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Research Article

Effects of Nanomaterials on the Body Composition of Patients with Dyslipidemia Based on Different Strength Sports Equipment

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Relevant studies have shown that the use of sports equipment for exercise can regulate the body composition of patients, thereby achieving the purpose of improving the metabolism of blood lipids in the body. Based on this, this article takes patients with dyslipidemia as the research object and explores the changes in their body composition and shape using different strength sports equipment made of nanomaterials during sports rehabilitation training. In this study, 200 patients with dyslipidemia were selected as experimental subjects in the form of interviews and questionnaires. According to the type of exercise, they were divided into 56 men in the men's running group, 56 men in the men's spinning group, 44 women in the women's running group, and 44 women in the women's spinning group. 12 weeks of incremental exercise training were carried out. The results of the experiment found that after the end of the 12-week exercise training, the body composition of the subjects in each group changed significantly ($P < 0.05$). The changes in the male and female spinning group were more obvious than those in the running group, and the weight of the male spinning group, waist circumference, and hip circumference decreased by 2.3%, 3%, and 3.5% and those of women's spinning group decreased by 3.1%, 3.4%, and 3.9%. In addition, blood lipids in each group also changed significantly ($P < 0.05$); there is a significant statistical difference. Through a return visit two years after the end of the experiment, it was found that most of the subjects had symptoms of discomfort, indicating that the nanomaterials have a certain negative impact on the human body.

1. Introduction

1.1. Background and Significance. In recent years, with the development of social economy and the improvement of people's material living standards, people's eating habits and structure have undergone great changes. Eating high-fat, high-calorie foods can cause abnormal metabolism of lipoproteins, high cholesterol and triglycerides, and high cholesterol and low cholesterol in the body. Middle-aged and elderly people cannot do strenuous exercise due to the decline in physical function, so they are used to being in a static state for a long time, and lack of physical exercise can easily cause dyslipidemia. Lack of exercise can easily lead to disorders of lipid metabolism and abnormal blood lipids in the body and abnormal blood lipids can easily induce cardiovascular and cerebrovascular diseases such as coronary heart disease and atherosclerosis. Therefore, strengthening physical exercise is very important for patients with abnormal blood lipids.

Nowadays, there are various ways of physical exercise. There are different sports equipment and methods according to different exercise intensity, such as walking, jogging, spinning, tennis, etc. With the development of science and technology, although nanomaterials have improved the quality of sports equipment due to their low impact, quantum impact, and surface and interface effects, many sports equipment have been made of high-performance nanomaterials. In addition, it can also cause biological effects that affect the environment and the human body to a certain extent and may pose a threat to human health. Therefore, it is very important to study and analyze the effects of different sports equipment based on nanomaterials on the body composition of patients with dyslipidemia.

1.2. Related Work. There have been long studies on the problems that exercise can improve, including the body's mechanism, reducing the chance of people suffering from illness, and helping patients recover their health. Román et al. pointed out that patients with liver cirrhosis usually have functional limitations, decreased muscle mass, and a high risk of falls. These variables can be improved with exercise. They showed that moderate exercise has a significant positive effect on the functional capacity, body composition, and fall risk of patients with liver cirrhosis. In the study, they randomly divided 23 patients with cirrhosis into exercise programs ($n = 14$) or relaxation programs ($n = 9$). Both programs include a 12-hour one-hour course on 3 days a week. At the beginning and end of the study, they used cardiopulmonary exercise tests to measure functional capacity, anthropometry, and dual-energy X-ray absorptiometry to assess body composition and Timed Up and Go tests to assess the risk of falls. In the exercise group, cardiopulmonary exercise tests showed an increase in total effort time ($P < 0.001$) and ventilatory anaerobic threshold time ($P = 0.009$). The circumference of the upper thighs increases, and the thickness of the skinfolds on the middle arms and middle thighs decreases. The dual-energy X-ray absorption method showed decreased fat mass (−0.94 kg, 95% CI −0.0048 to −1.41, $P = 0.003$) and increased lean mass (1.05 kg, 95% CI 0.27–1.82, $P = 0.01$), lean limbs mass (0.38 kg, 95% CI 0.06–0.69, $P = 0.03$), and stovepipe mass (0.34 kg, 95% CI 0.10–0.57, $P = 0.02$). Compared with the baseline, the Timed Up and Go test at the end of the study was reduced ($P = 0.02$). No changes were observed in the relaxation group. Their research results indicate that a moderate exercise program for patients with liver cirrhosis can improve their functional capacity, increase muscle mass, and reduce body fat content [1]. In addition, Chen et al. also conducted research on the effect of exercise on the body composition of obese patients. They divided the experimental patients into resistance training (RT), aerobic training (AT), and combined training (CT) to observe and explore the effects of exercise intervention on the body composition, muscle strength performance, and insulin-like growth factor 1 (IGF-1) of obese patients with sarcopenia. After two 8-week training sessions, each group of participants stopped training for 4 weeks and then checked the retention effect of the training intervention. Body composition, grip strength, maximum posterior extensor strength, maximum knee extensor strength, and blood IGF-1 concentration were measured. The skeletal muscle mass (SMM), body fat mass, appendix SMM/wt%, and visceral fat area (VFA) of the RT, AT, and CT groups were significantly better than the CON group regarding muscle strength performance at the 8th and 12th weeks. The RT group showed higher grip strength than the other groups at the 8th and 12th weeks and higher knee extensor performance at the 8th week. In the 8th week, the serum IGF-1 concentration in the RT group was higher than that in the CON group, while the CT group was better than the AT and CON groups. Compared with untrained adults, older adults with muscular obesity who participated in RT, AT, and CT interventions showed increased muscle mass, decreased total fat, and decreased VFA. The muscle strength performance and serum IGF-1 level of the training group, especially the RT group, are better than those of the control group [2]. At present, although there are many researches on the effects of exercise on human body functions, there are very few effects on the body composition changes caused by the application of nanomaterials in sports equipment for fitness exercise patients with dyslipidemia. Therefore, the research theme and purpose of this article have great social practical significance and discussion value.

