EXPERIMENTAL STUDY ON THE EFFECTS OF YOGA ON PHYSICAL FITNESS IN ADOLESCENTS

ESTUDO EXPERIMENTAL SOBRE OS EFEITOS DA IOGA NA APTIDÃO FÍSICA EM ADOLESCENTES

ESTUDIO EXPERIMENTAL SOBRE LOS EFECTOS DEL YOGA EN LA APTITUD FÍSICA EN ADOLESCENTES

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ABSTRACT

Introduction: Yoga originated in the Indus River basin, is an ancient technique involving physical skills or static aerobic exercise. Objective: Test and analyze the changes in physical fitness of adolescents submitted to yoga experiment. Methods: Experimental method, literature review, mathematical statistics and other research methods were used in making this paper. 30 freshmen in primary education at Yancheng Normal University were selected for a 12-week yoga teaching training to explore the impact of yoga on health and physical fitness of ordinary college students. Results: Body fat rate and fat mass index decreased, lung volume increased significantly, and physical fitness increased significantly. Conclusion: After 12 weeks of yoga exercises, the body composition of the tested college students improved significantly, increasing both flexibility and physical fitness. Notable changes were also seen in balance and responsiveness, revealing an intrinsic improvement in the students' skeletal muscles. ***Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

Keywords: Yoga; Physical Fitness; Adolescent Health.

RESUMO

Introdução: A ioga, originada na bacia do rio Indo, é uma técnica antiga que envolve habilidades físicas ou exercício aeróbico estático. Objetivo: Testar e analisar as alterações na aptidão física de adolescentes submetidos ao experimento de ioga. Métodos: Foram utilizados na confecção deste artigo o método experimental, revisão bibliográfica, estatística matemática e outros métodos de pesquisa. 30 calouros na educação primária da Universidade Normal de Yancheng foram selecionados para um treinamento de 12 semanas de ensino de ioga para explorar o impacto da yoga na saúde e na aptidão física de estudantes universitários comuns. Resultados: A taxa de gordura corporal e o índice de massa gorda diminuiu, o volume pulmonar aumentou significativamente, e a aptidão física aumentou significativamente. Conclusão: Após 12 semanas de exercícios de ioga, a composição corporal dos estudantes universitários testados melhorou significativamente, elevando tanto a flexibilidade quanto a aptidão física. Notáveis também foram as alterações constatadas na capacidade de equilíbrio e a capacidade de reação, revelando uma melhora intrínseca na musculatura esquelética dos estudantes. ***Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

***Descritores*:** *Ioga; Aptidão Física; Saúde do Adolescente.*

RESUMEN

Introducción: El yoga, originario de la cuenca del río Indo, es una técnica ancestral que implica habilidades físicas o ejercicio aeróbico estático. Objetivo: Comprobar y analizar los cambios en la forma física de los adolescentes sometidos a un experimento de yoga. Métodos: En la elaboración de este artículo se utilizaron el método experimental, la revisión bibliográfica, la estadística matemática y otros métodos de investigación. Se seleccionó a 30 estudiantes de primer año de educación primaria de la Universidad Normal de Yancheng para una formación en enseñanza del yoga de 12 semanas con el fin de explorar el impacto del yoga en la salud y la forma física de los estudiantes universitarios ordinarios. Resultados: El índice de grasa corporal y el índice de masa grasa disminuyeron, el volumen pulmonar aumentó significativamente y la forma física aumentó significativamente. Conclusión: Tras 12 semanas de ejercicios de yoga, la composición corporal de los estudiantes universitarios evaluados mejoró significativamente, aumentando tanto la flexibilidad como la forma física. También fueron notables los cambios observados en la capacidad de equilibrio y la capacidad de respuesta, lo que revela una mejora intrínseca en la musculatura esquelética de los alumnos. ***Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

