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Effects of Nutritional Intervention on Immune Function of Martial Arts Athletes

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Abstract: In recent years, many experiments have proved that there is a complex relationship between an individual's dietary situation and immune function, nutritional deficiency or excessive nutrition have a certain impact on immune function. As a traditional sport with a long history in China, Martial arts routine requires athletes to have appropriate weight and appropriate body fat rate, which are the physiological basis for completing difficult movements. Studies have shown that strenuous exercise or long-term overtraining can cause a temporary decline in immune function, and nutrition is an important factor in maintaining health. The impact of malnutrition on the immune system has always been concerned, and some malnourished athletes may be more prone to immunosuppression Reaction phenomenon.Therefore, studying the mechanism and relationship between nutrition and immune function of Martial arts routine athletes will help us to better promote the practical application of nutrition in Martial arts sports, and provide theoretical basis and experimental basis for strengthening scientific training and reasonable nutrition supplement. To study the effects of nutritional intervention on the immune function of Martial arts athletes. 14 excellent Martial arts athletes as the research object, using food weighing method, to study their dietary nutrition status, and set up the nutrition supplement group and the placebo, nutrition intervention plan formulation, the use of automatic biochemical analyzer test subjects of blood biochemical indexes, and observed by flow cytometry instrument subjects part immune index changes. Results: The actual total calorie value of dietary nutrition of Martial arts athletes was significantly lower than the scientific recommendation value, and the proportion of carbohydrate, fat and protein intake was unbalanced (for example, the recommended intake of carbohydrate was 100, and the actual intake was 87.42±18.48). The recommended protein value is 100, and the actual intake is 93.04±19.35). According to the data in Table 2, the energy value of breakfast before intervention was only 22.42±5.62, while the energy value of breakfast after intervention was 25.31±4.66.After taking the fortifier and the placebo, there were significant differences between the two groups. Nutrition intervention can improve the immune function of Martial arts athletes and promote their fatigue recovery. The supplementation of protein powder is helpful to improve the protein nutrition level of

Martial arts athletes, which is manifested as the increase of hemoglobin and proprotein levels and the improvement of immune function.Finally, through experiments, it is found that nutritional intervention can have a huge impact on the immune function of martial arts athletes. Nutritional intervention can promote the immune function of martial arts athletes and achieve the purpose of improving the physical fitness of martial arts athletes.

1. Introduction

As early as the 19th century, there were scholars to study the relationship between exercise and immunity. Numerous medical data make clear, intense exercise or long-term limit load training can cause immune function to drop temporarily, and when immune function drops, bacterium, virus, tumour will encase airframe, cause infection. Although the immune suppression caused by exercise is affected by many factors, a large number of epidemiological evidence and clinical studies point out that nutritional factors have an important impact on the immune function of athletes. Nutritional status regulates the interrelationship between exercise and immune function. Martial arts, as a traditional sport in China, has rich connotation. With the internationalization and competitive of Martial arts, Martial arts routine sports constantly pursue high-intensity training methods, and put forward high difficulty and high requirement for Martial arts routine athletes. This makes the science of Martial arts training and nutrition intervention become a new focus of academic research.For athletes, a reasonable nutritional mix is an important material basis for maintaining their full physical strength and athletic ability. The three major nutrients carbohydrates, protein and fat provide athletes with continuous energy, promote muscle growth and damage recovery. Vitamins and minerals are not only It helps in the metabolism of energy substances, maintains the balance of fluids inside and outside the cell, and also helps to reduce the oxidative stress caused by training in athletes.

In recent years, there have been major studies on sports nutrition in the academic circle: dietary investigation and research on athletes' nutritional status. If some scholars summarized the main problems existing in diet of Chinese athletes [1]; Research on the relationship between nutritional intervention and immune function. A large number of studies at home and abroad have shown that the nutritional status matched with various types of exercise, such as three energy substances, amino acids and trace elements such as zinc and iron, will affect the individual's exercise ability through influencing the immune mechanism of the body [2]. Studies on nutrition supplements to improve immune function of the body. If some scholars found that supplementing BCAA before sports can reduce the infection rate of athletes, it indicates that BCAA can accelerate the recovery of immune function of athletes after sports [3]. And the development and supplementary research of sports nutrition products, etc. [4].

To search related literature, the author found on nutrition intervention and the analysis of the relationship between the article and many immune mechanism, has more than 100 articles about dietary survey, about athletes nutritional supplement effect analysis of 66 articles about [5], about athletes such as basketball player, ice and snow sports nutrition intervention research has many scholars attention, however, in view of the Martial arts athletes of related research is less, its main focuses on the metabolic characteristics and energy characteristics of athletes and scientific training method [6]. In view of this, this article selects 14 excellent Martial arts athletes as experimental

research object, from the power characteristics of Martial arts sport, comprehensively analyzing the subjects in the dietary and physical state, use the nutritional supplements, such as adding glutamine study martial arts athletes to the change of biochemical index and some immune index, study the effects of nutrition intervention on the immune function of [7].