1.3. Innovations in This Article. The innovations of this paper are mainly reflected in the following aspects: (1) patients with dyslipidemia were selected as subjects by means of field visits and questionnaire surveys, and the subjects' body composition changes were tested through a 12-week exercise experiment. The experimental methods are closely related to the subject of the article research; (2) all experimental data are processed by statistical analysis software, and the experimental results are true and reliable, with greater credibility and reference value.

2. Application of Nanomaterials in Sports Equipment and Exercise Methods for Patients with Dyslipidemia

2.1. Application of Nanomaterials in Sports Equipment

2.1.1. Nanomaterials. Nanomaterials are a new type of materials developed in the mid-1980s. Since entering the 21st century, with the further development of science and technology, nanomaterials have developed into a material science technology with broad development and application prospects [3, 4]. Nanomaterials are a kind of special mesoscopic structure materials that are different from microscopic particles and macroscopic objects. Because the particles are actively small and have a large specific surface area, they have small size effects, quantum size effects, surface and interface effects, macroscopic quantum tunneling effects, and volume. The application of nanomaterials to other material objects can effectively improve the properties of the objects, such as improving their durability, wear resistance, and corrosion resistance and enhancing its mechanical strength such as compression and tension. The excellent properties of nanomaterials have made them extremely widely used in construction engineering, sports engineering, and biomedicine [5, 6].

2.1.2. Application of Nanomaterials in Sports Equipment. Different from the traditional and single exercise method in the past, people nowadays have a variety of exercise methods, and the sports equipment they rely on are also in various forms. With the development of society, sports are no longer limited to the outdoors. In order to perform physical exercises better, more conveniently and safely, gymnasiums came into being [7]. In the gym, there are a variety of fitness equipment equipped to facilitate people's physical exercise. Most of these pieces of equipment are applied to the current hot and excellent performance of nanomaterials. The most common sports equipment using nanomaterials are as follows:

(1) *The Application of Nanomaterials to Rackets*. The first to realize the application of nanomaterial rackets are tennis rackets, badminton rackets, and table tennis rackets. After adding nanomaterials, these rackets have significantly reduced weight, become lighter, thinner, more elastic, and have significantly improved feel and durability [8, 9].

(2) *The Application of Nanomaterials to Spinning Bikes*. Bicycles are favored by people because of their light weight, low price, environmental friendliness, and strong ability to rampage. Regular cycling can also exercise leg muscles to achieve fitness effects. The gym's spinning bike is a modified bicycle. Its external structure is similar to that of a bicycle. It is different from the flexibility of a bicycle. It is fixed on the floor and exercises by pedaling on the upper part of the body. The spinning bike uses carbon nanotubes, which greatly reduces the weight of the bike while also improving its rigidity and strength [10].

(3) *The Application of Nanomaterials on Treadmills*. In the sports field, the first use of nanomaterials was rubber used in race tracks, which was made by adding nanopowder to the material. The traditional metal structure is mixed with nanopowder and replaced by polyurethane and nano-polyurethane, making the material more durable, corrosion resistant, and flame retardant. With the improvement of conditions, people once again applied nanomaterials to the manufacture of treadmills. Nanopowder was added to the treadmill raw materials, which greatly improved the wear resistance and slip resistance of the treadmill track and improved the safety of use [11].

