

EFFECTS OF SPORTS NUTRITION ON FEMALE COLLEGE STUDENTS' PHYSICAL FITNESS



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EFEITOS DA NUTRIÇÃO ESPORTIVA SOBRE A APTIDÃO FÍSICA DAS ESTUDANTES UNIVERSITÁRIAS

EFFECTOS DE LA NUTRICIÓN DEPORTIVA EN LA APTITUD FÍSICA DE LAS ESTUDIANTES UNIVERSITARIAS

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ABSTRACT

Introduction: Optimizing the physical education training of female college students and maximizing physical fitness are considerable factors in contemporary physical education. It is believed that implementing sports nutrition can elevate the physical fitness of these female students. **Objective:** Explore the effects of sports nutrition on the physical fitness of female college students during their training period. **Methods:** 20 volunteers were randomly divided into experimental and control groups, with 10 female college students in each group. The control group had no changes in original living or training habits, while the experimental group was retrained according to the sports nutrition intervention strategy for one month. **Results:** In the experimental group, whose height was 161.02 ± 5.64 cm, body weight decreased from 55.91 ± 4.61 kg to 54.39 ± 4.45 kg, and vital capacity increased from 44.98 ± 8.61 ml/kg to 52.56 ± 8.91 ml/kg. The body mass index of grip strength increased from 45.18 ± 7.60 to 51.27 ± 9.99 after the experiment. The 50M running time was improved from 8.27 ± 0.49 s before the experiment to 7.98 ± 0.53 s after the experiment, and the horizontal jump time was improved from 164.87 ± 20.40 cm to 168.27 ± 21.24 cm. The 800m running time was improved from 263.55 ± 20.35 s before the experiment to 259.25 ± 29.29 s after the experiment. **Conclusion:** The intervention strategy in sports nutrition can effectively maximize the gain in the results of female college students. It is indicated to be promoted to spread the optimization of physical training in colleges and universities. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: Students; Universities; Physical Fitness; Physical Education and Training.

RESUMO

Introdução: A otimização do treinamento de educação física das estudantes universitárias e a maximização da aptidão física são fatores consideráveis na educação física contemporânea. Acredita-se que a implementação da nutrição esportiva possa elevar a aptidão física dessas estudantes. **Objetivo:** Explorar os efeitos da nutrição esportiva sobre a aptidão física de estudantes universitárias durante o período de treinamento. **Métodos:** 20 voluntárias foram divididas aleatoriamente em grupo experimental e controle, com 10 estudantes universitárias em cada grupo. O grupo de controle não sofreu alterações nos hábitos originais de vida ou treinamento, enquanto o grupo experimental foi readequado de acordo com a estratégia de intervenção de nutrição esportiva por um mês. **Resultados:** No grupo experimental, cuja altura era de $161,02 \pm 5,64$ cm, o peso corporal diminuiu de $55,91 \pm 4,61$ kg para $54,39 \pm 4,45$ kg, e a capacidade vital aumentou de $44,98 \pm 8,61$ ml/kg para $52,56 \pm 8,91$ ml/kg. O índice de massa corporal da força de prensão aumentou de $45,18 \pm 7,60$ para $51,27 \pm 9,99$ após o experimento. O tempo de corrida de 50M foi melhorado de $8,27 \pm 0,49$ s antes do experimento para $7,98 \pm 0,53$ s depois do experimento, e o tempo de salto horizontal foi aprimorado de $164,87 \pm 20,40$ cm para $168,27 \pm 21,24$ cm. O tempo de corrida de 800m foi aprimorado de $263,55 \pm 20,35$ s antes do experimento para $259,25 \pm 29,29$ s após o experimento. **Conclusão:** A estratégia de intervenção em nutrição esportiva pode efetivamente maximizar o ganho nos resultados das estudantes universitárias. Indica-se a sua promoção visando difundir a otimização do treinamento físico nas faculdades e universidades. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Estudantes; Universidades; Aptidão Física; Educação Física e Treinamento.