2. Overview of the Action Mechanism of Martial Arts Routine Movement and Nutritional Factors

2.1. Martial Arts Routine Sports

Martial arts can protect the body and improve quality. Systematic martial arts training can fully exercise the body and mind. It can strengthen the muscles and bones externally, pass the meridians internally, regulate the internal organs, and regulate the spirit. Brave and fearless will to fight.Martial arts is a unique traditional sport in China. It has both fitness and acrobatic performance. Due to its rich content and various forms, Martial arts is deeply loved by Chinese people and people all over the world [8]. In The Chinese martial arts, there are mainly two forms: acrobatic fighting, sanda and routine [9]. Among them, martial arts routines are composed of a series of movements with the meanings of attack and defense, including different basic hand shapes and basic footwork, which belong to high-intensity indirect movements [10].

According to research, Martial arts athletes are required to complete about 42 movements within a minute. It is a competitive sport with short time and high intensity, and it is an ultimate intensity load sport [11]. Anaerobic metabolism means that the oxygen supply cannot meet the needs of muscles during vigorous exercise. The muscles use the anaerobic decomposition of adenosine triphosphate (ATP) and creatine phosphate (CP) and the anaerobic glycolysis of sugar to generate lactic acid, release energy, and then synthesize adenosine triphosphate for supply. A metabolic process required by muscles.Due to the functional characteristics of anaerobic metabolism, appropriate body weight and body fat rate are necessary guarantees for Martial arts athletes to complete difficult movements [12]. With Martial arts becoming more competitive and international, Martial arts athletes' requirements on the difficulty and beauty of movements are also increasing. Therefore, in addition to scientific training, nutrition monitoring closely related to athletes' athletic ability is also indispensable.Nutrition testing is to evaluate the patient's systemic nutritional status through certain methods in clinical practice, in order to understand the patient's nutritional status or observe the effect of nutritional therapy.

2.2. Nutritional Factors and Immune Mechanism

Immunosuppression refers to the inhibitory effect on the immune response. A weakened immune system is susceptible to infections such as bacteria, viruses, and fungi, and even tumors.Exercise has a certain effect on the immune function of individuals, while timely nutrition supplement can accelerate the body's rapid adaptation to immune suppression. There are complex relationships among exercise intensity, nutritional status and immunity. Nutrition is not only an important factor to maintain the normal functioning of the body, but also can improve the athletic level of athletes. Whether the nutritional status of an athlete is beneficial to the immune function is related to the competitive metabolism between the immune system cells and their athletic muscle cells.

(1) Carbohydrates and immunity

Foods high in carbohydrates can stimulate appetite, increase appetite, make people fat, and can induce type 2 diabetes.Foods with high carbohydrate content are often adopted by endurance

athletes, because the high energy provided by high-carbohydrate water can easily make the body store a large amount of glycogen, which has a direct impact on the athletic ability of endurance athletes with anaerobic metabolism. Previous studies have shown that during 90 minutes of high-intensity endurance training, glycogen and muscle glycogen reserves are depleted, and as the reserves decrease, glucose from amino acids in liver gluconeogenesis increases, and muscle use of branched-chain amino acids increases. When glycogen is completely exhausted, the oxidation of amino acids in energy metabolism will increase to about 10%, and the metabolism of fat will also be enhanced. In this case, plasma glutamine and plasma free fatty acids associated with immune cells such as T-cells, lymphocytes and macrophages will be affected, thus affecting immunity.Glutamine is the amide of glutamic acid, and L-glutamine is the encoded amino acid in protein synthesis. The mammalian non-essential amino acid can be converted from glucose in the body.

(2) Protein, part of amino acids and immunity

Protein is an important component that composes all cells and tissues of the human body. All the important components of the body need the participation of protein. Generally speaking, protein accounts for about 18% of the total mass of the human body, and the most important thing is that it is related to life phenomena. Protein is the material basis of life, organic macromolecules, and the basic organic matter that constitutes cells.As the material basis of life, protein plays an important role. For example, protein is the material carrier for many nutrients to enter cells, oxygen transport requires hemoglobin, and immunoglobulin helps to improve the immune mechanism of the body. It has long been pointed out that low protein content in the body will lead to a decrease in the number and function of phagocytes, T-cells and B-cells, as well as a decrease in cytokine synthesis and secretion, thus leading to an increased risk of disease infection among martial arts athletes. According to previous studies, when the weight of athletes decreases to a certain amount, the function of phagocytes will decrease, affecting the immune mechanism. In addition, animal clinical trials have shown that rats exercising on a low-protein diet often suffer from hypercorticoidemia, resulting in impaired immune mechanisms, decreased function, and partial death from atrophy of the immune organs. On the other hand, insufficient intake of protein is not the main cause of immune system failure. Excessive intake of protein will also lead to the production of various toxic metabolic wastes in the metabolic process of the body, thus breaking the ph balance of the body and weakening the immune function.

