

Dietary Structure and Disease Prevention in Special Ethnic Groups

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Abstract:

Diet is vital for health, especially in ethnic groups with strong religious and cultural dietary beliefs. The Hui, a Muslim community in China, follow unique dietary rules rooted in Islamic traditions—these rules not only preserve their cultural identity but also shape their health risk profiles, forming the core focus of this study. Using existing epidemiological data and conducting cross-ethnic comparisons with the Han and Tibetan groups, the research explores the link between the Hui's eating habits and chronic disease incidence. Key findings show that frequent consumption of red meat, salted preserved foods, and high-fat dairy, combined with irregular meal schedules and insufficient intake of fresh fruits and vegetables, correlates with higher rates of gastric cancer, gallstones, and metabolic disorders. Notably, factors like traditional food preservation techniques, nutrient intake patterns, and cooking styles (e.g., heavy oil use in some Hui cuisines) contribute to health differences across the three ethnic groups, with variations also observed within the Hui population, emphasizing the need for targeted, culturally tailored interventions. These results highlight the urgency of integrating health promotion into the Hui's religious and community settings, ensuring initiatives align with their dietary beliefs. Such culturally sensitive approaches can effectively reduce the burden of diet-related diseases while safeguarding the Hui's cultural heritage, providing valuable insights for designing public health strategies for ethnic groups with distinct dietary traditions.

Keywords: Hui ethnic group, dietary structure, chronic disease prevention, gastric cancer, public health intervention.

1. Introduction

China is a unified multi-ethnic country, and the di-

versity of ethnic cultures is most directly and vividly embodied in food culture. Diet is not only a basic need for human survival, but also carries rich con-

notations of historical inheritance, religious beliefs and social interaction. Among many groups of ethnic nationalities, the Hui people is an ethnic group with strong Islamic beliefs, whose diet must be strictly in line with religious texts and laws [1,2].

In this cultural environment, a special dietary pattern has been formed which both mirrors religious devotion and makes up Hui's special food culture [3]. However, such dietary patterns can have a certain impact on human health. Some characteristics of Hui cuisine are beneficial to health, such as emphasizing clean eating and avoiding unclean food. But another characteristic is the presence of health risks, such as high levels of animal fat and salt in the diet. With the continuous transformation of modern lifestyle, the spectrum of diseases is gradually shifting from infectious diseases to chronic diseases, making it increasingly important to study the correlation between Hui dietary habits and disease occurrence. This study not only has important value in constructing public health interventions and prevention strategies that are culturally compatible with the Hui ethnic group, but also provides valuable experience for other ethnic groups with specific dietary customs.

2. Overview of the Hui Ethnic Group and Their Dietary Culture

2.1 Ethnic and Religious Background

The Hui is one of China's largest Muslim minorities with a population of more than 10 million throughout the country, especially in Ningxia, Gansu, Qinghai and Xinjiang [3]. Its historical origins are closely tied to the opening of the Silk Road and centuries of exchange between Eastern and Western civilizations. Since the Tang (618-907) and Song (960-1279) periods, Muslim merchants, diplomats, and immigrants from Arab, Persian, and Central Asian regions have gradually entered China [2,3]. Many of them settled, intermarried with local Han and other ethnic groups, and over generations, a distinct ethnic identity emerged—defined by the Islamic faith, a shared language environment (primarily Mandarin with regional dialects), and a strong cultural cohesion.

The Islamic faith serves as the core cultural and social foundation for the Hui. Islam is the core foundation of Hui culture and social life. Religious customs not only regulate the spiritual life of believers, but also have a profound impact on daily behavior, community relations, especially dietary behavior [1]. This deep integration of religion and lifestyle makes the Hui an ideal case for studying the intersection of culture, diet and health.