RESUMEN

Introducción: La optimización del entrenamiento físico de las estudiantes universitarias y la maximización de la forma física son factores considerables en la educación física contemporánea. Se cree que la aplicación de la nutrición deportiva puede elevar la forma física de estas estudiantes. **Objetivo:** Explorar los efectos de la nutrición deportiva en la forma física de las estudiantes universitarias durante su periodo de entrenamiento. **Métodos:** Se dividió aleatoriamente a 20 voluntarias en grupos experimental y de control, con 10 estudiantes universitarias en cada grupo. En el grupo de control no se introdujeron cambios en los hábitos de vida o de entrenamiento originales, mientras que el grupo experimental fue reentrenado de acuerdo con la estrategia de intervención de nutrición deportiva durante un mes. **Resultados:** En el grupo experimental, cuya altura era de $161,02 \pm 5,64$ cm, el peso corporal disminuyó de $55,91 \pm 4,61$ kg a $54,39 \pm 4,45$ kg, y la capacidad vital aumentó de $44,98 \pm 8,61$ ml/kg a $52,56 \pm 8,91$ ml/kg. El índice de masa corporal de la fuerza de agarre aumentó de $45,18 \pm 7,60$ a $51,27 \pm 9,99$ después del experimento. El tiempo de carrera de 50 m mejoró de $8,27 \pm 0,49$ s antes del experimento a $7,98 \pm 0,53$ s después del experimento, y el tiempo de salto horizontal



mejoró de $164,87 \pm 20,40$ cm a $168,27 \pm 21,24$ cm. El tiempo de carrera de 800 m mejoró de $263,55 \pm 20,35$ s antes del experimento a $259,25 \pm 29,29$ s después del experimento. Conclusión: La estrategia de intervención en nutrición deportiva puede maximizar eficazmente la ganancia en los resultados de las estudiantes universitarias. Se indica su promoción con el objetivo de difundir la optimización del entrenamiento físico en colegios y universidades. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descriptor: Estudiantes; Universidades; Aptitud Física; Educación y Entrenamiento Físico.

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INTRODUCTION

Physical education teaching is a key point of current college teaching. Strengthening the construction of students' physique is of great significance to improve college teaching results, enhance national physique and improve national physique.¹ However, there is a phenomenon among college students, especially female college students. In order to excessively pursue a slim body, many students choose to go on a diet and eat only a small amount of food every day.² Although this form can achieve the goal of weight loss in a short time, it will have a serious adverse impact on students' physical quality in the long run, and is not conducive to the optimization of physical training.³ The literature suggests that appropriate nutrition supplement can improve students' blood glucose level during physical exercise, and then greatly improve students' sports ability. Other literatures suggest that the combination of nutrition intervention and sports training can improve the physical function of college students and enhance their immunity.⁴ In the context of the normalization of COVID-19 prevention and control, it can greatly improve the ability to resist risks. The literature suggests that the principle of sports nutrition intervention to optimize students' physique is to improve their lipid metabolism level, so as to enhance the body fat consumption rate. In the aspect of cholesterol absorption, effective exercise nutrition intervention can hinder the absorption of intestinal cholesterol, so that excessive cholesterol can be discharged out of the body.⁵ In this way, the body fat rate can be reduced. Therefore, it can be seen that sports nutrition intervention for college students can effectively improve their physical quality, improve their physiological function, improve their body composition, improve their immunity, and have a lot of help for their daily life.

In view of this problem, this paper, through the form of sports nutrition intervention, combines the optimization of sports training with nutrition intervention, and discusses the optimization of sports comprehensive training of female college students, so as to improve the posture of female college students, promote their nutrition absorption, and improve their physical quality.

METHOD

Before the beginning of the experiment, 20 volunteers were randomly divided into the experimental group and the control group, with 10 female college students in each group. The study and all the participants were reviewed and approved by Ethics Committee of Xi'an Aeronautical Institute (NO.XAAI20Z021). Table 1 shows Basic information of research objects.

First of all, 10 volunteers in the experimental group were counted on food through personal filing. By querying their consumption records of meal cards and mobile phone purchases, the statistics and analysis

Table 1. Basic information of research objects.

Group	No.	Height (cm)	Weight (kg)	BMI index
Test group	10	161.02±5.647	55.91±4.611	21.54±1.535
Control group	10	160.52±5.379	55.58±4.201	21.64±1.464

of various foods and nutrients consumed in the first three days of the experiment were carried out, so as to obtain the nutritional intake before the nutritional intervention.

Then, the exercise nutrition intervention strategy was designed, mainly including adjusting the food intake, scientific proportion, and carrying out certain aerobic exercise for one hour every day. In this experiment, the control experiment was used. The experimental group strictly controlled the food intake and insisted on taking part in sports every day according to the sports nutrition intervention strategy; The control group was carried out according to the previous life training habits and eating habits. This experiment lasted for one month. During the experiment, in order to ensure the effectiveness of the experimental results, the experimental group was carried out in strict accordance with the matched food, and did not take extra snacks. The control group kept the original living habits unchanged to reduce the interference of unrelated factors.

