

## **Effect of exercises combining medical science on whole body and local fat content of obese female college students.**

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### **Abstract**

**Objective:** To discuss the effect of exercises combining medical science on whole body and local fat content of obese female college students.

**Methods:** 40 cases of obese female college students from a college from June 2013 to June 2016 were selected and divided into control group and observation group based on different intervention methods, with 20 cases in each group. The control group was given exercises intervention, while the observation group was given exercises combining medical science intervention. The intervention effects of both groups were observed.

**Results:** The intervention effect of the observation group is better than the control group. The difference is statistically significant, with  $p < 0.05$ .

**Conclusion:** The exercises combining medical science intervention can effectively improve the intervention effect on obese female college students, and promote body health.

**Keywords:** Combining exercises and medical science, Obesity, Exercises, Female college students, Losing weight.

*Accepted on March 8, 2017*

### **Introduction**

Obesity has been one big public health issue in the world now. In adults, obesity can result in increased morbidity and mortality [1,2]. Some reports showed that obesity rate was increasing year by year. In unite states, for women, the prevalence of overall obesity and of class 3 obesity showed significant linear trends for increase between 2005 and 2014 [3]. Nowadays, the cause of obesity tends to be complicated, including inheritance, life style, social environment, and lack of exercises. To better help obese female college students to lose weight and discuss the effect of sports combining medical science on whole body and local fat content, we chose 40 cases of obese female college students from June 2013 to June 2016 as research objects.

### **Data and Methods**

#### **General data**

40 cases of obese female students from a college from June 2013 to June 2016 were selected and divided into control group and observation group based on different intervention methods, with 20 cases in each group. Students in the control group are between 18 and 21 years old, with average age of  $(20.2 \pm 0.6)$  years old. Their body fat rate is between 35% to 40%, with average body fat rate of  $(38.2 \pm 1.1\%)$ . Students in the observation group are between 19 to 22 years old, with average age of  $(21.3 \pm 0.4)$  years old. Their body fat rate is between 36% and 42%, with average body fat rate of  $(40.3 \pm 1.2\%)$ .

The experiment lasts for 3 months. There is no significant difference between the general data between control group and observation group ( $p > 0.05$ ). Therefore, the comparison in this research is effective.

#### **Experimental procedure**

40 female students perform aerobic training and strength training for 5 to 7 times per week. The daily food intake amount of each student shall be obtained by calculation: individual standard weight  $\times$  unit weight heat supply of medium physical labor (30 Kal/kg). During the experiment, 40 girls shall record their daily diet. Extra 500 calorie is limited for students in the experiment.

#### **Intervention methods**

The control group is given sports intervention. Obesity is often because the calorie intake is more than calorie consumption. Sports exercise can help consume body calorie, thus help losing weight. However, a single exercise cannot achieve the best result losing weight. The exercise type should be diversified and enhanced over time, to transfer body fat to muscle and enhance our physique. Three aspects should be taken into consideration for sports intervention: First, exercise content: all students begin with mild exercise, such as walking and jogging, and gradually increase the workout. During exercise, the body consumes fat 30 minutes later, while before that, it consumes sugar instead. Therefore, to lose weight, students shall keep exercising for at least 30 minutes a day for

5 to 7 days a week [4]. Third, exercise intensity. Exercise intensity should be determined by individual physical condition. The general pulse should be 130 to 150 times/min. The observation group is given sports combining medical science intervention. The exercise plan is the same with that of the control group. Medical intervention means to supervise the health of dieters with medical knowledge and methods to prevent harmful factors with effective methods to help with the diet. In this way, dieters can achieve the target of fast weight loss that accords with the development law of human body. During medical intervention, we should focus on the following aspects: First, we should help dieters understand the knowledge of medical weight loss. Dieters can build up confidence by learning weight loss knowledge through lectures and related documentation. Second, during medical intervention, dieters should record their body changes at any time, including diet condition, weight change, blood fat, and blood sugar. The intervention plan should be adjusted based on the changes after exercises. This research was approved by the Ethical Committee of Northwest Normal University.

### Statistical methods

SPSS20.0 (International Business Machines Corporation, USA) is used to check the data of both groups. The intervention effect of both groups is measured by “%” and

verified by chi-square value. When there is difference between the indexes of both groups,  $P < 0.05$ .

### Results

After three month, the weight and body fat percentage of the 20 girls in the control group reduce significantly than before, which are 5.23% and 6.70% respectively. The change of fat weight and fat rate is not significant. Waistline and hipline reduce 3.01% and 3.23% respectively. Chest girth, thigh circumference, and biceps circumference reduce a little. In the observation group, the weight, body fat percentage, and fat rate reduce 8.13%, 17.23%, and 13.14% respectively. There is no significant change in fat free mass. Chest girth, thigh circumference, and biceps circumference reduce 4.12%, 4.56%, and 6.78% respectively. The result show that there is statistically significant difference in the intervention effects between observation group and control group, with  $P < 0.05$ .

### Improvement of indexes including weight, height, BMI, waistline, and WHR of both groups before and after experiment

After the intervention, the indexes of both groups changed, as shown in Table 1.

**Table 1.** Improvement of indexes including weight, height, BMI, waistline, and WHR of both groups before and after experiment ( $\bar{x} \pm s$  (n=30)).

Group	Weight (kg)	Height (cm)	BMI (kg/m <sup>2</sup> )	Waistline (cm)	Hipline (cm)	WHR
Control group	69.23 ± 9.8	1.65 ± 0.14	27.45 ± 2.2	102.3 ± 9.6	93.6 ± 8.5	1.16 ± 0.12
Observation group	63.12 ± 9.2	1.62 ± 0.12	23.48 ± 2.3	89.4 ± 9.8	91.4 ± 7.6	0.96 ± 0.12
T	0.0157	0.3765	0.0000	0.0000	0.0486	0.0000
p	<0.05	>0.05	<0.05	<0.05	<0.05	<0.05

Note: After intervention, the improvement of indexes including weight, height, BMI, waistline, and WHR of the observation group shows difference with the control group. The difference is statistically significant, with  $P < 0.05$ .