Amino acids are essential nutrients for the human body and the basic unit of human protein. Protein is an important component of the human body, and amino acids are indispensable. Amino acids can provide energy for the human body and convert them into nutrients such as acids, antibodies, fats, carbohydrates, etc., which have a great effect on the human body's immune system.In the past, amino acids were regarded as the precursors of protein synthesis to study the requirements of proteins and amino acids. However, in recent years, with the discovery that some amino acids have unique functions and functions in the regulation of metabolism and physiological processes, more and more attention has been paid to the regulatory role of amino acids in individual immune mechanisms. Take arginine as an example, it can promote the development of immune organs, promote the proliferation of lymphocytes in thymus, stimulate the response of monocytes around blood to antigen and cell division to repair wounds, resist bacterial infection and thus improve individual immune function.

(3) Vitamins and immunity

Enzyme system generally refers to enzyme system. Enzymes are a kind of catalytic protein composed of living cells, catalyzing thousands of chemical reactions in the metabolic processes of

organisms.As the material basis of maintaining all physiological functions of the body, enzymes can adjust the body condition, make all parts of the body operate effectively and promote metabolism of normal physiological functions of the human body. Vitamin is an integral part of human enzyme system. It can cooperate with enzymes to ensure the normal operation of the catalytic reaction and thus ensure the physiological activities of the body. During sports, the demand for vitamins of athletes will increase with the strengthening of body metabolism, and when the limit load exercise occurs, the vitamins in athletes can not meet the needs of the body, resulting in vitamin deficiency. According to research, the lack of any kind of vitamins in the body can cause a decrease in immune function. For example, vitamin-C deficiency can cause the migration of phagocytes to become weaker and reduce the killing function of such cells. Vitamin-A deficiency leads to A decrease in thymic lymphocytes, which play an important role in mitosis. β-carotene interprets reactive oxygen species, and when athletes consume more energy, their intake of β-carotene should increase. Vitamin-E is also an important antioxidant. Studies have found that when people increase their usual intake of vitamins by three to five times, their immune function improves, but too much can lead to a suppression of the immune system.

(4) Inorganic salts and immunity

Inorganic salts are salts of inorganic compounds, formerly known as minerals, which generally only account for 1% to 1.5% of the fresh weight in biological cells. More than 20 species have been found in the human body.Inorganic salt can constitute the body tissue and have the function of regulating the body physiology, it is the same as the vitamin, is the body tissue maintenance life essential material. When the inorganic salt reserves are insufficient, the immune response of organisms will be weakened. In endurance athletes, potential iron deficiency is often shown as a result of the transfer of antioxidant reactions and the restriction of iron absorption by a high-fat, high-protein diet. Studies have shown that when iron levels are low, lymphocytes respond less to cell promoters and immune tissue shrinks. However, excessive iron intake can lead to immunosuppression. Zinc is one of the essential trace elements in the body. It is involved in the metabolism of important substances and plays an important role in the regulation of the immune function and state of the body. When zinc deficiency occurs, lymphocytes of the body will atrophy, T cell killing activity will decrease, and individual immune function will decline. The addition of overdose zinc can also cause some toxic effects on the body. Chromium is an active component of the glucose tolerance factor (GTF), which maintains normal levels of glucose in the body's blood. Chromium is the guarantee of glucose tolerance factor activity. Deficiency of chromium can reduce the specific immune response in stress and suppress the role of the immune system.

3. Experimental Research Objects and Methods

3.1. Experimental Subjects

In order to ensure the comparability and operability of the study, 14 martial arts routine athletes were selected as experimental subjects. The subjects were healthy and their daily energy consumption was close to that of the subjects. In this paper, a cross model experiment was used for the study. All the subjects were randomly divided into a nutritional supplement combined placebo group, with 7 people in each group. The specific height and weight were shown in Table 1.

Table 1. Basic information of research objects

Indicators	Experimental group (Nutritional supplement group))	Control group (comfort group)
Age	18.7±2.6	19.4±3.2
Weight/kg	74.8±4.10	75.5±5.4
Height/cm	185. 2±9.1	184.9±8.3
The training of years	4.2±2.3	4.3±1.8

3.2. Experimental Methods

(1) Literature method: Searched websites such as CNKI, Wanfang Data Resource System, Pub Med, etc., and consulted relevant literatures on dietary nutrition intervention and immune function of athletes for reference analysis.

(2) 24-hour dietary review: Subjects review their food intake (including snacks) throughout the day in the previous period. Due to its simplicity, low cost and ease of operation, this method is often used in dietary nutrition surveys to estimate individual dietary intake.

(3) Food weighing method: Since the dietary review method often relies on the subjective recall of the observed objects, there is a certain discrepancy between the survey results and the actual situation, resulting in a decrease in the accuracy of the data. Therefore, this paper combined with the food model and adopted the weighing method to accurately measure the flow of the daily intake of the subjects.

(4) Mathematical statistical method: Analyze and process the survey data and result data with the software of Analysis and Management System of Dietary Nutrition for Athletes and The General Public. The independent sample T was used for difference test, and $P<0.05$ was significant difference, while $P< 0.01$ was very significant difference.

(5) Sampling method: 2ml venous blood was collected from the wrist flexural side of Martial arts set athletes in the quiet and fasting state in the morning. Blood samples were collected for four times before the experiment, after the first stage of the experiment (one month later), during the recovery period (three months later), and after the second stage of the experiment (four months later). The samples were uniformly cryopreserved in the experimental center.