2.2 Dietary Structure and Lifestyle Habits

Hui is one of the Muslim minorities with a large population in China, with a total population of more than 10 million, mainly distributed in Ningxia, Gansu, Qinghai, Xinjiang and other places [3]. Its historical origin is closely related to the opening of the Silk Road and the centuries long exchange of Eastern and Western civilizations. Since the Tang (618-907) and Song (960-1279) periods, Muslim merchants, diplomats, and immigrants from Arab, Persian, and Central Asian regions have gradually entered China. Many of them settled down and intermarried with the local Han and other ethnic groups. After several generations of inheritance, they gradually formed a unique ethnic identity with Islamic faith as the core, Chinese (including local dialects) as the main language environment, and strong cultural cohesion. Islam is the core foundation of Hui culture and social life. Religious customs not only regulate the spiritual life of believers, but also have a profound impact on daily behavior, community relations, especially dietary behavior. The deep integration of religion and lifestyle has made the Hui ethnic group a typical case for studying the intersection of culture, diet, and health.

2.3 Dietary Structure and Lifestyle Habits

The Hui ethnic group generally believes in Islam, and their dietary norms are based on the Quran and Hadith, which explicitly prohibit the consumption of pork, blood, animals that have not been legally slaughtered, and unclean food [1,2]. The concept of “halal” runs through the entire process of food, not only limiting the types of edible food, but also covering the processing, slaughter, and handling of ingredients. The main ingredients of the Hui people's diet are beef and mutton, dairy products (such as yogurt, milk tea) and wheat products (noodles, Mantou, dumplings, etc.) [3]. Traditional dishes such as hand pulled Lamian Noodles, roast mutton and beef stew not only meet religious requirements, but also make full use of local agricultural resources. In many regions, the preparation of these dishes involves the use of more oils and seasonings to create a rich and mellow flavor. This cooking method is both culturally important and makes the dishes rich in nutrients [4,5].

Geography and climate conditions also have an impact on the diet of the Hui ethnic group. In northwest China (such as Ningxia and Gansu), the climate is dry and there is a large temperature difference between day and night. Local residents tend to consume high-energy and high-fat foods to maintain body temperature and replenish energy. This dietary habit, which is influenced by climate, has strong stability and can be continued through family inheritance. At the same time, Hui cuisine culture emphasizes commu-

nity interaction and hospitality etiquette. During religious holidays such as Eid al Fitr, large gatherings often prepare large amounts of meat and sweets. Although these festive dietary traditions enrich cultural life, a lack of dietary control may lead to excessive calorie intake and increased health risks.

3. Main Disease Conditions and Analysis

In recent years, epidemiological studies on Hui ethnic groups have shown that the incidence rate of various chronic diseases in Hui ethnic groups not only shows obvious regional clustering, but also is closely related to the diet structure. This association is not accidental, but the result of the combined effects of traditional dietary customs rooted in religious doctrines, local climate conditions, genetic physiological characteristics, and the gradual transformation of lifestyles under the influence of modern society. Although some cultural customs, such as abstaining from pork and alcohol, can reduce specific health risks, habits such as high salt, high-fat diets, and excessive dependence on food pickling increase susceptibility to chronic diseases.

3.1 Common Major Diseases Among the Hui Ethnic Group

3.1.1 Gastric Cancer

Northwest China is one of the regions with the highest incidence rate of gastric cancer in China. The incidence rate of gastric cancer in the Hui population in this region continues to be higher than that in the surrounding Han and Tibetan populations [4-6]. This high incidence rate is closely related to long-term dietary customs and new lifestyle changes. The main dietary risk factors include frequent use of food preservation methods such as pickling, air drying, smoking, and salting. These methods not only have cultural value, but can also adapt to the local climate conditions of drought, cold, and insufficient supply of fresh ingredients throughout the year. However, they can promote the production of carcinogenic nitrosamines, especially in high salt environments. The dependence on preserved meat in winter, as well as insufficient intake of fresh vegetables in raw or light meals, leads to long-term exposure of the human body to dietary carcinogens.

Meal times and dietary habits also increase the risk of stomach cancer. In some Hui rural families, there is a situation of skipping breakfast or using strong tea instead of breakfast, resulting in long fasting time and disrupted gastric acid secretion cycle. Long term this will increase the burden on the gastric mucosa, weaken the mucosal

protective barrier, and make the gastric mucosa more prone to inflammation, atrophic gastritis, intestinal metaplasia, and other precancerous lesions. Nutrient deficiency further amplifies this risk. Insufficient intake of vitamin C and other antioxidants reduces the body's ability to neutralize carcinogens. A survey shows that the average intake of fruits and vegetables by residents in some Hui ethnic areas is far below the national dietary recommendation standards, especially among middle-aged and elderly people. The demographic differences are also significant. Men aged 50 and above typically consume more cured meat and strong tea, both of which are associated with increased risk of gastric mucosal irritation and gastric cancer. Although women are less likely to drink excessive amounts of strong tea, they generally consume a high cured meat diet, which has led to a narrowing gap in the risk of gastric cancer between men and women in some areas.