(4) *The Application of Nanomaterials in Various Heavy Equipment*. There are also heavy equipment similar to weightlifting equipment and pull-up equipment in the gym. Most of these are also applied to nanomaterials. Adding nanocoatings to the surface of these heavy equipment can not only prevent the corrosion of the equipment due to human sweat, but also it is conducive to slip resistance, and nanocoating can also form a barrier layer between the device and the air, reducing the impact of air on the device and extending the service life of the device [12, 13].

2.1.3. Common Types of Nanomaterials Used in Sports Equipment. There are many nanomaterials used in sports equipment, mainly as follows:

(1) *Carbon Fiber Composite Materials*. Carbon fiber material is a special fiber mainly composed of carbon elements. It is mainly used as a reinforcing material to compound with resin, metal, and ceramics to produce advanced composite materials. Carbon fiber materials are mainly used to make sports equipment such as tennis rackets, badminton rackets, rowing boats, skis, and snowboards.

(2) *Nanocoatings*. Nanocoatings are mainly glue-like coating agents made of nanomaterials such as epoxy resin, polyurethane, acrylic resin, etc. It is mainly used for the protection of surfaces such as stadiums and racetracks to enhance the wear resistance and slip resistance of their surfaces.

(3) *Aramid Fiber*. Aramid fiber is a new type of composite material developed in recent decades. It has a series of advantages such as high strength, corrosion resistance, impact resistance, light texture, and heat insulation. It is mainly used in the production of protective equipment, bicycles, and tennis rackets.

(4) *Graphene Magnesium-Based Composite Materials*. Graphene magnesium-based composites show the characteristics of light weight, high unit mass strength, high fatigue strength, good damage safety performance, high wear resistance, good damping performance, and large freedom of molding. They are mainly used in bicycles, golf clubs, struts, etc. [14, 15].

2.2. Exercise Methods for Patients with Dyslipidemia

2.2.1. Dyslipidemia. Dyslipidemia is a chronic metabolic syndrome caused by the production of high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, and triglycerides. It is more common in middle-aged and elderly people. This is an important factor in the development of human atherosclerosis and is the main cause of coronary heart disease and rhinitis (such as heart disease and stroke). Dyslipidemia is mainly caused by genetic diseases or environmental factors, including malnutrition, overeating and alcohol abuse, and lack of exercise; under the combined effect of these factors, it is very easy to make blood lipids in the body abnormal [16, 17].

2.2.2. Classification of Dyslipidemia. According to the classification, dyslipidemia can be divided into the following:

(1) *Secondary Hyperlipidemia*. This dyslipidemia is caused by a variety of diseases in the patient itself. The patient's systemic diseases, such as diabetes, kidney disease, liver disease, etc., may affect the patient's body due to the action of drugs in the treatment of systemic diseases. The increase in blood sugar and blood lipids leads to abnormal blood lipids.

(2) *Primary Hyperlipidemia*. Primary hyperlipidemia is caused by the patient's own congenital genetic defects. It is a dyslipidemia that naturally forms and appears in the patient's body without the action of other external forces [18, 19].

It can be divided into

(i) *Classification of Hyperlipoproteinemia*. The classification of hyperlipoproteinemia can divide patients into six types according to their condition: I, IIa, IIb, III, IV, and V. This classification method is very helpful for clinical diagnosis and treatment, but the only disadvantage is that this method is too cumbersome.

(ii) *Clinical Classification*. According to the different clinical manifestations of patients, it can be divided into hypercholesterolemia, hypertriglyceridemia, mixed hyperlipidemia, and low-density lipoproteinemia.

(3) *Genotyping*. With the development of technology, it has been discovered that many patients with dyslipidemia have defects in single or multiple genetic genes. Because the dyslipidemia caused by this gene defect is accompanied by similarities between families, it is clinically called familial hyperlipidemia [20, 21].

2.2.3. Exercise Methods for Patients with Dyslipidemia. Many studies have shown that physical exercise has a great impact on human body mechanisms and functions. Excessive high-load exercise training can damage human body functions, but proper physical exercise can effectively improve the patient's body mechanisms [22, 23]. Through exercise, patients with dyslipidemia can change their body shape and composition, reduce fat and sugar in the body, achieve fitness goals, and at the same time help their recovery. There are many general physical exercise methods. For most middle-aged and elderly patients with dyslipidemia, they can choose to walk slowly, jog, play badminton, ride shared bicycles, and do other relatively relaxed aerobic exercises because they cannot perform violently stimulating exercises. Through proper and healthy aerobic exercise, patients can improve their systemic function and promote the recovery of the condition [24, 25].

