

# The Impact of Different Dietary Habits on Human Health

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**Abstract.** With the improvement of living standards, more and more people are no longer satisfied with merely being full; they have begun to pursue better quality ingredients and healthier eating habits. However, the public still lacks sufficient awareness of the crucial role of protein in the body. Current research on dietary habits generally focuses on carbohydrates and fats. Most research reports suggest that excessive fat intake affects human health, and excessive carbohydrate intake tends to cause obesity. The impact of protein on the body remains a relatively underexplored area, with insufficient papers and a relatively narrow discussion direction. This paper, based on the current dietary issues among the Chinese population, conducts a detailed analysis of different dietary habits, compares three different dietary habits, and finds that a high-carbohydrate diet is suitable for people engaged in long-term high-intensity physical labor, a low-carbohydrate diet is suitable for people engaged in long-term moderate or low-intensity labor, and a high-protein diet is suitable for ordinary individuals with insufficient muscle mass and low physical activity, as well as athletes. These findings can enable the public to have a deeper understanding of the significance of protein in the diet and adjust their eating habits accordingly. However, this discussion lacks studies on the effects after adjustment and requires follow-up experiments.

**Keywords:** High-carbohydrate diet, Low-carbohydrate diet, High-protein diet.

## 1. Introduction

In 2017, the overweight and obesity rate among Chinese people reached 32.7%, and this figure continues to rise. As of 2024, according to data released by the Chinese National Health Commission, the overweight and obesity rates among Chinese people reached 34.3% and 16.4% respectively, with more than half of the Chinese population being overweight or obese. As the quality of life improves, more people are paying attention to physical health, hoping to control their weight and thus avoid chronic diseases such as hyperlipidemia, hyperglycemia, hypertension, and gout. Among the seven essential nutrients required by the human body, the public has a relatively unified understanding of fats, but many people lack sufficient knowledge of protein and carbohydrates. A 2018 study indicated that the median protein intake at breakfast, lunch, and dinner among elderly individuals in fifteen Chinese provinces was 0.22, 0.34, and 0.33g/kg, respectively, which is significantly lower than the recommended intake of 0.4g/kg [1]. Therefore, Chinese people's understanding of the role of protein in dietary nutrition needs to be enhanced.

Currently, dietary habits among Chinese citizens are diverse, with high-carbohydrate, high-fat, and high-protein diets (HPDs) being the most common. High-fat dietary habits are generally regarded by the public as unhealthy; thus, the current mainstream media and government advocacy emphasize reducing fat intake, paying less attention to other dietary habits. However, such advocacy has certain issues. Each individual's physical condition is different, and suitable dietary habits should be adjusted according to the actual situation. For example, diabetic patients need to reduce carbohydrate intake, and patients with fatty liver need to reduce almost all energy intake. Therefore, different dietary habits are suitable for different groups of people, and one cannot simply magnify the shortcomings of a particular nutrient.

This paper studies the impact of different dietary habits (high and low carbohydrates and high protein) on human health, reviews existing literature discussing the pros and cons of different dietary habits, and explores their impact on renal burden, cardiovascular health, and overall human health.

## 2. Comparison Between Different Dietary Habits

According to the Dietary Nutrient Reference Intakes for Chinese Residents (2023 Edition), the proportion of energy provided by carbohydrates in a day's activities should be 50-60%, fats should account for 20-30%, and proteins should account for 15-20% [2]. Thus, the characteristics of high-carbohydrate, low-carbohydrate, and HPDary habits are clear: adjusting the proportion of energy provided by corresponding nutrients during daily activities. Consequently, the energy proportions of other nutrients are also reduced. According to existing literature, different dietary habits each have their own advantages and disadvantages. Below, I will analyze the characteristics, advantages, and disadvantages of high-carbohydrate, low-carbohydrate, and HPDary habits one by one.

### 2.1. High-Carbohydrate Diet (HCD)

A HCD refers to a dietary habit where carbohydrates provide more energy than the normal proportion in daily activities. This dietary habit is often found among university students and people engaged in high-intensity physical labor. Carbohydrate sources are widespread, including staple foods such as rice and wheat (starch), various sugars (sucrose, maltose), and syrups.

The advantage of this dietary habit lies in its ability to provide a large amount of energy supply. Carbohydrates are metabolized quickly in the body, rapidly converting into glucose for absorption and utilization by cells. However, such a dietary habit also brings significant problems. High carbohydrate intake can affect the intake of other essential nutrients such as protein, vitamins, and minerals, possibly leading to deficiencies of some key nutrients and negatively impacting health.

More importantly, the introduction of a large amount of carbohydrates increases the risk of hypertension. Moreover, plant-derived and animal-derived carbohydrates have opposite effects on the incidence of hypertension. Research data from September 2023 show that people with a total carbohydrate energy supply ratio of 65.95–73.32, 73.33–77.65, and  $\geq 77.66$  had 1.3, 1.21, and 1.32 times the risk of hypertension, respectively, compared to those with a ratio below 65.95, and this relationship was more pronounced in urban populations. Thus, a HCD may be a risk factor for hypertension. Interestingly, the higher the intake of plant-derived carbohydrates, the higher the risk of hypertension; whereas, the higher the intake of animal-derived carbohydrates, the lower the risk [3]. In cities compared to rural areas, the impact of carbohydrates on hypertension incidence is greater, possibly because high-intensity physical labor in rural areas greatly consumes the energy produced by carbohydrates.