3.1.2 Gallstones

In Linxia County, the incidence of gallstones among the Hui ethnic group is 15.1%, significantly higher than that of the local Han residents. The main dietary incentives include frequent consumption of beef and mutton, deep-fried dough sticks, Sanzi and other high-fat, high cholesterol foods. In many Hui ethnic families, fried noodles are the staple food for breakfast or festive gatherings, and long-term consumption leads to excessive lipid intake.

Metabolic status also plays an important role. The average body mass index (BMI) of some Hui ethnic groups is higher than the average level of Chinese rural residents, and the incidence rate of nonalcoholic fatty liver and metabolic syndrome continues to rise. Both of these diseases can affect cholesterol metabolism and increase the probability of cholesterol crystal formation in bile. From a biochemical perspective, some Hui patients with gallstones have elevated levels of serum cholecystokinin (CCK). Under normal circumstances, this substance can promote gallbladder emptying, but sustained elevation can cause partial contraction of the gallbladder, leading to bile stasis. In terms of gender and age differences, middle-aged women are a high-risk group for gallstones, which is related to the regulatory effect of hormones on bile metabolism. A history of childbirth, changes in postpartum diet, and reduced physical activity during middle age may also increase the risk of developing the disease.

Other risk factors also include. The Hui ethnic group in the northwest region faces difficulties in obtaining fresh fruits and vegetables in winter, and their intake of meat dishes increases in important religious and social occasions, leading to an increase in cholesterol levels in bile [7-10]. During festivals, consuming a large amount of

meat and fried foods for several consecutive days can lead to short-term elevated blood lipid levels and long-term increased risk of gallstones.

The impact of lifestyle changes cannot be ignored. As more Hui residents move from rural areas to cities, their physical activity levels have significantly decreased, and urban employment is mostly in sedentary offices or service industry jobs, reducing the natural stimulation of physical labor on gallbladder contraction function. At the same time, more processed snacks and fried street food have emerged in urban food environments. Although these foods meet halal standards, their nutritional structure is similar to traditional high-fat foods. The combination of modern sedentary habits and traditional, modern dual high-fat diets further exacerbates the risk of gallstones in the long run.

3.1.3 Diabetes and Dyslipidemia

In Gannan Prefecture, the prevalence of type 2 diabetes among Hui people is higher than that of Tibetan people and lower than that of Han people, but still higher than the national average [9]. This phenomenon is the result of the combined effects of traditional dietary customs and new lifestyles. In traditional Hui cuisine, high sugar drinks such as Babao tea, various sweets, and high calorie dairy products such as milk tea and yogurt all have cultural and religious significance. However, long-term consumption combined with a higher intake of refined wheat staple food leads to elevated blood sugar levels and increased risk of insulin resistance. From the perspective of traditional Chinese medicine, some Hui ethnic groups tend to have a constitution of “damp heat”, manifested as delayed metabolism, and are more prone to lipid accumulation related diseases. The reduction in physical activity caused by urbanization migration, motorized transportation, and sedentary work methods further exacerbates energy imbalance, leading to obesity and metabolic dysfunction. Hyperlipidemia is often associated with type 2 diabetes, and its inducements include excessive intake of animal fat and processed carbohydrates. The opportunity for young Hui people in urban areas to come into contact with fast food, sugary drinks, and processed snacks has increased, leading to a trend towards younger generations of metabolic diseases that were once dominated by middle-aged and elderly people.

