

## Research Progress, Existing Problems and Countermeasures on Promoting Health through Scientific Drinking Water

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**Abstract:** The high incidence and frequency of chronic diseases have become an important factor restricting the public's health level, it is particularly urgent to promote in-depth research on scientific drinking water to promote health. The article adopts thematic research method and time series method to comprehensively sort out the research history, main content, stage division, application process and other related contents of the theme of drinking water promoting health from ancient times to the present at home and abroad. It also summarizes the existing research results and the problems existing in the daily practice of drinking water promoting health. Research has shown that scientific drinking water can effectively promote human health. However, there are still many problems in the research on the theme of promoting health through scientific drinking water, such as the lack of public awareness of water promoting health, insufficient daily practical application ability of public drinking water promoting health, and incomplete basic theoretical system of water promoting health. It is urgent to focus on improving the public's awareness and practical level of scientific drinking water promoting health, constructing a healthy water judgment index system, establishing a scientific drinking water index system, strengthening the basic theoretical research of scientific drinking water promoting health, and other practical and theoretical research priorities. This provides a practical basis and theoretical support for scientific drinking water promoting public health, and has significant theoretical and practical significance in promoting human health.

**Keywords:** Scientific Drinking Water;

**Health Promotion; Research Progress; Prevention and Treatment of Chronic Diseases; Countermeasure**

### 1. Introduction

According to statistics, in the past thirty years, the prevalence and number of chronic diseases in China have increased from 12.3% and 159 million in 2003 to 23.2% and 320 million in 2020; The research results of the World Health Organization also indicate that in 2020, the proportion of deaths caused by chronic diseases worldwide reached 73.6% [1,2]. Chronic diseases have become the main cause of death worldwide, and their high incidence has become a major health problem that restricts and affects global sustainable development. Human health is facing severe challenges. In order to improve human health, the World Health Organization first proposed the four cornerstones of health in the Victoria Declaration in 1992, which are "reasonable diet, moderate exercise, smoking and alcohol restriction, and psychological balance". Among them, a reasonable diet provides effective methods and approaches to promote human physical health. Previous researches have shown that the long-term insufficient intake of water nutrients and mineral nutrients among the seven nutrients needed for human health is the common cause of most chronic diseases, such as coronary heart disease, diabetes, hypertension, cancer, hyperuricemia [3-5]. Drinking water with balanced and appropriate proportion of minerals and meeting drinking standards has a significant role in preventing and treating chronic diseases [6-9]. Scientific drinking water can effectively promote human health [4,6,10,11]. Since ancient times, humans have conducted long-term theoretical research and practical exploration on the promotion of health through

drinking water, and have achieved a series of research results to serve and promote human health. However, there are still many shortcomings. This article adopts time series method and thematic research method to comprehensively sort out the research mainline, main content, stage division, application process and other related research results of the global theme of promoting health through drinking water since ancient times. It also summarizes the problems existing in previous research and daily practice of promoting health through drinking water. Based on this, corresponding countermeasures and suggestions are proposed, which have significant theoretical value and practical significance for effectively addressing the high incidence and frequent occurrence of chronic diseases worldwide and promoting human health.

## **2. A Review of the Research Progress on Promoting Health through Drinking Water**

### **2.1 Early Research on Promoting Health through Drinking Water**

(1) Abroad. There is a long history of promoting health through drinking water abroad, with records of using mineral water to treat diseases dating back to the 9th century BC in Europe; There are records of water immersion in river basins during the civilizations of Egypt and India; 2400 years ago in ancient Greece, Pochetis used the physical properties of hot springs, water temperature, and water wave vibration to treat joint stiffness, soften scars, and alleviate pain caused by arthritis for patients; Sebastian Knauper has been using hydrotherapy as an official medical practice since the 18th century; In the 1840s, Joel Shu first proposed the concept of hydrotherapy, which was widely used to treat specific diseases such as arthritis, rheumatic diseases, and poliomyelitis. Many rehabilitation centers in European and American countries have hydrotherapy rooms. In short, foreign countries have long used the external application of water to treat diseases and promote health.