RESULTS

Analysis of sports nutrition intervention

In order to carry out sports nutrition intervention, we must analyze the current diet structure of the experimental group, and then put forward corresponding adjustment methods.

Table 2 shows the intake of different kinds of food before and after nutrition intervention. It can be seen from the table that there are some problems in the current dietary structure of girls. For example, in many dieting concepts, eating vegetables and fruits instead of staple foods and other foods can achieve the purpose of rapid fat reduction. Therefore, in the diet structure before intervention, the proportion of vegetables and fruits is high. And coarse cereals such as sweet potato and taro are also considered as excellent substitutes for staple foods. Therefore, many girls choose to eat these coarse cereals during weight loss, so the proportion of these coarse cereals is relatively high. The corresponding intake of poultry and livestock meat, eggs, aquatic products, milk and products, soybeans and nuts in the normal diet is low. In addition, before the nutritional intervention, the intake of oil in girls is also high. The reasons are: first, the intake of sweets and snacks is too much, and there are some problems in the dietary structure of girls, resulting in the consumption of a large number of sweets and snacks.

Table 2. Intake of different kinds of food before and after nutrition intervention (g/d).

Food	Before	After	t	P
Vegetables	296.88±90.241	270.59±97.403	5.4765	>0.05
Fruit	117.96±68.551	106.36±71.875	4.5440	>0.05
Cotton potato	303.68±87.596	277.35±88.594	4.5964	>0.05
Poultry	36.91±17.129	80.93±18.996	14.5374	<0.01
Egg	38.00±14.338	56.59±15.742	11.1403	<0.05
Aquatic products	23.60±3.729	37.09±3.877	10.2182	<0.05
Milk and products	96.42±28.467	101.43±30.732	3.6720	>0.05
Soy and Nuts	21.64±9.919	45.36±9.093	13.1479	<0.01
Grease	43.27±13.412	33.70±11.663	6.7500	>0.05

The oil in these foods has exceeded the standard. In addition, many girls go on a diet during the day to lose weight, but they choose to eat supper at night due to excessive hunger. The supper represented by fried chicken, barbecue and crayfish contains a lot of oil. Therefore, before the nutritional intervention, the oil intake of the experimental group exceeded the standard.

From the comparison of interventions, it can be seen that this nutritional intervention has increased the intake of poultry and livestock meat, eggs, aquatic products, milk and products, soybeans and nuts, so that they can maintain good physical function. At the same time, the intake of vegetables, fruits, Cereals, potatoes, fats and other food types is reduced, especially the intake of fats and oils is controlled, so that it can not only ensure normal physiological and sports activities, but also prevent the adverse effects of high fat on the body. Table 3 shows Comparison of intake of various nutrients before and after nutrition intervention.

Optimization effect of college physical training based on sports nutrition intervention

In order to explore the effect of sports nutrition intervention on the optimization of college girls' physical training, this paper takes the changes of physical fitness test indicators and physical fitness indicators as the research object, and discusses them respectively.

Table 4 shows the impact of sports nutrition intervention on physical fitness test indicators. It can be seen from the table that the weight of the experimental group with a height of about (161.02 ± 5.647) cm decreased from (55.91 ± 4.611) kg before the intervention to (54.39 ± 4.458) kg, and the vital capacity body mass index increased from (44.98 ± 8.619) ml/kg before the intervention to (52.56 ± 8.914) ml/kg, P < 0.05, indicating that there was a significant difference. This shows that good sports nutrition intervention can reduce the body weight of the experimental group and improve its vital capacity body mass index, which further shows that sports nutrition intervention can improve the body shape, cardiopulmonary function and other aspects of college students. Therefore, sports nutrition intervention has a better role in improving the physical quality of College Students. Table 5 shows Effect of sports nutrition intervention on physical fitness indexes.

The comprehensive comparison between the experimental group and the control group shows that the current physical training methods can improve the physical fitness index of the control group to a certain extent, but the growth rate of the experimental group is significantly higher than that of the control group. Therefore, the optimization of college physical training and the combination of nutrition intervention and sports teaching can effectively improve the physical quality of students.

Table 3. Comparison of intake of various nutrients before and after nutrition intervention.