3. Experiments Based on the Effect of Nanomaterials on the Body Composition of Patients with Dyslipidemia in Different Strength Sports Equipment

Body composition refers to the content and proportion of various substances and ingredients in the body, which includes muscle, bone, fat, water, and various elements. Generally, when a normal person performs physical exercise, the body composition of sports equipment of different intensities will change to different degrees and the external body shape will also change. This is especially true for patients with dyslipidemia who have significant body composition and function. Due to the characteristics of the body composition caused by their disease, as long as they exercise, their body will immediately send out signals, showing a different body ingredient. In order to specifically explore the impact of sports equipment of different intensities on the body composition of patients with dyslipidemia, this article selected several communities and selected 200 dyslipidemia patients as subjects to participate in this experiment through field visits and questionnaire surveys. They were allowed to experience two aerobic exercises, running and spinning, and the changes in their body composition and shape after exercise were tested.

3.1. Selection of Experimental Subjects and Basic Conditions. There were 200 subjects in this experiment. The examinations of their fasting blood glucose and blood lipids, resting heart rate, blood pressure, and electrocardiogram confirmed that the 200 subjects were all patients with dyslipidemia and had no other diseases except for dyslipidemia. Among them, 112 were males and 88 were females, with an average age of 52.23 ± 6.78. The 200 subjects were all people who lacked physical activity. According to the different sports equipment and exercise methods, 200 subjects were randomly divided into 4 groups, namely, 56 men in the men's running group, 56 men in the men's spinning group, 44 women in the women's running group, and 44 women in the women's spinning group. The basic physical conditions of the subjects are shown in Table 1.

3.2. Experiment Implementation and Exercise Plan. The 200 subjects were trained in running and spinning according to the predivided groups. The exercise time was three times a week, 40–50 minutes each time, for a total of 12 weeks, without changing their original lifestyles. Before sports training, the subjects in each group were tested with incremental load, and the maximum load of each subject was measured and the ventilation was 75%, 80%, 85%, 95%, and 100%. The heart rate corresponding to the anaerobic threshold is used as the subject's target heart rate. In the process of sports training, warm up for 5–10 minutes before the start of each exercise, and then start training and stop training when the subject's load intensity reaches the target heart rate. The exercise time to reach the target heart rate is as follows: exercise at 75% intensity for 20–30 minutes in the first week; exercise at 75%–80% intensity for 30 minutes in the 2-3 weeks; exercise at 85%–90% intensity for 30–40 minutes in the 4–6 weeks; exercise for 40 minutes at 95% intensity in weeks 7–10; exercise for 40–50 minutes at 100% intensity in weeks 11-12.

Weight Training Methods. Before the experiment, introduce the test procedure and related precautions for all subjects, adjust the position of the individuals in each group according to the fitness preferences, wear a breathing mask during the exercise, and adjust the participants accordingly. Provide additional training to the cardiovascular examiners and then to the trainees. Training stops when the intensity of the learning exercise reaches the limit of physical fatigue. The criteria for judging exhaustion are respiratory quotient >1.0 and heart rate >180 beats/min.

3.3. Experimental Test Indicators. The height, weight, waist circumference, hip circumference, muscle, fat, body fat, and bone mineral content of the subjects were measured 1 day before the beginning of the experiment and 1 day after the end of the experiment and 4 ml of venous blood was drawn and placed on the anticoagulation needle. Blood lipids (TG, HDL-C, LDL-C, and CHOL) are tested in the tube; the subjects will be visited 2 years after the end of the experiment to observe the changes in their body comfort before and after exposure to sports equipment.

Table 1: Basic physical conditions of the subjects.

	Age	Height	Weight
Men's running group	49.05 ± 8.47	1.70 ± 0.15	75.2 ± 8.3
Men's spinning group	50.26 ± 4.38	1.69 ± 0.25	79.2 ± 7.8
Women's running group	43.05 ± 7.90	1.55 ± 0.27	63.2 ± 10.3
Women's spinning group	53.77 ± 8.90	1.52 ± 0.20	66.4 ± 9.7

3.4. Statistical Processing and Analysis of Experimental Data. All data in this experiment were analyzed and processed by the statistical analysis software SPSS 22.0, and the mean ± standard deviation ($x \pm s$) was used for statistical description. The difference between two groups was tested by variance S test, and the difference between multiple groups was used. With t test, $P < 0.05$ is considered to have a significant statistical difference and $P < 0.01$ is considered to have an extremely significant statistical difference. The formulas involved are

$$\sigma = \sqrt{\frac{1}{n}\sum_{i=1}^{N}}\left(x_i - \mu\right)^2,$$

$$s^2 = \frac{\left(M_1 - x_1\right)^2 + \left(M_2 - x_2\right)^2 + \left(M_3 - x_3\right)^2 + \cdots + \left(M_n - x_n\right)^2}{n},$$

$$t = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\left(\sigma_{x_1}^2 + \sigma_{x_2}^2 - 2\gamma\sigma_{x_1}\sigma_{x_2}\right)/(n-1)}}. \tag{1}$$

4. Analysis of the Experimental Results Based on the Effect of Nanomaterials in Different Strength Sports Equipment on the Body Composition of Patients with Dyslipidemia

In the third section of the article, we selected 200 subjects with dyslipidemia symptoms to participate in the running and spinning training of this experiment by means of interviews and questionnaire surveys. In this section, we will conduct specific experimental results, analysis, and discussion.