(2) Domestically. The history of promoting health through drinking water in China has exceeded three thousand years, mainly manifested in: firstly, in the important relationship between drinking water and life

and health, the Eastern Han Dynasty's "Treatise on Cold Damage" proposed the use of different water decoction and preparation methods for different diseases and prescriptions; The Tang Dynasty's "Qian Jin Yi Fang" was the first to propose the use of water for treating illnesses; Secondly, in terms of the relationship between water quality and health, works such as "L ü shi Chunqiu", "Treatise on Cold Damage", "Treatise on Health Preservation", and "Compendium of Materia Medica" have elaborated on the interrelationship between water and health, as well as between water and diseases. Unclean diet, improper drinking water, and contaminated water sources can all lead to illness or worsen the condition; Thirdly, in terms of treating diseases through drinking water, especially mineral water, the Han Dynasty's "Biography of Famous Physicians" recorded that "Half of the Milky Way River is used to treat ghost heat, while the earth slurry is used to relieve poisoning and depression"; The "Shui Jing Zhu" of the Northern Wei Dynasty repeatedly mentioned that drinking hot springs can "cure all diseases"; The Tang Dynasty's "Inscription on Liquan" states, "Liquan left the capital, and all chronic illnesses caused by drinking have been cured; The Qing Dynasty's "Treatise on Blood Disorders" proposed that the primary way to treat diseases is to treat water.

### **2.2 Research on Modern Drinking Water Promoting Health**

After chronic diseases became the main type of disease worldwide in the 1970s and 1980s, research on promoting health through drinking water at home and abroad mainly focused on two aspects:

(1) Research on the correlation between quantity of drinking water and health status. The research believes that: frequent drinking water shortage, unconscious dehydration and chronic dehydration can lead to various cardiovascular diseases [12,13], cancer [14], type II diabetes [15,16], hyperuricemia [14], urinary system diseases [17], obesity [10] and other diseases; Long term maintenance of good water intake can reduce the incidence of heart disease [14], restore normal blood pressure [18], lower cholesterol levels in the blood [14], lower uric acid levels [19,20], and prevent renal dysfunction [21]; If timely hydration and

sufficient drinking water are taken due to insufficient drinking water and other situations, it has a significant effect on the treatment of chronic diseases such as coronary heart disease [22,14]), hyperuricemia or gout [6].

(2) Research on promoting health through scientific drinking water. Firstly, water quality is an important factor leading to chronic diseases. WHO research shows that 80% of the world's diseases, 50% of child mortality and 80% of cancer are related to poor drinking water. Drinking poor water quality leads to more than 50 kinds of cardiovascular diseases, digestive tract diseases, infectious diseases, various skin diseases, diabetes, cancer, cardiovascular diseases, etc. [10,23]. Secondly, research on the correlation indicators between scientific drinking water and health. The ancient Indian Vedas proposed indicators such as "Sheetham, Sushu, Sivam, Istham, Vimalam lahu Shadgunam"; Martin Fox, Ph.D. proposed indicators such as hardness, total dissolved solids, pH value, and silica dioxide [10]; Hiroichiro proposed water quality indicators [24]; Batman identified indicators such as water output, water duration, and water quality [14]; WHO proposed indicators such as water quantity, water source, and water quality [6]; Shen proposed indicators such as water source, hardness, and mineral salts [25]; Wu proposed indicators such as water quality, water quantity, drinking water time, and drinking water temperature [26]; Li et al. proposed indicators such as water quantity and quality.

Overall, the important role of drinking water in promoting human health has been recognized and valued both domestically and internationally for a long time. Research on it has undergone a transition from an early focus on external use to a later focus on internal use, from emphasizing quantity of drinking water to scientific research on drinking water. Relevant research results have been widely applied and put into social practice. And it has gathered relevant consensus globally: firstly, drinking water for health has a profound historical origin, and the two have a strong correlation; Secondly, the quality of drinking water is the key and primary factor in promoting health. Good water is the king of all medicines, while bad water is the source of all diseases; Thirdly, scientific drinking water can effectively prevent and treat chronic diseases, improve human health levels, and so on.

### 3. Existing Issues

Based on the existing research history and current situation on the promotion of health by drinking water, it can be seen that people have a long history of importance and awareness of water and health. Drinking water promotes health with a certain research foundation and has achieved rich theoretical research results. However, there are still many shortcomings in the public's understanding of drinking water promoting health, the daily practical application of drinking water promoting health, and the basic theoretical research on drinking water promoting health.

#### 3.1 Insufficient Understanding of the Fundamental Role and Importance of Water

(1) There is a cognitive 'blind spot' regarding water. Mainly manifested in the following aspects: firstly, the belief that water is indistinguishable. Believe that water and its substitutes are the same, with no difference in their functions and effects; The second is that drinking more or less water is the same. The "China Water and Quality of Life Perception Survey Report" shows that 95.3% of people do not know how to drink water, 65.9% of people do not drink water until they are thirsty, and less than 5% of people have the good habit of drinking water regularly and in a fixed amount. Water "blindness" is more common.

