of consumption expenditure, but even the richest households in India do not consume adequate amounts of fruits, vegetables and non-cereal proteins in their diets. An average Indian household consumes more calories from processed foods than fruits [7].

5.1. Comprehensive diet in India

5.1.1. Main food sources. India's diet is mainly grains, especially rice, and wheat, followed by beans, vegetables, dairy products, and various spices. The proportion of meat in the diet varies from region to region. The southern region prefers vegetarian food and the northern region prefers meat.

5.1.2. Health and nutrition challenges. India faces various health challenges, including malnutrition, micronutrient deficiency (such as vitamin A and iron), obesity, and chronic diseases (such as diabetes and cardiovascular disease). The widespread nutritional imbalance in the diet has a great impact on children and pregnant women.

Obesity and malnutrition coexist: India's health status shows obvious polarization. Due to the consumption of high-calorie and high-fat foods, residents in urban areas are at risk of obesity and related diseases, while rural areas have serious malnutrition, especially vitamin and mineral deficiency. The increase of non-communicable diseases: With the process of industrialization and changes in lifestyle, cardiovascular diseases, diabetes, and other non-communicable diseases are gradually becoming major

challenges to public health. The burden of chronic diseases: Chronic diseases such as hypertension, diabetes, and heart disease have become the main burden of national health in India.

5.1.3. Socio-economic factors. Low-income families are often limited by purchasing power, resulting in insufficient sources of vegetables and protein in their diet, and more dependence on lower-cost grains and beans. This may lead to malnutrition and health problems.

5.2. Comprehensive diet of developed countries

5.2.1. Diversity and convenience. In developed countries such as the United States, food supply is extensive and diversified, from fast food to exquisite catering. Convenience food occupies an important position in daily life, and fast food and processed food are consumed in large quantities.

5.2.2. Nutrition education and policies. Developed countries have a perfect nutrition education system and food safety regulatory agencies to encourage healthy eating through policies, such as reducing the intake of salt, sugar, and saturated fat.

5.2.3. Chronic disease prevention. Developed countries attach great importance to the prevention of chronic diseases such as heart disease and diabetes, and support health management through public health publicity, healthy diet guidelines, and a medical insurance system.

5.3. Chinese comprehensive diet

5.3.1. Changes in diet structure. With the development of the economy, China has transformed a traditional diet to a richer and more diverse diet. The popularity of Western fast food and processed food, especially in urban areas.

5.3.2. Eating habits. The traditional Chinese diet is mainly based on grains, vegetables, beans, and an appropriate amount of meat, emphasizing balance and seasonality. However, in recent decades, diet patterns have begun to be affected by globalization, and the consumption of high-calorie and high-fat foods has increased.

5.3.3. Nutrition. Similar to India, China also faces the challenge of nutritional imbalance, especially between urban and rural areas. Urban residents may be at risk of consuming too much animal fat and high-sugar foods, while malnutrition is still prevalent in rural areas.

In a word, India, developed countries, China, and other developing countries all have their unique dietary conditions and face different health challenges. Developed countries tend to provide a more balanced and nutritious diet, while India, China, and other developing countries try to balance the impact of traditional eating habits and modern lifestyles to meet the nutrition and health problems brought about by rapid urbanization and globalization, all countries are exploring effective strategies to promote the formation of healthy eating culture and improve people's nutrition and health [8].

6. Conclusion

India's food culture is rich and diverse, and eating habits vary depending on the region and family's economic situation. But in general, Indians tend to eat plant-based food, especially in relatively wealthy families. On the contrary, nutritional deficiency is common for Indian poor people, especially in rural areas, due to the serious food security problem. Some key aspects, such as daily food intake and the structure of rich and poor people are discussed in detail in this article. In wealthy families, high-quality animal oil, such as butter, sheep oil, or vegetable oil (oil puff, butter), can be used. The abundance of material life and changes in modern lifestyles have made diseases such as obesity, high blood sugar, high blood lipids, and heart disease common afflictions among the wealthy in India. Improving and balancing diet structure can effectively reduce the risk of the above health problems and promote overall

health. At the same time, regular exercise and healthy lifestyle choices are also key factors that cannot be ignored. For people living in poverty, public nutrition programs, agricultural education and promotion, and improving health awareness will help the government and society work together to improve people's living conditions and material provisions. Furthermore, drawing on some initiatives from both developed and developing countries is also an effective solution. In summary, whether it is the government, society, or individuals, all should actively improve the dietary structure balance nutrient intake based on the current situation, and work together to enhance the overall health level.

References

- [1] Dar, S.A., Dar, S.A., Nabi, M. (2022). *Conservation of Biodiversity in India: Current Status and Future Strategies*. In: Rani, M., Chaudhary, B.S., Jamal, S., Kumar, P. (eds) *Towards Sustainable Natural Resources*. (Springer, Cham.) https://doi.org/10.1007/978-3-031-06443-2_11
- [2] Sendhil, R., Kumara, T. K., Ramasundaram, P., Sinha, M., & Kharkwal, S. (2020). Nutrition status in India: Dynamics and determinants. *Global Food Security*, 26, 100455. <https://www.sbigeneral.in/blog-details/8-common-nutritional-problems-in-india>
- [3] Pandey, B., Reba, M., Joshi, P.K. et al. (2020). Urbanization and food consumption in India. *Sci. Rep.*, 10, 17241. <https://doi.org/10.1038/s41598-020-73313-8>
- [4] Mohidem, N. A., Hashim, N., Shamsudin, R., & Che Man, H. (2022). Rice for food security: Revisiting its production, diversity, rice milling process and nutrient content. *Agriculture*, 12(6), 741.
- [5] Soman, B., Lathika, A.R., Unnikrishnan, B. et al. (2023). Tracing the Disparity Between Healthcare Policy–Based Infrastructure and Health Belief–Lead Practices: A Narrative Review on Indigenous Populations of India. *J. Racial and Ethnic Health Disparities*. 1-12. <https://doi.org/10.1007/s40615-023-01810-3>
- [6] Raghunathan K, Headey D, Herforth A. (2021). Affordability of nutritious diets in rural India. *Food Policy*. 99, 101982. <https://doi.org/10.1016/j.foodpol.2020.101982>
- [7] Sharma, M., Kishore, A., Roy, D. et al. (2020). A comparison of the Indian diet with the EAT-Lancet reference diet. *BMC Public Health*. 20, 812. <https://doi.org/10.1186/s12889-020-08951-8>
- [8] Dubé, L., Fatemi, H., Lu, J., & Hertzler, C. (2016). The healthier the tastier? USA–India comparison studies on consumer perception of a nutritious agricultural product at different food processing levels. *Frontiers in public health*, 4, 6. <https://doi.org/10.3389/fpubh.2016.00006>