4.1. Changes in Body Mass Index and Waist and Hip Circumference of Patients with Dyslipidemia before and after Exercise. During the experiment, we separately counted the height, weight, and hip and waist circumference of all subjects before and after 12 weeks of exercise training and calculated their body mass index ($BMI = kg/m^2$, namely, weight/height 2) and waist-to-hip ratio (waist/hip circumference), as shown in Tables 2 and 3 and Figure 1.

It can be seen from Tables 2 and 3 that the body index and waist-to-hip circumference ratio of patients with dyslipidemia before and after exercise training changed significantly, and the body weight, waist circumference, and hip circumference of the subjects in each group decreased significantly ($P < 0.05$). There are significant statistical differences; between these groups, the male group's weight increased by 3.3%, waist circumference increased by 3.0%, and waist circumference was 3.5%, which is a noticeable change between the four groups. The changes in body weight, waist circumference, and hip circumference of the women who ran the circle were 3.1%, 3.4%, and 2.9% compared to the runner group. The changes in weight and waist and hip circumference of the women's spinning group were also more obvious than those of the running group, which were 3.1%, 3.4%, and 2.9%, respectively. Overall, the changes in the spinning group were more obvious than the running group. This shows that spinning training is more intense than running training, and it has a greater impact on the body shape of patients with dyslipidemia.

According to Figure 1, there was no significant change in the body index of subjects in each group before and after exercise ($P > 0.05$), and there was no significant statistical difference, while the waist-to-hip ratio of each group changed significantly, with the male spinning group and the female spinning group is the most obvious, with extremely significant statistical differences ($P < 0.01$). It is once again confirmed that spinning training with a larger exercise load has a greater impact on the body shape of patients with dyslipidemia.

4.2. Changes in Body Composition of Patients with Dyslipidemia before and after Exercise. The changes in body composition of the subjects before and after exercise are shown in Table 4 and Figure 2.

According to Table 1 and Figure 2, it can be seen that after 12 weeks of exercise, the body components of the subjects in each group have significantly changed compared with those before exercise. The bone mineral content of the subjects increased compared with that before exercise, but the changes were more significant. There is no statistical significance if $P > 0.05$; the muscle content showed an increasing trend, and the change was significant, with extremely significant statistical difference ($P < 0.01$); the fat content and body fat percentage both decreased significantly, with extremely significant statistical difference ($P < 0.01$). At the same time, compared with the men's running group and the women's running group, the men's spinning group and the women's spinning group had more obvious changes in body components ($P < 0.05$), and the increase in bone mineral and muscle content was more obvious, while the fat content and the percentage of physique decreased more significantly.

4.3. Changes in Blood Lipids in Patients with Dyslipidemia before and after Exercise. One day before the experiment and one day after the end of the experiment, we took the venous blood of all subjects for the detection of TG, HDL-C, LDL-C, and CHOL. Now the detection results of various blood lipids are plotted as shown in Figure 3.

It can be seen from Figure 3 that after the end of the 12-week exercise training, TG and CHOL in the men's running group decreased but there was no statistical difference ($P < 0.01$); HDL-C increased significantly ($P < 0.05$); LDL-C showed an upward trend but not significant ($P > 0.05$); TG in the male spinning group has a

Table 2: Changes in body index of patients with dyslipidemia before and after exercise.

Group	Height (m^2)		Weight (kg)		BMI (kg/m^2)	
	Before exercise	After exercise	Before exercise	After exercise	Before exercise	After exercise
Men's running group	1.70 ± 0.15	1.70 ± 0.15	75.2 ± 8.3	72.4 ± 7.32	25.02 ± 3.18	24.88 ± 3.30
Men's spinning group	1.69 ± 0.25	1.69 ± 0.25	79.2 ± 7.8	75.4 ± 8.14	25.75 ± 3.45	25.53 ± 3.43
Women's running group	1.55 ± 0.27	1.55 ± 0.27	63.2 ± 10.3	59.4 ± 6.42	24.37 ± 4.86	24.19 ± 4.25
Women's spinning group	1.52 ± 0.20	1.52 ± 0.20	66.4 ± 9.7	62.12 ± 5.31	24.28 ± 3.64	24.07 ± 3.16

Table 3: Changes in waist-to-hip ratio in patients with dyslipidemia before and after exercise.