(6) Biochemical indexes: Blood biochemical indexes including hemoglobin (HGB), serum protein, blood urea and various immune indexes were tested. Test instruments: Hitachi 7600 automatic biochemical analyzer and Beckman CEHCS XL flow cytometer.

4. Experimental Results

4.1. Dietary Survey Results of Martial Arts Routine Athletes before and after Nutritional Intervention

(1) Before and after supplementation, the three meals calorie distribution ratio and total calorie intake of the participants changed

The changes of three meals and daily total calories before and after nutrition supplement are shown in Table 2 and Figure 1. As can be seen from the information in the chart, before the intervention, the total calorie intake of the subjects was roughly in balance with the scientific

recommendations. However, the calorie distribution of the three meals was uneven. The intake of breakfast and lunch was lower than the scientific recommendation, while the intake of dinner was much higher than the scientific recommendation. After the intervention, the proportion of calories consumed at breakfast and lunch increased, but there was no significant difference, while dinner intake decreased significantly.

Table 2. Changes of three meals and daily total calories before and after nutrition supplement (n=14)

Energy and recommended values	Before the intervention	After the intervention	Recommended value
breakfast(%)	22.42±5.62	25.31±4.66	30
lunch(%)	31.79±6.10	37.33±5.64	40
dinner(%)	43.38±7.10	27.42±4.24	30
Total quantity of heat(kcal)	4778.2±662.28	4528±466.24	4888.10±451.74

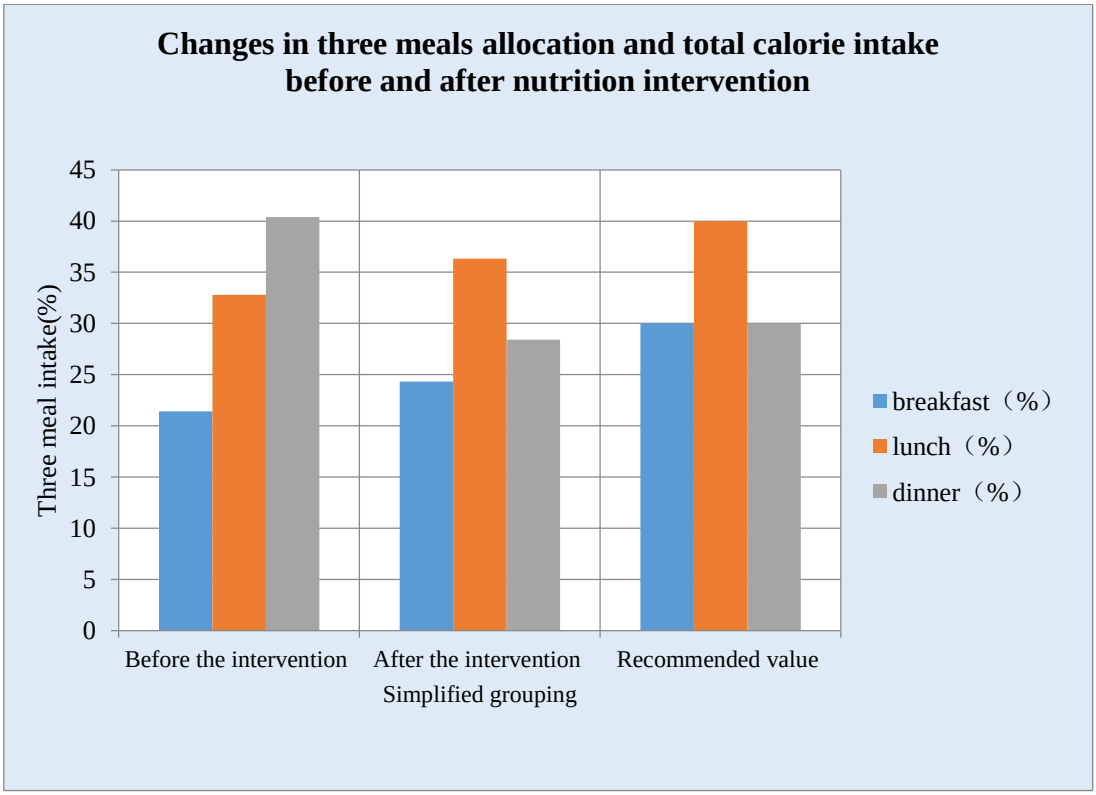

Figure 1. Diagram of the change of three meals and total daily calorie intake before and after nutrition supplement

(2) Changes in energy supply of the three major energy materials before and after nutrition intervention

The changes in the intake of the three major energy substances before and after nutrition

supplement are shown in Figure 2. The research results in the figure show that before the nutritional intervention, the participants' intake of carbohydrate, fat and protein was unreasonable. Carbohydrate and protein intake was lower than the recommended intake (the actual intake of carbohydrates was 87.42±18.48 when the recommended intake of carbohydrates was 100; The recommended protein value is 100, and the actual value is 93.04±19.35, while the fat intake seriously exceeds the recommended value (the recommended value is 100, and the actual value is 186.05±38.38), with insufficient sugar intake, high fat and low protein. After the nutrition intervention, the intake of three nutrient elements tends to be reasonable, the intake of carbohydrate and protein increases, and the intake of fat decreases obviously.