***Descriptores*:** *Yoga; Aptitud Física; Salud del Adolescente.*

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INTRODUCTION

As the builders and successors of socialism, the healthy physical and mental development of college students is the focus of the country and the whole society.[1] However, in recent years, college students' myopia, obesity and other problems have become increasingly serious, which is directly related to the habits of college growth time such as studying on paper, playing games, and playing electronic products, which make college students' body muscles too stiff, strained, and even affect the normal development of bones, hindering the development of college students' physical and mental health.[2] It can be seen that it is urgent to

improve the physical flexibility and flexibility of college students.[3] With the changes in China's economic system, college students engaged in yoga can meet the needs of the development of compulsory education sports, and under the premise of the reform of the national education organization, promoting the healthy and comprehensive development of college students has become an inevitable requirement for the current development of college students' sports.[4] According to the development and reform of college sports by the State General Administration of Sports, yoga is deeply loved by teachers and students, and college students are more obsessed and love yoga.[5] In this context, exploring the influence mechanism of yoga on the promotion of college students' physical health is helpful to promote and improve the physical health level of college students. Therefore, improving the physical health of contemporary college students is one of the important problems facing China, and it is also a problem that needs to be solved in the development of colleges and universities.[6] Yoga refers to a sports system that integrates body, mind and spirit by using body movements, breath regulation, idea and body relaxation. Yoga has developed rapidly in the West in the past hundred years, but it has gradually become popular in China in recent years. It provides a good way of life for modern people to reduce stress, maintain health, care and entertainment, and has become one of the main forms of public entertainment and fitness. According to the survey, yoga has produced good effects on many important organs of the human body, such as the waist, shoulder and brain. In addition, yoga has good effects on relieving mental stress, maintaining health, and focusing attention, especially on the physiological and psychological functions of teenagers.[7] Therefore, more and more studies began to pay attention to the impact of yoga on the mental health of adolescents.[8] Yoga originated from ancient India, because of its unique exercise method, is popular among the majority of students and has become a sports program in colleges and universities, which can not only strengthen the body, shape the body, but also help college students improve their physical fitness.[9] It can control people's emotions, relieve anxiety, and maintain a state of physical health and inner peace through a series of ways such as pranayama, meditation, meditation, and breathing. Therefore, yoga has great potential in the development of physical education in colleges and universities in China.[10]

Research object and method

Subjects of study

The influence of yoga training on the development of flexibility quality of college students was the research object.

The study is Purely observational studies which no need to registry ID of ICMJE, and all the participants were reviewed and approved by Ethics Committee of Guangxi College for Preschool Education, China (NO. 2022013)

Research Method

Documentation Law. Through CNKI and other databases, with "yoga exercise", "physical fitness", "health" and other theme words, the relevant literature from 2015 to 2020 was consulted, and the above literature was classified and summarized, which provided first-hand information for the in-depth research of this study. The collected literature was sorted, analyzed and refined to provide theoretical support for the research of this paper.

Expert interview method. In this study, experts in the field were interviewed from four universities, including face-to-face and WeChat interviews. The main interview content is the characteristics of yoga exercise, college students' physical health promotion indicators, etc., and the experimental purpose and design roadmap of this study are clarified through in-depth and comprehensive interviews.

Experimental research method. Experimental subjects: In this study, 30 freshmen of primary education in Yancheng Normal University were selected to undergo 12-week yoga teaching training as experimental subjects, of which 15 were experimental classes. Yoga exercises using grouped inquiry; 15 students are in the control class, using regular teaching methods to practice traditional sports.

Experiment time: The start and end time of the experiment is 1 to 2 weeks. Of these, there are 2 lessons per week, for a total of 30 lessons.

Experimental hypothesis: through the "group inquiry" method of yoga exercises, students' physical fitness changes to different degrees; The use of "group inquiry" method is conducive to improving the effect of yoga exercise among college students.