(2) The nutritional function of water is generally overlooked. Chinese ancient saying: Medicine is not as good as food, and food is not as good as water. However, modern people generally overlook the health and nutritional functions of water itself on the human body. Drinking water is not just for quenching thirst, its greater function and function is to obtain the mineral nutrients needed by the human body through drinking water, in order to make up for the lack of mineral nutrition obtained through other channels. The public has not yet clarified the true meaning of "diet" and drinking before eating.

#### 3.2 Insufficient Ability to Apply Scientific Drinking Water to Promote Health in Daily Practice

(1) Misconceptions in the daily use of drinking water. Due to factors such as traditional cognition, knowledge structure, lifestyle habits,

or business promotion, there are still many misconceptions in the daily practice and application of drinking water, such as drinking too much water can cause poisoning, tea and coffee can replace drinking water, drinking water with high mineral content is prone to stone formation, drinking water before bedtime can cause facial swelling, mistaking safe water for healthy water, and not drinking water when not thirsty. These misconceptions have led to the failure of the daily practice and application of drinking water to promote health among the public.

(2) Unable to distinguish the quality of different water types. Due to various factors, most people lack awareness of different water quality types such as purified water, mineral water, natural mineral water, ionized water, tap water, etc., and cannot distinguish the quality and differences of their water, resulting in confusion in daily drinking water selection and application.

(3) Lack of skills in identifying the quality of water. Water quality identification is a relatively professional skill, but currently there is a lack of a simple and easy method to identify the quality of water. The overall lack of skills in water quality identification and discrimination makes it difficult for most people to identify and distinguish the quality of water.

(4) Lack of scientific drinking habits and methods. The drinking methods and habits closely related to drinking water, including when to drink water, how much temperature to drink water, how much water to drink every day, whether to drink a lot or a small amount of water, whether to drink water quickly or slowly, are closely related to health. However, most people lack basic knowledge and bad drinking habits. Drinking ice water or cold water, drinking quickly, not drinking water before bedtime, not thirsty and not drinking water have become the norm of daily life. Previous studies have shown that these drinking habits can cause great harm to health.

### **3.3 Insufficient Research on the Basic Theory of Promoting Health through Scientific Drinking Water**

Drinking water that meets drinking standards can promote human health, which has become a consensus in the field of theoretical research. But what kind of water can better promote

human health when drinking? Are there any special requirements and methods for drinking water? What is the physiological and metabolic mechanism of drinking water promoting health? In terms of other aspects, there are still corresponding research deficiencies and gaps that need to be further studied at the theoretical level.

(1) The research on the health water standard system is incomplete. What kind of water can promote human health? This is the basic prerequisite for drinking water to promote health. Currently, there is a lot of discussion about safe water, but safe water does not necessarily mean healthy water. At present, research on what healthy water is still at the qualitative level, lacking systematic quantitative research. The definition of quantitative standards for healthy water is still in the research stage, lacking a systematic indicator system. Existing results mainly use indicators such as hardness, pH value, TDS, and water source to measure the health level of drinking water, and have not yet formed an industry recognized indicator system, which needs to be further improved.

(2) The connotation and definition index system of scientific drinking water. Previous studies have proposed and elaborated on the connotation of scientific drinking water from various aspects, but most of them have discussed the safety function of water, and there is relatively insufficient research on the medical and nutritional value of drinking water. The connotation of scientific drinking water needs to be further expanded and explored. At the same time, there have been studies that have elaborated on scientific drinking water from aspects such as what water to drink, how much water to drink, what temperature to drink, and when to drink water. However, a unified and widely recognized scientific drinking water definition index system has not yet been formed.

(3) The mechanism of scientific drinking water promoting health is not well studied. There is a consensus that scientific drinking water can effectively promote human health. However, the physiological and biochemical mechanisms of promoting human health through drinking water to maximize its effects and functions, and to create coupling resonance between water and human body functions, is always been a research gap. It is necessary to deeply

analyze and clarify its basic principles and mechanisms at the theoretical level, which has great research value and clinical practical significance.