3.2 Comparative Analysis with Other Ethnic Groups

The comparison between ethnic groups not only highlights the impact of dietary structure on disease risk, but also provides a basis for developing targeted intervention measures. The proportion of red meat and fried foods in the

diet of the Hui ethnic group is higher, which is associated with an increased risk of stomach cancer and gallstones. The Han ethnic group has stronger dietary diversity and richer vegetable intake, but the inland Han population also faces a higher risk of gastric cancer due to excessive salt intake [4,5]. The Tibetan diet is dominated by buttered tea and tsamba. Although the calories are high, the food processing method is simple and chemical treatment is less, which may be one of the reasons for the low incidence rate of Tibetan type 2 diabetes. Although the Hui ethnic group has a richer diet, they consume more refined sugars and wheat products, which increases the risk of metabolic diseases.

The diet of the Hui ethnic group in Ningxia is mainly based on the combination of wheat and meat, while the Hui ethnic group in Qinghai consumes more dairy products. The Hui ethnic group in Gansu retains the traditional custom of high salt cured meat. Different dietary patterns correspond to different disease risks. Pickled meat is strongly related to the risk of gastric cancer. A high dairy diet affects cholesterol metabolism. Excessive intake of refined carbohydrates aggravates the risk of diabetes.

In addition, there are ethnic differences in food preservation and storage methods. The Han people in temperate regions mostly rely on refrigeration and seasonal vegetables, while the Hui people in arid northwest regions still use traditional meat preservation methods such as air drying, smoking, and salting due to cultural preferences and environmental needs [2,3]. Although these methods can effectively extend the shelf life of food, they will increase the salt content in the diet and increase the risk of carcinogenic substance intake. Unlike the Tibetan people's habit of consuming fresh dairy products, the Hui people's long-term consumption of meat has led to the accumulation of health risks.

Cultural and religious factors also bring unique challenges. For example, the promotion of fresh vegetables in Tibetan communities can be carried out in secular public places, while health interventions in Hui communities are more widely accepted during religious activities such as Friday worship and Eid al Fitr. At this time, advocating healthy dietary adjustments by respected religious leaders has a more significant effect [1,8]. This suggests that health interventions should respect religious customs while addressing health risks. In addition, high-fat foods symbolize “hospitality” in Hui culture, so “reducing high-fat food intake” should not be simply promoted as “unhealthy”, but needs to be reinterpreted in a way that conforms to cultural awareness, while retaining the connotation of “hospitality” and reducing health risks.

4. Dietary Structure and Disease Prevention

When formulating prevention strategies for Hui ethnic diseases, it is necessary to respect their religious dietary taboos and long-standing customs. Neglecting these basic public health measures is difficult to gain recognition. Therefore, intervention measures should focus on transforming existing diets rather than completely replacing traditional diets, gradually integrating them into healthy choices. The core preventive measure at the dietary level is to increase the proportion of fresh vegetables, fruits, whole grains, and legumes in daily diet. The current diet of the Hui ethnic group mainly consists of wheat staple food and beef and mutton. Although these foods are rich in protein and have cultural significance, they need to be paired with plant-based ingredients to supplement other nutrients, reduce saturated fat intake, and increase dietary fiber. Carrots, tomatoes, cucumbers, apples and other common agricultural products are not only easy to obtain, but also rich in vitamins and antioxidants, which can supplement the trace nutrients lacking in the diet [6,9]. The cooking methods can shift from deep frying and pan frying to steaming, boiling, and stewing, which are already present in the healthy diet of the Hui ethnic group. For example, low-fat and flavorful beef and mutton stew can be made by adding spices that meet halal requirements. Replacing animal fats such as sheep tail oil with vegetable oils rich in unsaturated fatty acids, such as sunflower seed oil and rapeseed oil, can further reduce the risk of cardiovascular disease [5-6].

Eating cured meat is a traditional habit influenced by climate and culture, and can be reduced overall sodium intake by pairing it with fresh side dishes or lightly stir fried vegetables. In areas with refrigeration conditions, vacuum packaging technology can be used to reduce salt usage and achieve “low salt preservation”. At the community level, cooking demonstrations can be held after market days or religious events to showcase low salt cured meat production methods and reduce health risks without changing the core flavor. In addition, it is necessary to improve irregular eating habits such as skipping breakfast and eating late at night, which can exacerbate the risk of stomach and metabolic diseases [5,9]. Fixed meal times help regulate gastric acid secretion and insulin response, and can be coordinated with religious fasting cycles. Public health promotion can focus on healthy eating during non fasting periods, while providing guidance on healthy eating during special periods such as Ramadan and Eid al Fitr. Multiple gatherings during festivals can reduce metabolic burden by adding vegetable dishes and providing low-fat dairy desserts.