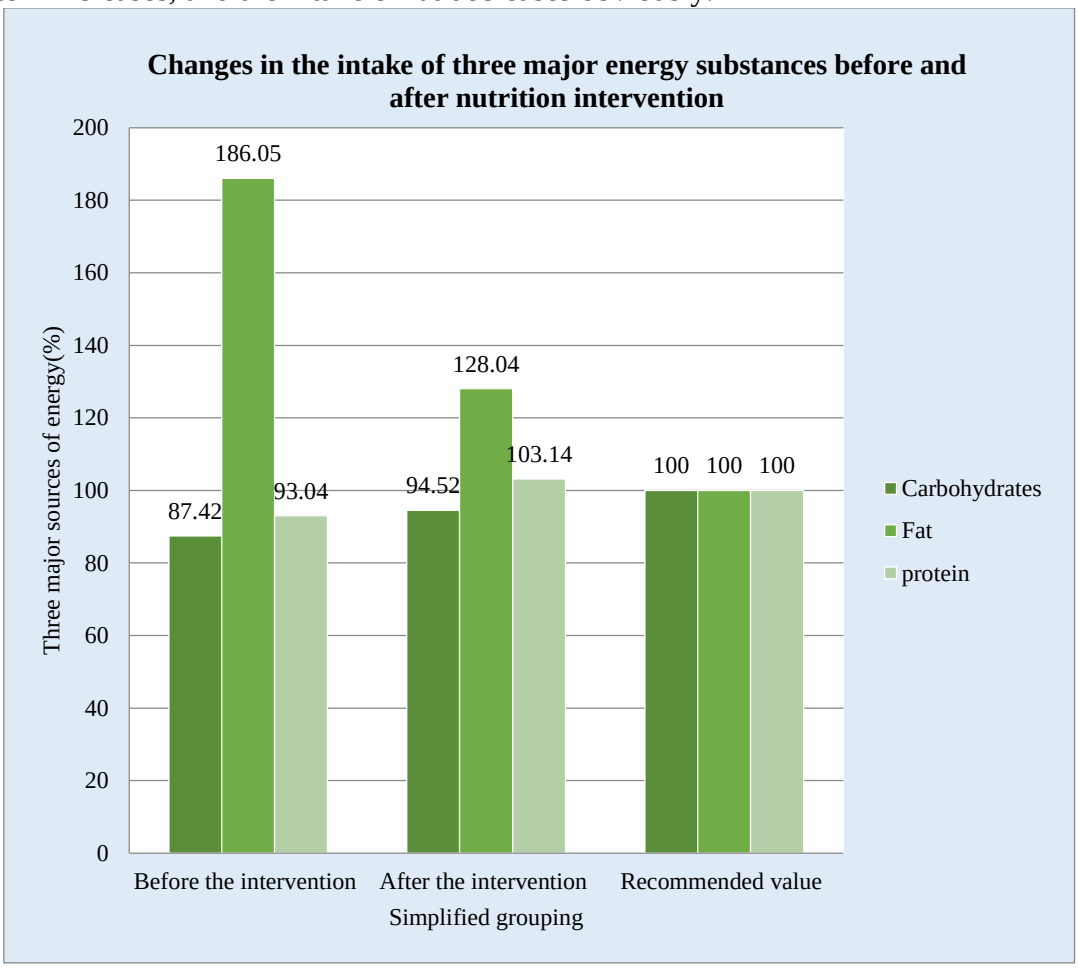

Figure 2. Changes in the intake of three major energy substances before and after nutrition supplementation

(3) The intake of various vitamins before and after nutrition supplementation

The changes of vitamin intake before and after nutritional supplement are shown in Figure 3. Figure shows that Vitamin-A and Vitamin-B1 intake was lower before the intervention, with Vitamin A intake being three-fifths of the recommended level and VitaminB1 intake being less than half of the specified level, and VitaminB1 intake was better than Vitamin-B1 intake. After the intervention, Vitamin-A and Vitamin-B1 intake increased significantly, but Vitamin-B1 still did not reach the recommended level of 100.