**Table 2.** Blood glucose change of both groups ( $\bar{x} \pm s$ ).

Group	Number of cases	Glycosylated haemoglobin	2-hour post-meal blood glucose (mmol/L)	FBG (mmol/L)
Control group	30	9.0 ± 3.3	8.9 ± 2.4	9.6 ± 2.6
Observation group	30	7.5 ± 1.9	7.2 ± 3.5	7.6 ± 2.9
T	--	0.0351	0.0322	0.0067
p	--	<0.05	<0.05	<0.05

Note: The change of blood glucose of the observation group shows statistically significant difference from the control group, with  $P < 0.05$ .

### Blood glucose change of both groups

Before intervention, the difference in blood glucose between both groups is not statistically significant, with  $P > 0.05$ . After intervention, the result is as shown in Table 2.

### Change of blood fat of both groups

After the intervention, the blood fat level of the observation group shows no significant difference from the control group. The difference is not statistically significant, with  $P > 0.05$ .

After intervention, the blood fat level of the observation group improves, as shown in Table 3.

**Table 3.** Change of blood fat of both groups ( $\bar{x} \pm s$ ).

Time	Number of cases	Triglyceride (mmol/L)	Total cholesterol (mmol/L)	LDL	HDL
Control group	30	2.6 ± 1.3	7.4 ± 1.1	3.3 ± 1.2	1.7 ± 0.7
Observation group	30	1.4 ± 0.6	4.9 ± 1.2	2.0 ± 1.5	2.1 ± 0.8
T	--	3.1882	8.4115	3.7267	2.0110
P	--	P<0.05	P<0.05	P<0.05	P<0.05

Note: After intervention, the blood fat change of the observation group shows statistically significant different from the control group, with P<0.05.

## Discussion

With the improvement of living standards, the number of obese people in China is rising year by year. Besides the harm to health, obesity also casts certain psychological effect. At least 2.8 million people are died of obesity around the world each year. WHO lists obesity as a disease. Obesity means that a large number of fat cells which is beyond the standard percentage, stimulate in the subcutaneous tissue and abdomen. Internationally, BMI is used as the standard of obesity. It is calculated by the equation:  $BMI = \text{Weight (kg)} / \text{height}^2 \text{ (m)}$ . For example, if the height and weight of a girl are 160 cm and 50 kg, her BMI is:  $50 / (1.6 \times 1.6) = 19.53$ . The normal range of adult is 18.5 to 24. People whose BMI exceeds 24 are obese. With the progress of modern science and technology, BMI index is regarded as a reference. The diagnosis of obesity is also determined by the fat rate and fat thickness. In recent years, the physical quality of college students in China has generally been declining and is severely lower than those in western countries including America and Japan. Therefore, there is no time to delay in comprehensive intervention of obese college students to improve their physical quality. The intervention that combines exercise and medical science not only improves the physical quality of female college students, but also helps to build up positive attitude and self-confidence, which helps them better suit the society in the future.

At present, there are several reasons that lead to obesity of female college students: 1) Unreasonable lifestyle. According to a survey related to student physical health issued by Gansu Education Department in 2015, besides strength quality, other physical qualities, including endurance, flexibility, and speed, are continuously declining, with endurance ranking the first. College students are in the last stage of growth and development. In college, students have less class time and more free time. In this case, many of them often stay in dormitory or classroom rather than outdoor taking exercise. Students in majors with strong research features sit a lot, which lead to obesity caused by abdominal fat accumulation [5]. 2) Study pressure: Nowadays, many college students are only children who are spoiled and fear of hardships. Besides, pressure brought by graduation and further study also makes exercise time less and less. What's more, the singularity of campus exercise is also a key influence factor. Currently, PE

courses in colleges of Gansu province are mainly competitive activities, including running and jumping, which makes it hard to attract students' interest [6]. 3) Social factors: Located in north China, Gansu owns a longer winter time, which is a reason why obese people here are far more than south China. Due to cold weather in north China, many students like fried and barbecue food, which are of high calorie and fat. The unreasonable dietary structure increases the ratio of obesity [7].

The combination of exercise and medical science refers to the mode that integrates multiple knowledge, including sports, exercise, health care sports, medical nutrition, rehabilitation medical science, and exercise prescription. It covers all knowledge related to exercise and medical science, with exercise and medical science interacting and complementing each other, to help people recover to health. The combination of exercise and medical science is the most effectively method to help disease crowd recover to health [8]. Under the intervention combining exercise and medical science, the weight and body fat percentage of the female college students are significantly reduced. Therefore, we can draw the following conclusion: The exercise combining medical science mode can better help female college students losing whole body and local weight, improve their body size, and build better figure. It is an effective intervention that worth insisting for obese female college students [9].

Currently, there are many extreme way to lose weights available, including yogurt diet, apple diet, and water diet. Many weight watchers may cost students a lot of time and money. What's worse, their diet often causes malnutrition, which is not good for health. The diet effect that is achieved in short time is easy to rebound. However, through exercise combining medical science, students can develop good lifestyle. What's more, scientific exercise and reasonable diet will help to lose weight fast, without bounce.

## Acknowledgment

The work presented in this paper is supported by the project: The two phase of the three phase of the knowledge and technology innovation project of Northwest Normal University (project number: NWNKJXGC-SK0302-9).

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