Experimental design: In order to investigate the changes in the physical fitness of the students' yoga team, the physical fitness of the students in the experimental class and the control class mainly includes 50 meters, standing long jump, sitting forward bending, male 1000 meters / female 800 meters for forward testing, obtain the results of the front test, and arrange the experimental class and the control class according to the data obtained. Ensure that the test results of the experimental class and the control class before the experiment are basically the same. The experimental procedure is shown in Figure 1.

Mathematical statistics. In this study, the data were collated and analyzed by using EXCEL and SPSS statistical software, and corresponding statistical charts were formed.

Experimental results and analysis

Comparative analysis of the test results of the explosive quality of the two groups of students before and after the experiment

In this study, the comparison of the test results of the two groups of students before and after the experiment was comprehensively summarized, and the specific data are shown in Figure 2. In general, the internal improvement of the experimental group was slightly better than that of the control group, in order to more clearly reflect the comparison of the explosive quality test results of the two groups of students before and after the experiment.

Combined with the above chart information, we can clearly see that before and after the experiment, the test results of the boys in the experimental group improved, and the difference was very significant (P=0.01); The test scores of girls in the experimental group improved, and the difference was very significant (P=0.01). The control group also showed some improvement, but the improvement was not as pronounced as in the experimental group. Therefore, we can conclude that although the results of the control group are very good, the explosive quality of the experimental group has improved significantly. Yoga asana

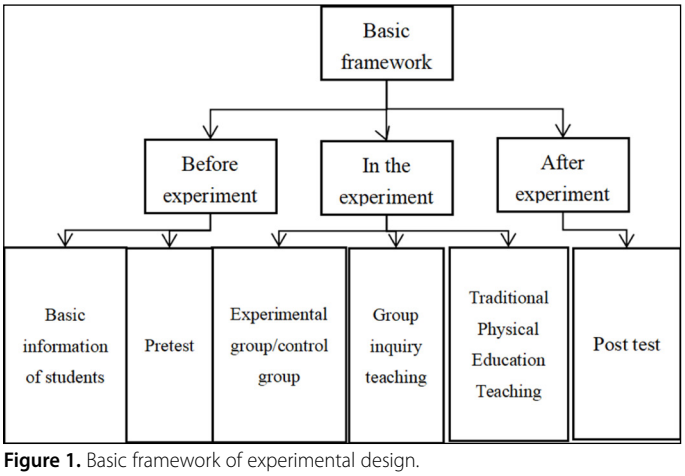

Figure 1. Basic framework of experimental design.

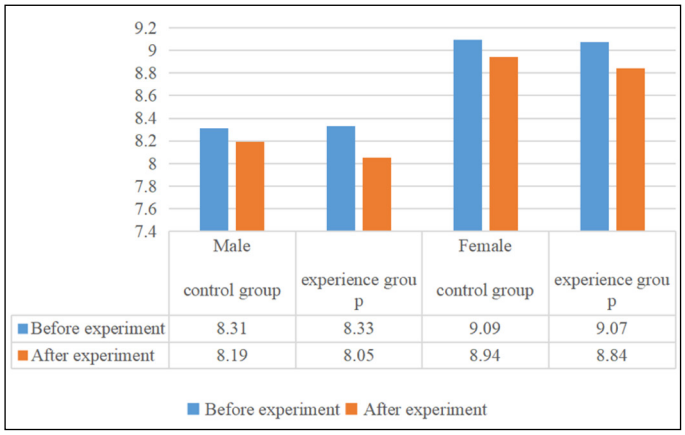

Figure 2. Comparative analysis of the results of the explosive quality test of the two groups of students before and after the experiment.

practice can improve the general physical fitness of college students, especially muscle strength and elasticity, through a series of asanas, so as to improve the speed quality of college students. After experimental studies, yoga exercises can exercise the head, neck, shoulders, spine, back, legs, etc. well. After 12 weeks of yoga training, the university students improved their standing long jump scores after the experiment, and their 800 m run decreased.