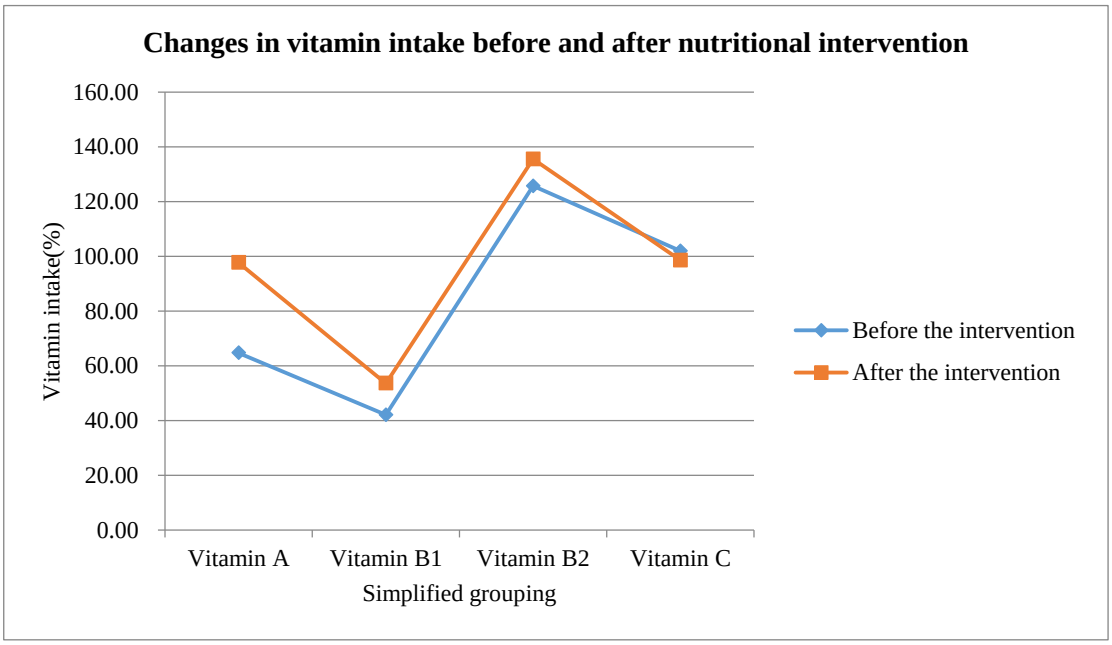

Figure 3. Changes in vitamin intake before and after supplementation

(4) The intake of trace elements of athletes before and after supplementation

The changes of athletes' microelement intake before and after nutritional intervention are shown in Figure 4. It can be seen from the figure that before and after dietary nutrition intervention, the mineral intake of Martial arts athletes is not much different from the recommended value, and the calcium intake is slightly lower. In general, the daily diet of athletes can meet their body's demand for minerals.

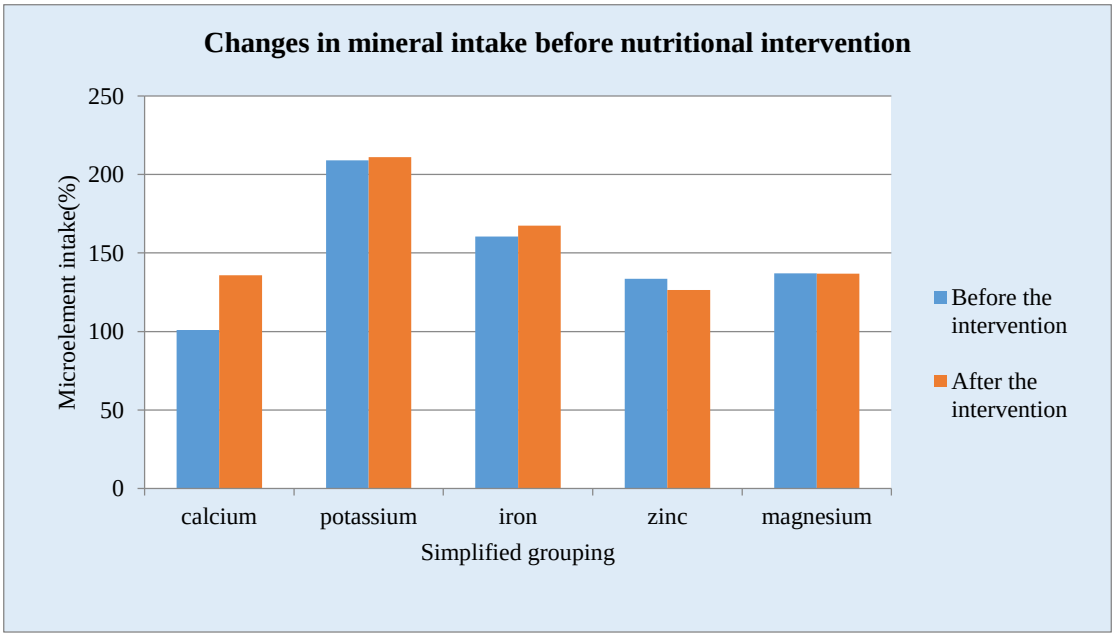

Figure 4. Changes in athletes' microelement intake before and after nutritional intervention

It can be seen from Figure 4 that before the intervention, the calcium intake was around 100%, and the calcium intake after the intervention was around 130%.

4.2. Effects of Nutritional Intervention on Blood Biochemistry and Related Immune Indexes of the Subjects

Cross-design experiment is a kind of experimental design with strong evidence to evaluate the effect of clinical treatment or intervention. Its main feature is that it has both its own control group and parallel control group within the framework of the same scheme. In the experiment of this paper, self-control with similar pairing is included, so the sample size is small. In the experimental design of this paper, each subject has an observation period of two stages before and after the experiment, as well as a recovery period between the stages. Only when the body returns to the basic state, can the subject enter the second stage of the experiment. Therefore, this greatly avoids the influence of the experimental effect between the stages and minimizes the error as far as possible. The data analysis results of various indexes obtained by cross design experiments are as follows.

