

## **Experimental study on the effect of outdoor cycling on the physical health of college students.**

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### **Abstract**

**Background and aims:** Some studies reported that outdoor sports can help improve the physical quality and promote body health of college students. However, the influence of outdoor cycling on the physical health of college students was limited. We aimed to study the effect of outdoor cycling on the physical health of college students.

**Method:** 70 cases of college students were selected and divided into different groups for research through experiment and mathematical statistics.

**Result:** After experiment, the time for 3,000 m running of the observation group was significantly shorter than the control group and before; while the lung capacity of was higher than the control group and before ( $t=2.39$ ,  $P<0.05$ ); after experiment, the exercise intensity (30%) ( $\chi^2=6.25$ ,  $P<0.01$ ), exercise duration (30 min) ( $\chi^2=6.44$ ,  $P<0.01$ ), and exercise frequency (less than 3 times) ( $\chi^2=7.47$ ,  $P<0.01$ ) of college students in the observation group were significantly lower than those of the control group, which were at least 80%, 60 min, and 5 times ( $P<0.01$ ).

**Conclusion:** Outdoor cycling can significantly improve the physical health of college students with remarkable effects.

**Keywords:** College students, Physical health, Outdoor cycling.

*Accepted on November 1, 2017*

### **Introduction**

Physical health is a state of no diseases of major organs of the body, good development and well-balanced body shape good physiological functions, furthermore, it requires strong movement and work capabilities, and the ability to defend attacks from diseases and to adapt the changing natural and social environment [1]. Outdoor sports are prevailing at present for their adventure spirit, which could satisfy college students with exercise and adventure demands [2]. Outdoor sports can help improve the physical quality and promote body health of college students [3]. Due to insufficient awareness of their own health management, college students need the scientific guidance and effective supervision from all walks of the society [4-7]. In this way, college students can obtain feedbacks to their physical health, establish self-management beliefs, and then carry out relevant actions. Living in a healthy manner can help improve college students' health quotient, as well as their levels of IQ and EQ [8,9]. At the same time, since there is a close relationship between physical health and health quotient, it is of great importance on developing life-long habits and beliefs to provide college students with health management measures, help correct their bad habits, and conscientiously carry out evaluation and supervision, thus to improve their physical health and related knowledge.

According to related researches, Chinese college students' physical health situation is not optimistic. Most college students have poor perseverance, which is even reducing year by year. In this case, relevant departments should pay more attention to the exercise manner and quantity of college students. This paper mainly analyses the influence of outdoor cycling on the physical health of college students, with selecting some college students for comparison and analysis. Please refer to the following for details.

### **Research Object and Methods**

#### ***Research object***

70 cases of college students from September 2015 to September 2016 were selected and divided into observation group and control group based on their numbers, with 35 cases in each group. Selected college students shared the same learning and living conditions. They were in healthy and disease-free states, without any special exercise training. The control group was given regular exercise, while the observation group was given outdoor cycling. The changes of lung capacity and physical perseverance of both groups were compared. The exercise amounts and health knowledge of both groups were analysed.

## Research methods

**Experiment:** The control group was given regular exercise, while the observation group was given outdoor cycling. Please refer to the following for details.

College students in the observation group were given three days of outdoor cycling on the road. College students in the observation group were given nutrition supplement based on their physical agility. All college students were camping outside during the exercise.

The lung capacity, physical perseverance (time for 3,000 m running), exercise amount (time, intensity, and frequency), and health knowledge of all colleges students before and after the experiment were observed and calculated.

The health knowledge included self-care knowledge, diet structure, and healthy exercise. The data were obtained by issuing questionnaires, with a full score of 100. The higher the score, the better the condition of health knowledge.

## Ethical consideration

The study was carried out in compliance with the Declaration of Helsinki of the World Medical Association, and according to a protocol approved by Anqing Normal University, the approval number is 2015009. The objectives of the study were explained to the study participants and verbal consent was obtained before interviewing each participant.

## Mathematical statistics

SPSS22.0 was adopted for the data processing. The lung capacity, physical perseverance, exercise amount, and health knowledge of both groups were expressed by  $\bar{x} \pm s$ . t-test was adopted for group comparison. If there were significant differences of various indexes between both groups,  $P < 0.05$ .

## Results and Analysis

In the control group, there were 26 males and 9 females, the male: female ratio was 2.89:1; the age ranges from 18 to 23 y old, with the average age of  $20.59 \pm 1.43$  y old.

**Table 1.** Comparison of the time for 3,000 m running and lung capacity of both groups.

Group	Time for 3,000 m running (s)		Lung capacity (ml)	
	Before experiment	After experiment	Before experiment	After experiment
Observation group (n=35)	1026.35 ± 100.64	838.71 ± 98.97	4015.63 ± 273.38	4299.96 ± 283.37
Control Group (n=30)	1026.27 ± 100.42	1015.39 ± 99.56	4015.48 ± 273.21	4138.58 ± 280.42
t	0.01	7.45	0.01	2.39
P	0.10	0.01	0.10	0.02

**Table 2.** Health knowledge scores of both groups before and after experiment (grades).

Group	Self-care knowledge score		Diet structure and health exercise behavior score	
	Before experiment	After experiment	Before experiment	After experiment

In the observation group, there were 28 males and 7 females, the male: female ratio was 4:1; the age ranges from 19 to 24 y old, with the average age of  $20.61 \pm 1.51$  y old.