Group	Waist circumference (cm)		Hip circumference (cm)		Waist-to-hip ratio	
	Before exercise	After exercise	Before exercise	After exercise	Before exercise	After exercise
Men's running group	86.56 ± 9.45	83.74 ± 9.25	97.23 ± 8.55	94.39 ± 7.51	0.83 ± 0.46	0.83 ± 0.14
Men's spinning group	88.73 ± 10.43	84.33 ± 10.71	97.52 ± 5.81	93.22 ± 5.41	0.88 ± 0.14	0.86 ± 0.09
Women's running group	84.76 ± 11.27	81.24 ± 9.17	99.45 ± 4.31	96.44 ± 4.13	0.89 ± 0.04	0.88 ± 0.0.6
Women's spinning group	85.14 ± 7.29	81.27 ± 7.36	98.24 ± 7.70	94.17 ± 5.24	0.86 ± 0.09	0.84 ± 0.07

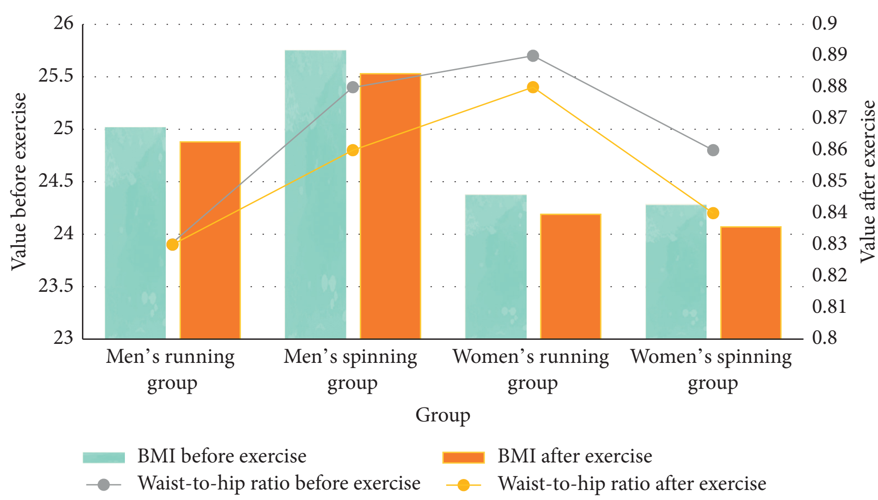

Figure 1: Comparison of BMI and waist-to-hip ratio of patients with dyslipidemia before and after exercise.

Table 4: Changes in body composition of patients with dyslipidemia before and after exercise.

Group	Bone mineral content (kg)		Muscle weight (kg)		Fat weight (kg)		Body fat percentage (%)	
	Before exercise	After exercise	Before exercise	After exercise	Before exercise	After exercise	Before exercise	After exercise
Men's running group	2.95 ± 3.72	3.55 ± 4.32	40.55 ± 9.70	45.24 ± 9.03	22.23 ± 4.75	18.01 ± 7.21	33.12 ± 5.40	30.46 ± 5.14
Men's spinning group	3.05 ± 3.14	3.94 ± 3.42	42.43 ± 6.45	48.33 ± 5.71	23.72 ± 5.41	17.73 ± 4.34	34.48 ± 6.14	29.56 ± 5.34
Women's running group	2.94 ± 3.71	3.65 ± 5.74	38.46 ± 6.27	43.24 ± 6.17	21.47 ± 4.01	17.53 ± 4.13	32.15 ± 5.43	29.36 ± 5.12
Women's spinning group	2.95 ± 3.92	3.98 ± 3.06	39.24 ± 7.38	45.02 ± 7.24	21.74 ± 6.81	16.86 ± 6.34	31.46 ± 4.76	26.55 ± 4.17

downward trend but not obvious ($P > 0.05$); and HDL-C is significantly increased ($P < 0.05$). TG and CHOL in the female running group have a downward trend ($P > 0.05$), HDL-C increased significantly ($P < 0.05$), and LDL-C decreased significantly ($P < 0.05$). TG and CHOL in the female spinning group had a downward trend ($P > 0.05$), HDL-C increased significantly ($P < 0.01$), and LDL-C decreased significantly ($P < 0.05$). In short, there are significant statistical differences in blood lipids between the women's running group and the spinning group ($P < 0.05$) and the men's running group and the spinning group have significant differences in TG, HDL-C, and