(1) Changes in blood biochemical indexes of the participants before and after intervention

The protein nutrition status and skill level of athletes can be reflected by the serum protein status of Martial arts athletes. After extreme load exercise, the protein breakdown in the body will be enhanced. If protein nutrients are not added in time, the protein metabolism level in the body will be affected. Therefore, it is of great significance to determine and monitor the protein level of Martial arts set athletes for the study of nutritional factors and immune function. The changes of blood biochemical indexes of Martial arts routine athletes before and after the intervention are shown in Table 3. The results show that after the nutritional intervention, there are differences in hemoglobin and biochemical indexes between the experimental group (nutritional intervention agent) and the control group (placebo).

Table 3. Changes of blood biochemical indexes of Martial arts routine athletes before and after intervention

The biochemical indicators	Nutrition intervention group	placebo
Bun(mmol/1)	4.81±1.22	4.96±1.34
Protein(g/1)	74.18±4.05	71.88±5.69
ALT(u/1)	20.83±17.07	13.83±3.34
Hb(g/1)	141.08±9.21	127.58±6.89
PR0(mg/1)	359.92±56.96	328±48.61

It can be seen from Table 3 that the protein of the nutritional intervention group was 74.18±4.05, and the protein of the placebo was 71.88±5.69.High level of hemoglobin is helpful for athletes to keep their physical stamina and improve the training effect. Table 3 shows that the hemoglobin index and preprotein index of 14 subjects show significant differences after nutritional intervention and original status respectively. Martial arts athletes who took the nutritional intervention had significantly higher test values than those who took the placebo, suggesting that protein fortifiers can help improve protein nutrition levels in the body. Blood urea nitrogen can reflect the athlete's endurance and recovery ability to training intensity, its changes and exercise load height closely through testing BUN, can understand the athlete's body function. As can be seen from the above

chart, there was no significant difference in blood urea nitrogen values between the two groups, while other test indexes of the nutrition supplement group were higher than those of the comfort group.

(2) Analysis of the changes of partial immune indexes of participants before and after intervention

In this paper, the partial immune indexes of martial arts routine athletes in the nutrition supplement group and the comfort group were analyzed by means of multivariate anOVA, and the test values of creatine kinase, cardiac isoenzyme, immunoglobulin and other indexes between the two groups were observed. In the experiment, $P < 0.05$ was considered as significant difference. A large number of studies have shown that the range of the activities of serum and movement has close ties to the duration and intensity, two groups of athletes have differences in CK, IgG index, subjects of serum numerical nutrition intervention group was obviously lower than that of the placebo group, showing a good sport to adapt to the state and the ability to adapt, and the subjects' IgG value (8.42 ± 0.82) significantly higher than the placebo, with significant statistical significance.

5. Analyze and Discuss

5.1. Analysis and Discussion of Dietary Survey Results of Martial Arts Routine Athletes Before and After Nutritional Intervention

Dietary nutrition is an important source for the recovery of various nutrients after sports training, and the reasonability of the intake of various nutrients is an important reason for the nutritional recovery of Martial arts athletes. The total daily calorie intake of athletes is very important to maintain weight and exercise ability; Excessive intake of calories will not be able to burn off, but into fat, and then stored in the body, which will easily lead to Martial arts athletes excessive body fat, affecting the athletic ability of athletes; When inadequate intake, the energy reserves Martial arts athletes face is insufficient, affect the effect of martial arts training and exercise capacity, and Martial arts athletes of energy recovery after exercise, which cause the body immune function, thus make the body of pathogenic microorganisms increased susceptibility or infectious disease symptoms worse.

Through the investigation and study on the diet of 14 excellent Martial arts routine athletes, it is found that the dietary structure of the tested athletes is generally unreasonable, and the specific situation is as follows:

(1) The total energy intake is generally low and the calorie intake of three meals is not balanced

The total intake of Martial arts athletes is lower than the scientific recommended value, and the intake of high-quality protein and carbohydrate-rich cereals and tubers is less, which may be related to the relatively single type of food supply in training restaurants and the intentional reduction of basic substances due to the athletes' emphasis on weight. As the most ideal basic energy substance, glycogen reserve provided by carbohydrates can reduce the utilization of protein and fat by Martial arts athletes in sports, thus delaying the emergence of athletes' fatigue. Glycogen is a necessary energy substance in the endurance based martial arts routine. If the supply is insufficient, normal substance metabolism and athletic ability of athletes will be affected.

Studies have shown that before the dietary nutrition intervention, Martial arts athletes had unreasonable allocation of three meals, low intake of calories for breakfast and lunch, and high intake of calories for dinner. Because Martial arts athletes have no scientific concept of diet and nutrition, they neglect the importance of balanced diet and nutrition. Because Martial arts athletes lack of understanding of the importance of breakfast, too low breakfast intake ratio will affect the

athletes' recovery of various nutrients, thus affecting the effect of morning training; However, the excessive proportion of dinner intake, athletes can not use up the excess energy, easy to cause the increase of body fat content.