Various data of both groups showed no significant difference, with  $P > 0.05$ , which is good for scientific comparison and study.

## Comparison of the time for 3,000 m running and lung capacity before and after experiment

Before experiment, the time for 3,000 running and lung capacity of both groups showed no significant difference ( $t=0.01$ ,  $P > 0.05$ ); after experiment, the time for 3,000 m running of the observation group was significantly shorter than the control group and before; while the lung capacity of was higher than the control group and before ( $t=2.39$ ,  $P < 0.05$ , Table 1).

## Comparison of self-care knowledge score, diet structure, and health exercise behavior before and after experiment

Before experiment, the self-care knowledge score, diet structure, and awareness score of healthy exercise behavior of the observation group showed no significant difference when comparing with the control group, with  $P > 0.05$ ; after experiment, various indexes of the observation group were significantly higher than the control group, with  $P < 0.05$ , Table 2.

## Comparison of exercise intensity, duration, and frequency of both groups before and after experiment

Before experiment, there were no significant differences in exercise intensity, duration, and frequency of both groups, with  $P > 0.05$ ; after experiment, the exercise intensity (30%) ( $\chi^2=6.25$ ,  $P < 0.01$ ), exercise duration (30 min) ( $\chi^2=6.44$ ,  $P < 0.01$ ), and exercise frequency (less than 3 times) ( $\chi^2=7.47$ ,  $P < 0.01$ ) of college students in the observation group were significantly lower than those of the control group, which were at least 80%, 60 min, and 5 times ( $P < 0.01$ , Table 3).

Observation group (n=35)	58.94 ± 2.62	85.93 ± 6.46	60.17 ± 1.55	90.36 ± 1.74
Control Group (n=30)	58.81 ± 2.71	73.35 ± 4.52	60.08 ± 1.47	78.89 ± 3.56

**Table 3.** Comparison of exercise amount of both groups before experiment (n (%)).

Group	Exercise intensity		Exercise duration		Exercise frequency	
	Less than 30%	More than 80%	Less than 30 min	More than 60 min	Less than 3 times	More than 5 times
Observation group (n=35)	30 (85.71)	5 (14.29)	28 (80.00)	7 (20.00)	31 (88.57)	4 (11.43)
Control Group (n=30)	29 (82.86)	6 (17.14)	32 (91.43)	3 (8.57)	30 (85.71)	5 (14.29)
χ <sup>2</sup>	0.11	0.11	1.87	1.87	0.13	0.13
P	0.74	0.74	0.17	0.17	0.72	0.72

  

Group	Exercise intensity		Exercise duration		Exercise frequency	
	Less than 30%	More than 80%	Less than 30 min	More than 60 min	Less than 3 times	More than 5 times
Observation group (n=35)	1 (2.86)	34 (97.14)	2 (5.71)	33 (94.29)	1 (2.86)	34 (97.14)
Control Group (n=30)	8 (22.86)	27 (77.14)	10 (28.57)	25 (71.43)	9 (25.71)	26 (74.29)
χ <sup>2</sup>	6.25	6.25	6.44	6.44	7.47	7.47
P	0.01	0.01	0.01	0.01	0.01	0.01

## Discussion

3,000 running can effectively reflect the physical perseverance and cardiovascular system function, while lung capacity refers to the maximum amount of gas that can be exhaled after the maximum inhalation [10]. Outdoor cycling can effectively help guide the exercise of colleges students and establish effective feedback mechanism and supervision environment, which is of great importance to improve the physical perseverance and lung capacity of college students [11]. In this study, before experiment, there were no significant differences in lung capacity and 3,000 m running time between both groups; but after experiment, the lung capacity of the observation was significantly higher than that of the control group, while the 3,000 m running time was significantly less than that of the control group, with P<0.05. Therefore, the above view can be confirmed.

Outdoor cycling promotes health and natural contact. In this way, it can help college students to be closer to the nature, improve their sub-healthy status, improve their life quality, and prolong their lives [12]. After the outdoor cycling exercise, the awareness of exercise and self-care of college students are enhanced, which is of great significance to the formation of long-term health exercise consciousness. In this paper, the self-care knowledge score of (85.93 ± 6.46) and diet structure and health exercise behavior score (90.36 ± 1.74) of the observation group are significantly higher than those before experiment and the control group, with P<0.05. Therefore, the above view can be confirmed.

Outdoor cycling can meet most needs of college students on exercise, especially when most colleges students are not

willing to walk or exercise in a sports ground, which affects their athletic abilities [13]. After outdoor cycling, all college students are benefited with enhanced physical fitness, higher exercise intensity, longer exercise duration, and higher exercise frequency [14]. In this research, the percentage of college students in the observation group with exercise intensity higher than 80% is 97.14%, the percentage of college students in the observation group with exercise duration longer than 60 minutes is 94.29%, and the percentage of college students in the observation group with exercise frequency more than 5 times is 97.14%, which are significantly higher than those of the control group. The percentage of college students in the observation with exercise intensity less than 30% (2.86%), exercise duration less than 30 min (5.71%), and exercise frequency less than 3 times (2.86%) are lower than those of the control group, with P<0.05.

To sum up, outdoor cycling has a positive effect on students' physical health and is worth further promoting among college students.

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