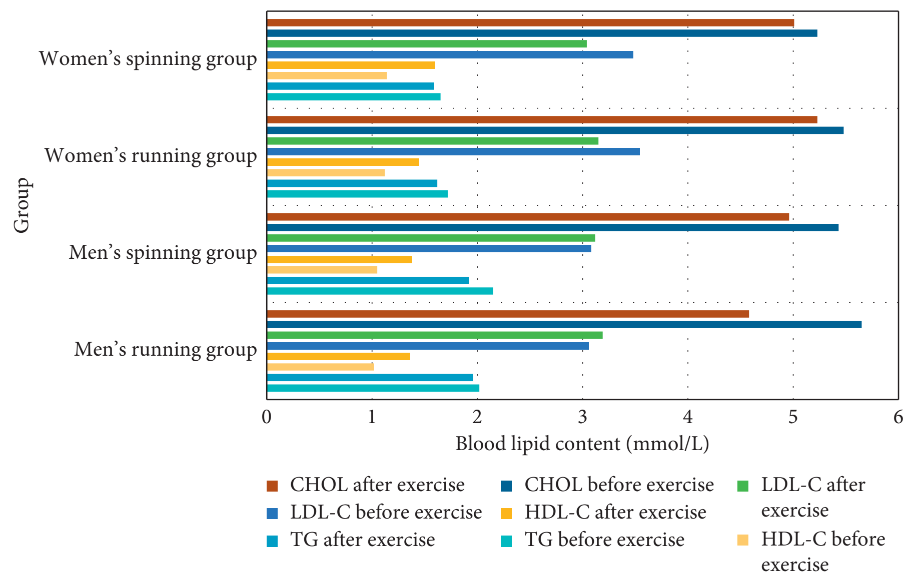

Figure 2: Changes in body composition of patients with dyslipidemia before and after exercise.

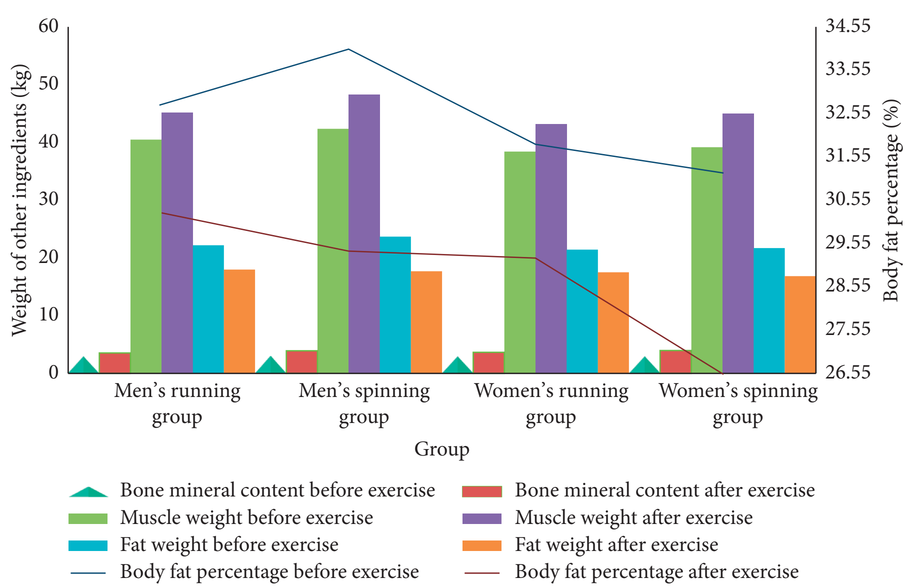

Figure 3: Changes in blood lipids in patients with dyslipidemia before and after exercise.

CHOL. This shows that exercise training has a greater impact on the changes in blood lipids in patients with dyslipidemia, and the changes in the spinning group are more obvious than those in the running group, indicating that the overall effect of spinning on blood lipids is greater than running.

4.4. Changes in Body Comfort of Patients with Dyslipidemia before and after Exercise. Research has found that nanomaterials have some very special properties, which make it possible for them to have a certain negative impact on the environment and organisms due to biological effects, thereby affecting human health. In order to explore whether the 12-week exercise training caused the exercise bike and treadmill to have an impact on the physical comfort of the subjects, two years after the end of the experiment, we conducted a return visit to all the subjects again and investigated them within 2 years. Due to the fact that some subjects have moved out of the original community or other factors during the period, we finally got 145 valid data. Through the investigation, it was found that the physical characteristics of the subjects after the end of the experiment were generally as follows: uncomfortable throat, frequent coughing; lung lesions, mild pneumonia symptoms; no obvious symptoms, but occasional physical discomfort; and nothing variety. The specific statistical results are shown in Figure 4.