#### **4. Suggestions for Countermeasures**

Water accounts for about 60% -70% of an adult's body weight, and drinking water that meets drinking standards can effectively promote human health, which has become a consensus in the field of theoretical research. However, for the general public, there is still a significant lack of understanding and practical application skills regarding the importance of water, its nutritional function, differences in different types of water, water quality identification skills, drinking water methods, and daily application skills. It is urgent to improve the public's awareness and practical application skills of promoting health through scientific drinking water. At the same time, the theoretical system of promoting health through scientific drinking water should be further improved in basic theoretical research, and both theory and practical application should be developed simultaneously, so that the concept of promoting health through scientific drinking water can take root in the hearts of the public and provide new methods and paths for solving the chronic disease problems faced by humans.

##### **4.1 Improve the Public's Awareness and Practical Level of Promoting Health through Scientific Drinking Water**

(1) Promote the new practice of popularizing scientific drinking water to promote health. Given the general lack of awareness among the public about the importance of drinking water in effectively promoting health, it is necessary to promote new practices of scientific popularization of drinking water for health at the entire social level, so that the public can fully recognize the important role and function of water in promoting human health in terms of knowledge structure, thinking, and action. This is a practical need for human health.

(2) Enhance public awareness of the importance of the relationship between water and health. Through extensive scientific popularization and practical activities promoting health through drinking water, people can understand and learn the basic knowledge of the role and function of drinking water, fully realize the importance of drinking

water for physical health and the prevention and treatment of chronic diseases, solve the dilemma and difficulties of "water blindness" being more common than "illiteracy", and form a broad consensus in the whole society that drinking water promotes health.

(3) Improve the public's skills in identifying and assessing the quality of water. With the help of existing theoretical research results, through simple and easy to understand drinking water promotion and health science popularization activities, aiming to enable the public to master the skills of identifying and evaluating the quality of water, ensuring that they can effectively identify and evaluate the quality of water in their daily lives, continuously improving their ability to identify the quality of water, and providing technical support for health at the source.

(4) Develop good drinking habits. Drinking water is a lifestyle habit with profound scientific logic and connotation. It is necessary to promote health through new ways of popularizing drinking water science, guide the public to form good drinking habits, follow objective laws of nature, society, physiology, and the body, and implement specific requirements for daily drinking water volume, temperature, time, and methods. Only then can drinking water effectively promote health and achieve the predetermined goals.

##### **4.2 Building a Healthy Water Judgment Index System**

The premise for drinking water to effectively promote health is to drink drinking water that meets drinking standards and has a promoting effect on human health. What kind of water can effectively promote health? This is the key issue, it is necessary to make a judgment on what kind of water can effectively promote health. Previous studies have proposed using indicators such as water source, TDS, hardness, and pH value to measure the health of drinking water. However, due to the differences in living habits among people in different regions around the world, consensus has not yet been reached on these indicators. It is necessary to further refine and implement a widely recognized and feasible health water assessment index system at a multidisciplinary, multidisciplinary, multi-level, and multi demand level to guide the public in making scientific and rational choices of drinking

water that can promote human health.

#### 4.3 Building a Scientific Drinking Water Indicator System

Previous studies have identified water quality as a key indicator for scientific drinking water and proposed the concept of healthy water, which measures the health level of water using indicators such as water source, TDS, hardness, and pH. However, scientific drinking water also involves indicators such as daily drinking water intake, drinking water temperature, drinking water time, and drinking water methods. Previous studies have not yet reached a consensus on the health water indicator system, nor have they reached a unified standard on daily drinking water intake, drinking water temperature, drinking water time, and drinking water methods. It is necessary to construct a more reasonable scientific drinking water indicator system at the level of pathology, biology, physiology, and other disciplines to provide guidance and services for promoting health through daily drinking water for the public.

#### 4.4 Strengthen the Theoretical Research on Promoting Health through Scientific Drinking Water

There is a consensus that scientific drinking water can effectively promote human health. But a systematic theoretical system has not yet been formed, especially the research on the mechanism of scientific drinking water promoting health is still a research gap. After establishing a sound scientific drinking water indicator system, it is necessary to conduct in-depth research on the dialectical relationship between daily drinking water volume, drinking water temperature, drinking water time, drinking water methods and the promotion of health. The mechanism of scientific drinking water promoting health should be studied at the macro, meso, and micro levels, especially at the micro level to explore the co-occurring, synergistic, antagonistic, and coupling mechanisms of natural minerals in drinking water. The scientific principles of scientific drinking water promoting health should be clarified at the theoretical level to eliminate many misconceptions about the promotion of human health by drinking water and improve the practical level of scientific drinking water promoting health among the public.

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