Another important intervention direction is to transform traditional beverages and dairy products, while preserving their cultural attributes and enhancing their health value. For example, Ba Bao tea, which has cultural significance but high sugar content, can reduce blood sugar load by reducing sugar, using natural sweeteners, or adding dietary fiber. Dairy products such as yogurt and milk tea can be developed in low-fat or probiotic fortified versions to improve digestive health while meeting halal standards [2-3]. Collaborating with local halal food producers can ensure the accessibility and cost-effectiveness of healthy alternatives. Recognizing or incentivizing manufacturers of improved health foods can also promote industry participation.

Health intervention also needs to rely on cultural and community carriers. Mosques, community centers, and other religious sites are trusted sources of information for the Hui ethnic group and can serve as channels for health education. On Friday, the main day of the month, brief nutrition knowledge can be added to the lecture, combining the Islamic teachings of “moderation” and “love for the body” with modern dietary science. Community health programs can select respected elders, imams, or family leaders to serve as “health advocates” and promote healthy eating through role models. Past practice has shown that dietary adjustment recommendations endorsed by authoritative individuals have significantly higher acceptance and implementation rates [1,9]. In addition, intervention measures need to be adapted to regional differences. The Ningxia region can promote the use of legume fortified mixed grain flour and mixed grain bread to improve the nutritional balance of the “wheat meat” diet. Qinghai region can reduce the fat content of milk tea and promote probiotic dairy products. Gansu region needs to focus on promoting low salt cured meat technology [2,10].

Urbanization has brought new challenges. The modern Hui ethnic group needs to make a choice between traditional dietary customs and high calorie street food and fast food. This can be addressed through the following measures. Increase the supply of halal certified healthy food in urban markets, provide affordable vegetable rich lunch packages, and carry out health promotion projects in the workplace. For young people, social media can be used to post short videos such as healthy halal recipes, cooking challenges, and health tips, adapting to modern nutritional needs while inheriting traditional cooking techniques. Integrating health promotion into religious and secular community life can not only achieve long-term sustainability in dietary adjustments, but also protect the cultural identity cherished by the Hui people while reducing the burden of chronic diseases.

5. Conclusion

This study reveals the close relationship between the dietary structure of the Hui ethnic group and the incidence of chronic diseases, emphasizing the importance of culturally adapted dietary interventions. Epidemiological data analysis and comparative study showed that the incidence of gastric cancer, gallstones, and metabolic diseases in the Hui population increased, which was related to the excessive intake of red meat, pickles, high-fat dairy products, irregular meals, insufficient intake of fresh ingredients and other dietary characteristics. Further comparison with Han and Tibetan ethnic groups shows that differences in food preservation and processing methods, as well as macro nutrient balance, have a significant impact on disease risk. The regional dietary differences within the Hui ethnic group also lead to different disease spectra, indicating that the effectiveness of “one size fits all” intervention measures is limited. Research has confirmed that dietary adjustments, such as increasing intake of vegetables and whole grains, optimizing cooking methods, and improving traditional beverages, need to be combined with community promotion through cultural and religious channels to achieve optimal results. The research results have important guiding significance for public health practice. Interventions that respect religious doctrines and cultural preferences have higher acceptance and greater sustainability, and can reduce the burden of diet related chronic diseases without compromising cultural identity. However, this study has limitations. The analysis mainly relies on existing literature and regional survey data, which makes it difficult to fully reflect the internal differences and rapidly changing urban dietary patterns within the Hui community. In addition, reference studies are mostly cross-sectional designs, which cannot clarify the causal relationship between specific dietary components and diseases. Future research should adopt longitudinal, multi regional dietary tracking combined with clinical health data to more accurately identify risk factors. At the same time, pilot programs can be conducted in both urban and rural Hui communities to evaluate the effectiveness of culturally adapted dietary interventions. With the continuous

changes in modern lifestyles and food environments, it is necessary to achieve a balance between protecting cultural heritage and meeting disease prevention needs through dynamic monitoring and strategic adjustments.

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