It can be seen from Figure 4 that most of the 145 subjects who returned to the interview indicated that their physical comfort has changed after the exercise training. 69 indicated

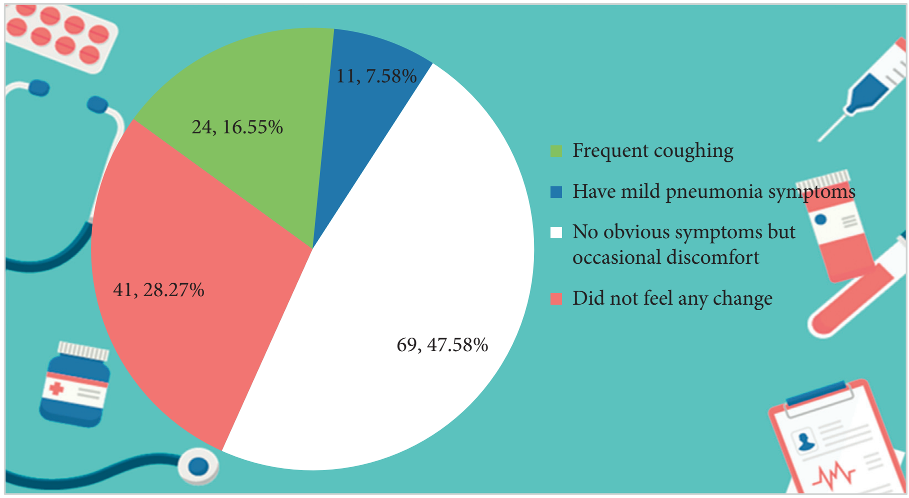

Figure 4: Changes in body comfort of patients with dyslipidemia before and after exercise.

that although the body had no obvious symptoms, they often experienced physical discomfort, accounting for 47.58%; 24 people said they had frequent coughing, accounting for 16.55%; 11 people said they had mild pneumonia symptoms during the period, accounting for 7.58%; and the remaining 41 people said they had not felt any changes in their body, accounting for 28.27%. Nearly 70% of the subjects indicated that their bodies had adverse reactions after the end of the experiment. This shows that sports equipment made of nanomaterials can cause some harm to the human body to a certain extent. The cause of the disease is explained in this article: fitness during exercise, nanoparticles in sports equipment may enter the human body through human breathing and skin contact and accumulate and transfer to the body to produce biological effects. In the long run, it will be harmful to human cells, lungs, liver, kidney, and brain tissue influences.

To sum up, for patients with dyslipidemia, exercise can change their body composition and shape, help them effectively promote the metabolism of blood lipids in the body, and thus benefit their recovery. But nowadays, many sports and fitness equipment are added with nanomaterials, which are easy to have an adverse effect on the human body. Patients with dyslipidemia suffer from diseases and their immunity is reduced, so they are more vulnerable to injury. Therefore, this article believes that patients with dyslipidemia can take outdoor exercises to achieve the purpose of exercise, such as elderly exercises, Tai Chi, square dancing, or slow walking and jogging.

5. Conclusions

Since the reform and opening up, Chinese economy has developed rapidly and the people's living standards have improved significantly. This has been accompanied by changes in the dietary structure and eating habits of the residents. The days of eating good food only during the Chinese New Year are gone. However, long-term rich and greasy eating habits have disrupted the balance of lipoproteins in many people, abnormally elevated blood lipid levels in the body, and various diseases caused by abnormal blood lipids also pose a major threat to human health. With the acceleration of aging, the prevalence of dyslipidemia among middle-aged and elderly people is getting higher and higher.

Studies have shown that exercise can change the shape of the body and is aimed at effectively stimulating blood lipid metabolism in the body. For middle-aged people and older with dyslipidemia, moderate exercise can help get rid of the dyslipidemia. In today's society, people often use sports equipment to achieve better sports results. As technology advances, more sports devices are converted into nanoparticles to optimize performance. Nanotechnology is a form of high technology with special properties that can biologically affect the molecular structure of sports equipment, possibly adversely affecting the environment and human body.

This study found through experiments that both spinning and running training for a period of time can change the body composition of patients with dyslipidemia, improve their blood lipid content, reduce body fat percentage, and increase muscle content; at the same time, the effect of spinning exercise on changes in body composition was most obvious. However, in the course of the experiment, we also found that the addition of nanomaterials to sports equipment caused a negative impact on the body of patients with dyslipidemia. Some subjects experienced frequent coughing, and mild pneumonia. Two years after the experiment, the body felt unwell and other symptoms. Therefore, this study suggests that middle-aged and elderly patients with dyslipidemia should choose outdoor exercise as the main exercise method. Exercise methods such as elderly exercises, Tai Chi, slow walking, and jogging are all good choices.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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