(2) Improper proportion of energy supply by the three major energy materials

It was found that before dietary nutrition intervention, there was unreasonable intake of fat, carbohydrate and protein in Martial arts athletes. The intake of carbohydrates and protein was lower than the recommended intake (the recommended intake of carbohydrates was 100, and the actual intake was 87.42±18.48; The recommended protein value is 100, and the actual intake is 93.04±19.35, while the fat intake seriously exceeds the recommended value (the recommended value is 100, and the actual intake is 186.05±38.38), with insufficient sugar intake, high fat and low protein. Martial arts routine exercise is an endurance exercise based on anaerobic metabolism, with high energy consumption. Therefore, Martial arts routine exercise needs more protein and fat to ensure basic body functions. Protein plays an important role in the physiological function of human body. Long-term high-intensity training will cause the depletion of protein in the body. When diet cannot be timely supplemented, the protein level of the body will decrease. However, excessive fat intake will cause the body to produce more ketone bodies during training, and athletes are prone to fatigue. Too low carbohydrate intake for a long time will also lead to the lack of glycogen in Martial arts athletes' bodies, resulting in sugar malnutrition, which will further reduce the athletes' sports level, ability and physical recovery after sports. Therefore, it is suggested that Martial arts athletes should increase the intake of high quality carbohydrates and protein in diet combination to increase the intake of glycogens.

(3) Low vitamin intake

Among the 14 excellent Martial arts routine athletes, the intake of vitamin A and vitamin-B1 is low, which has not reached the scientific quota, especially the extreme deficiency of vitamin-B1. Vitamin-B1 is a water-soluble vitamin whose biological function is to maintain normal glucose metabolism. Lack of vitamin-B1 will cause individual muscle strength decline, muscle soreness, not conducive to sports training. The deficiency of vitamin-B1 intake in Martial arts athletes may be caused by unreasonable food processing and single varieties of high-carbon water cereals.

In terms of trace mineral elements, the intake of 14 Martial arts routine athletes basically met the standard of scientific recommendation. Trace minerals play an important role in maintaining metabolic balance of life and improving individual function. In the martial arts routine movement based on skeletal muscle, sodium, calcium and potassium are all important mediators of muscle contraction and relaxation.

5.2. Analysis and Discussion on the Changes of Blood Biochemistry and Related Immune Indexes of Martial Arts Routine Athletes Before and After Nutritional Intervention

The protein powder used in this study is rich in protein and various amino acids, which has a preliminary effect on the fatigue recovery of athletes on the basis of ensuring the daily energy supply of Martial arts athletes. Our research results showed that the hemoglobin index and serum protein index of the supplemental protein powder were much higher than those of the placebo group, and the experimental data had significant statistical significance.

Glutamine is an essential amino acid in the human body and an important fuel for many immune cells in the immune system. It can maintain antioxidant reserves in various tissues, maintain acid-base balance in the organism and enhance immune response. Previous studies have found that patients taking glutamine have improved immunity, but studies have been mixed on the effects of

exercise training on immune suppression. In this study, the experimental group (nutritional supplement group) and the control group (placebo group) were set, and subjects in the two groups were given glutamine and placebo respectively, so as to observe the effect of glutamine on cellular immune function. In this study, the values of IL-2 and T lymphocyte subsets in peripheral blood of the experimental group were higher than those of the control group. IL-2 is a polypeptide consisting of 133 amino acids and plays an important role in immune regulation. T-lymphocyte is one of the most important functional cells in the body, and it is an important immune active cell. There are two subsets of lymphocytes with different functions: TCD+4 cells and CD+8 cells. The former plays an auxiliary and inducing role in the immune response, while the latter has a killing and inhibiting role. T-lymphocyte subsets are affected by the decrease of plasma glutamine concentration during prolonged exercise. When the immune mechanism is threatened, timely supplementing glutamine can prevent the decrease of glutamine concentration and provide energy materials for immune cells, thus ensuring the stability of immune cell function.

6. Conclusion

By studying the dietary intervention of 14 Martial arts routine athletes, this paper found that the actual intake of Martial arts routine athletes was significantly lower than the scientific recommendation before the nutritional intervention. The three major energy substances intake proportion is not balanced, and athletes breakfast, lunch and dinner calorie intake is not reasonable; Before the nutritional intervention, athletes had insufficient intake of vitamin-A and vitamin-B1. After the intervention, vitamin-A and vitamin-B1 were obviously improved, but they still did not reach the scientific recommended values. Before and after dietary nutrition intervention, the intake of trace mineral substances in Martial arts routine athletes was not much different from the scientific recommended value, which could meet the basic needs of the body for minerals in daily diet. The deficiency of nutrition in Martial arts athletes and the large dose of nutritional supplements will affect the immune function.

In view of this, the author suggests that the diet of martial arts routine athletes should be scientifically managed, equipped with professional sports nutritionists, develop appropriate recipes; To strengthen the nutrition knowledge study for Martial arts routine athletes, and make diet plan according to the actual training situation; As well as regular nutrition monitoring for Martial arts routine athletes, according to the specific actual situation of individual nutrition intervention.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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