Nutrient	Before	After	t	P
Iron (mg)	18.10±4.620	24.40±4.714	9.4284	<0.05
Calcium (mg)	424.08±118.534	457.07±129.827	4.6179	>0.05
Zinc (mg)	4.88±1.429	7.24±1.515	7.1377	<0.05
Vitamin C (mg)	89.24±20.201	93.91±20.620	4.6859	>0.05
Vitamin B1 (mg)	0.86±0.531	1.21±0.672	6.3819	<0.05
Vitamin B2 (mg)	0.79±0.458	1.13±0.634	6.4386	<0.05
Vitamin A (ug)	433.27±99.367	610.26±96.166	14.1583	<0.05
Vitamin E (mg)	8.43±2.023	9.44±2.107	4.1900	>0.05
Vitamin B12 (ug)	0.95±0.626	2.45±0.935	9.9573	<0.05
Folic acid (ug)	295.36±20.770	373.90±21.875	7.7902	<0.05
Energy (Kcal)	1731.89±210.990	2003.69±282.716	8.6072	<0.05
Protein (g)	48.50±12.006	77.41±17.902	16.1434	<0.01
Carbohydrate (g)	246.31±82.736	264.34±88.008	3.5765	>0.05
Fat (g)	64.81±15.079	72.46±16.685	5.3579	>0.05

Table 4. Effect of sports nutrition intervention on physical fitness test indicators.

Group	Time	Height (cm)	Weight (kg)	Volual Light Weight Index
Test group	Before intervention	161.02±5.647	55.91±4.611	44.98±8.619
	After intervention	161.13±5.449	54.39±4.458	52.56±8.914
Control group	Before intervention	160.52±5.379	55.58±4.201	47.79±7.173
	After intervention	160.62±5.682	57.12±4.406	46.07±7.335

Table 5. Effect of sports nutrition intervention on physical fitness indexes.

Project	Time	Control group	T	P	Test group	T	P
Grip weight index	Before	45.21±7.714	0.1562	0.9117	45.18±7.601	2.2005	0.0399
	After	46.43±7.118			51.27±9.994		
50 meters run (second)	Before	8.21±0.540	0.3127	0.8943	8.27±0.499	0.2366	0.9136
	After	7.94±0.747			7.98±0.532		
Standing long jump (cm)	Before	164.90±20.888	0.1679	0.9601	164.87±20.404	0.1361	0.9908
	After	168.12±21.456			168.27±21.240		
800 meters (seconds)	Before	268.52±21.110	1.1376	0.3046	263.55±20.351	0.5565	0.6361
	After	267.53±28.107			259.25±29.294		

DISCUSSION

At present, there is a mess in nutrition in Colleges and universities. The main reason is the lack of correct nutrition knowledge. Many students lack correct guidance when adjusting their body weight. They often obtain it by consulting various materials and sharing on the Internet. Some of these data sharing lacks scientific basis. Although it can achieve the effect of weight loss in a short time, it has buried the root of the disease in the body. Therefore, the school should publicize the correct nutrition knowledge, provide corresponding consulting services, analyze the nutrition matching, nutrition reference for people with special physique, food intake for people with diseases, etc., help students improve their understanding of nutrition knowledge, solve the nutrition problems needed in life, and prevent the negative impact on their physique due to wrong nutrition knowledge.

The existing sports training mode is often small class system and specialized teaching, that is, according to the actual needs of students, it is divided into basketball, football, volleyball, swimming, badminton, table tennis and other classes, and teaching and training are carried out in the classroom. Although this way of dividing classes according to sports items can more effectively meet students' interests and hobbies, there are also misunderstandings in training. The traditional sports division mode and training mode can not meet the current students' more diversified sports needs. Therefore, this paper puts forward the sports training mode of "integral system". Students are no longer confined to a certain class type, but can make an appointment for relevant classes before class according to their own actual needs. In addition to traditional sports types, courses such as physical improvement, endurance training and body shape adjustment can also be added to meet the more practical needs of current students. Students select this course before the physical education class, and obtain corresponding credit points after successfully completing the course. If the accumulated points reach a certain standard, it means that all the physical education courses of this semester have been completed and passed. Optimizing this sports training mode can make the traditional and task-based sports training courses more interesting, and greatly improve students' enthusiasm for sports learning and training, so as to improve the effect of school sports teaching, improve students' physical test results, and promote the progress of students' physical quality.

CONCLUSION

From the research results of this paper, it can be seen that strengthening students' sports nutrition intervention can regulate and adjust students' diet structure, increase students' intake of various nutrients, reduce the impact of unreasonable diet on students' bodies, and at the same time, supplemented by sports intervention, can effectively improve students' physical fitness test indicators and physical fitness indicators, so as to improve the effect of school physical education teaching. Therefore,

teachers should strengthen the correct nutrition knowledge propaganda, optimize the existing sports training mode, and provide more practical help for students. Students should not go on a diet blindly according to their own actual needs, but should eat and exercise scientifically with the help of teachers, so as to promote the improvement of their own physique.

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