The effect of yoga training on the development of flexibility in the lower back, shoulder and hip of college students

The data obtained by the test before and after the experiment were compared and analyzed, and it was found that the relevant flexibility quality indicators of college students after training had a large increase compared with before training. $P < 0.01$, with a significant difference. (Table 1)

Due to long-term sedentary conditions, college students' lumbar and back muscles cannot be effectively exercised. Seated forward flexion mainly measures the maximum range of motion that college students can achieve when they are at rest, and reflects the stretch of their waist and back muscles. The larger the measured value of forward flexion of the sitting body, the better the flexibility of the lower back and back of the college student.

The experimental results show that the yoga training movements designed in the experiment play a traction and stretching effect on the waist of college students, and have a stretching effect on the back muscle groups of college students, improve the strength of the low back muscle groups and ligaments of college students, and strengthen the coordination and flexibility of the lumbar spine of college students. For example, boat pose, college students need to sit on a yoga mat, knees together, toes hooked, hands on the outside of both knees, inhale, upright back; Exhale, tighten the abdomen, body backwards, with the chest arched back; Inhale, lift your legs off the mat, hook your toes back, and tighten your abdomen with each exhale. This kind of yoga movement has a significant effect on the relaxation of the joints and erector spinal muscles between the spines of college students, can strengthen the protective effect of muscles and ligaments on joints, and greatly improve the flexibility of college students' low back.

College students lie down for a long time, look down at books, write homework, play mobile phones, shoulder muscles are stiff, flexibility and flexibility are greatly reduced, and even some college students have shoulder muscle strain, frozen shoulder and other diseases. The flexibility quality index of rotating shoulder grip distance mainly reflects the flexibility of the shoulder joint of college students. The smaller the measurement, the better the flexibility of the shoulder joint.

Table 1. Development of low back, shoulder and hip flexibility of college students before and after the experiment.

	Sitting forward bend ($\bar{x}\pm s$)/cm	Turning shoulder grip distance ($\bar{x}\pm s$)/cm	Crossover ($\bar{x}\pm s$)/cm	($\bar{x}\pm s$) Longitudinal fork /cm
Pre-experiment	16.82±3.25	79.96±10.73	11.38±6.52	28.26±7.32
After the experiment	17.74±3.73	78.14±9.54	10.83±6.48	27.74±9.21
P	<0.01	<0.01	<0.01	<0.01

CONCLUSIONS

Yoga training can significantly improve the range of motion of the lower back, shoulders, hips, elbows and knees of college students and the flexibility of muscles, tendons and ligaments, which is conducive to improving the range of motion and action strength of college students' bodies, shaping a good posture and achieving the purpose of strengthening the body. Yoga is conducive to improving the physical fitness of college students, mainly in explosiveness, endurance, jumping quality and flexibility quality, among which the endurance quality and flexibility quality of boys are the most obvious. It is suggested that college students should carry out rationalized movement groups and carry out effective special quality training when engaging in yoga, so as to continuously improve the physical health level of students. Yoga training has a significant effect on the improvement of college students' flexibility quality, and it is recommended that schools widely carry out yoga training courses, incorporate yoga training courses into the physical education curriculum system, and encourage college students to actively participate in yoga training courses. In addition, the school should strengthen the construction of yoga training venues and the investment in professional equipment, and regularly maintain them to improve the safety and professionalism of yoga training. Yoga teachers should not only strengthen their professional knowledge, but also study physical education, exercise physiology and other related fields, expand their knowledge, and improve the professionalism and scientificity of teaching. In addition, in the process of yoga training, yoga teachers should teach according to the individual differences of college students, scientifically set exercise loads, pay attention to the changes in body shape and flexibility of college students in time, and adjust the teaching content and intensity. When college students carry out yoga training, they should maintain a serious attitude and practice step by step according to the study plan under the guidance of yoga teachers. Do not blindly pursue training effects and sports injuries. College students should improve their learning initiative, take the initiative to ask yoga teachers if they are not sure of the movements, strive to do every movement in place, actively exchange learning experience with classmates and teachers, share experience, correct bad posture, and shape a healthy body and mind.

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