Another study shows that the fiber content in carbohydrates directly affects the incidence of diabetes, with a U-shaped relationship between carbohydrate fiber ratio and the risk of developing type 2 diabetes [4].

For people engaged in long-term high-intensity physical labor, a HCD is appropriate. Their daily physical labor can effectively consume the carbohydrates ingested while providing sufficient energy for long working hours. For short-term explosive high-energy consumption, such as athletes or soldiers, sufficient carbohydrate support is also necessary. However, for sedentary office workers or students, a HCD is unsuitable. Excessive energy intake will be stored as body fat over time, leading to obesity and associated issues like hyperlipidemia, hypertension, atherosclerosis, and diabetes, which pose direct threats to health.

### 2.2. Low-Carbohydrate Diet (LCD)

An LCD refers to a dietary habit where carbohydrates provide less energy than the normal proportion. Carbohydrates are rapidly converted into energy, while proteins and fats convert more slowly. Thus, reducing carbohydrates reduces blood sugar levels, which explains why diabetic patients control their diet mainly by restricting carbohydrate intake.

The advantages of this diet are evident. Reducing carbohydrates increases the consumption of fats and proteins. Since fats are stored in blood vessels and the liver, a LCD can improve fatty liver incidence. Research shows that a 30% LCD combined with enhanced dietary intervention

significantly reduces blood sugar, blood lipids, and BMI in diabetic patients, and prevents adverse effects such as hypoglycemia and allergies [5]. According to a March 2024 research report, among 55 patients undergoing low-carbohydrate intervention, 26 no longer showed signs of fatty liver after the intervention, achieving a 47.3% fatty liver clearance rate [6]. Lower blood sugar also reduces pancreatic burden, effectively combating diabetes.

However, this diet also has clear disadvantages. In the short term, especially during high-intensity work, reduced carbohydrate intake can cause temporary energy shortages, affecting performance. More seriously, if protein intake remains constant, an LCD may lead to muscle atrophy. An experiment by Aki Yokogawa et al. showed that under identical protein intake, LCDs in rats caused reduced muscle protein synthesis and muscle atrophy [7].

Overall, an LCD is suitable for overweight or obese individuals with high muscle and fat mass. Combined with exercise, it helps deplete carbohydrates and convert body fat into energy, reducing fat stores. For those engaged in long-term moderate or low-intensity labor, a LCD is also suitable. However, for individuals with low muscle mass, it is unsuitable, as it may exacerbate muscle loss and increase injury risk. High-intensity laborers lacking adequate carbohydrate support may experience dizziness, hypoglycemia, and other adverse effects during energy gaps, affecting subsequent life and work.

### 2.3. HPD

A HPD refers to a dietary habit where protein provides more energy than the normal proportion. This habit is common among athletes and fitness enthusiasts. Compared to LCDs with constant protein intake, adding more protein better supports muscle protein synthesis, reducing the risk of muscle atrophy.

A HPD is currently favored by many experts. Since protein is eventually metabolized into amino acids, it has little impact on blood sugar and blood lipids. Also, protein metabolism mainly occurs in the stomach and small intestine, exerting less pressure on the liver compared to high-fat diets [8]. Muscles also require protein to maintain mass and quality. Clinical studies show that HPDs can reduce the incidence of many chronic diseases. A study led by Dr. Andreas Pfeiffer from the German Institute of Human Nutrition indicated that regardless of the protein source, HPDs did not negatively affect kidney function or glucose metabolism, and after six weeks of a HPD, liver fat levels decreased by an average of 48%, with more than half of participants experiencing over 50% reduction [9].

However, HPDs are not entirely without problems. A 2015 study suggested that HPDs increase kidney burden by significantly enhancing renal hyperfiltration and increasing urea and urinary protein excretion. Excessive urea secretion raises the risk of gout. Conversely, low-protein diets can reduce cholesterol levels, improve blood lipid metabolism, and delay renal aging [10].

HPDs are suitable for ordinary people with no kidney issues and low exercise levels, as increased protein helps maintain muscle mass. For long-distance runners or those who exercise regularly, a HPD is almost indispensable. In endurance activities where carbohydrates only supply energy for about 40 minutes, proteins and fats are needed to fill the energy gap. Moreover, muscles require protein for repair post-exercise. Without sufficient protein, muscle mass declines, affecting normal activities. However, for individuals with existing kidney issues, high protein intake could further increase kidney burden and induce conditions like kidney stones and gout.

## 3. Conclusion

This paper analyzes and discusses the applicability and potential health impacts of three different dietary habits: high-carbohydrate, low-carbohydrate, and HPDs. Although a HCD provides rapid energy, suitable for high-intensity physical laborers and athletes, it increases risks of hypertension, obesity, and metabolic diseases without proper exercise. An LCD positively impacts weight control, blood sugar reduction, and fatty liver improvement, particularly for overweight, obese, and pre-diabetic individuals, but its lower energy supply efficiency makes it unsuitable for high-intensity

workers and may cause muscle atrophy if protein intake is insufficient. HPDs significantly improve chronic disease risk, maintain muscle mass, and enhance athletic ability, especially beneficial for fitness enthusiasts and long-distance runners, but may burden the kidneys if overconsumed.

In conclusion, each dietary habit has pros and cons and should be chosen based on individual physical condition, exercise intensity, occupational characteristics, and health goals. Future dietary interventions and nutritional management should emphasize scientific balance and personalized guidance, reasonably balancing the proportions of the three major nutrients.

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