

# *A Study on the Influence of Physical Exercise on Mood State of College Students during the Covid-19 Pandemic—A Case Study of Shandong Province*

Liu Jinyue, Sun Jing, Guo Yuqi, Wu Xinru, Zhang Jie<sup>a,\*</sup>, Ding Huanxiang

*School of Physical Education and Health, Linyi University, Middle Section of Shuangling Road, Lanshan District, Linyi, Shandong, 276005, China*

*<sup>a</sup>zhangjie@lyu.edu.cn*

*\*Corresponding author*

**Keywords:** COVID-19; State of mind; Physical Exercise

**Abstract:** In the big wave of health coming, with the help of the specialty characteristics, people meet hand in hand in this province. The sports and fitness fans of all colleges and universities shall form the Shandong Provincial Sports Health Promotion college students team to provide free consultation and guidance services for the real and effective health of college students during the epidemic period. For the prevention and control of the epidemic contribution of sports students. The correlation between physical exercise and mood state of college students under the background of COVID-19 were studied by means of literature review and questionnaire survey. Through research for contemporary college students to sounds the alarm of healthy life.

## **1. Introduction**

Since December 8, 2019, pneumonia of unknown cause has appeared in Wuhan and spread to all parts of the country. In order to effectively prevent and control the further spread of the epidemic, the CPC Central Committee has called on people all over the country to take families as units and stay indoors to cut off the transmission of the virus to the greatest extent possible. Major changes are taking place in the way people live across the country, with the sudden reduction in the range of outdoor activities leading to a more sedentary and less active lifestyle. This time in 2022, the epidemic broke out again and came with a threatening force. Cities, villages, communities and schools were closed one after another across the country. In response to the Ministry of Education's proposal of "no suspension of classes", all schools across the country have implemented online teaching, using a variety of online classes to carry out teaching activities. Online teaching has become the norm of the epidemic. However, although this online teaching method solves the urgent problem of college students' normal learning of knowledge, it also leads to the phenomenon of reduced activity and abnormal mood of college students. If affected by the epidemic, most students are unable to exercise normally as before, and their physical health is bound to be affected. In addition, they stay in the dormitory every day in front of mobile phones, computers and online classes. Some students have no release of pressure and emotions, and their state of mind is also

subtly affected.

Physical exercise can achieve the purpose of physical fitness and entertainment. After two years of fighting the epidemic, people have realized that immunity is very important, and people have a deeper understanding and demand for fitness. Whether in education level, political level or economic level, sports function can be highlighted. Exercise to increase immunity is a long-term process, in the usual accumulation and persistence. Many evidences show that regular exercise during the epidemic has a positive effect on physical, psychological and social stability. College students, as the backbone of the society, gather as the largest group during the lockdown period, and their mental health status has become the focus of university education and social attention. During the COVID-19 pandemic, college students' physical and mental health and teaching effectiveness have been the focus of social attention. Mental activity affects people's behavior. As a form of expression of emotion, state of mind is also one of the important factors affecting mental health. After physical exercise, can let the brain thinking imagination more flexible, coordination, further improve and improve their reaction speed. It can also improve the central nervous system of students, increase the excitement of the brain through the secretion of dopamine, and effectively inhibit the production of negative emotions. The most important thing is that it can also effectively exercise our coordination ability, so that students can improve the function level of all aspects of the body, so that each nervous system is more coordinated, and even promote the healthy development of human body. State of mind is a weak, calm and long lasting emotional state that affects people's entire mental activities. A state of mind is an emotional or emotional arousal state caused by environmental stimulation. It is a weak and lasting emotional state with infectious effects. The state of mind can be divided into positive and negative. The positive mood was characterized by energy and happiness, while the negative mood included depression, fatigue, panic, anger and tension. Once a state of mind is aroused, it can last for a long time, such as a few hours, a few days or even a few weeks, and has the characteristics of stability and dispersion, which will make people form a weak psychological background, and affect the subject's attitude towards things, the subject's behavior and physical and mental health for a period of time <sup>[1]</sup>.

## **2. Research object and research method**

### **2.1 Research Object**

In this study, Shandong Normal University, Jinan University, Qingdao University, Ocean University of China, Shandong University of Technology and Linyi University were selected as the research objects. Each school randomly selected 200 people, a total of 1200 questionnaires.

### **2.2 Research Methods**

#### **2.2.1 Literature research method**

With keywords such as "COVID-19", "physical exercise" and "mood state", the research on relevant issues was comprehensively and systematically consulted, collected and analyzed through databases such as CNKI, Wanfang Data and VIP.

#### **2.2.2 Questionnaire survey**

(1) Physical Activity questionnaire: Using the physical activity Questionnaire for college students, this questionnaire mainly dares to investigate the basic information of students' physical exercise.

(2) Use the Mood State Scale (POMS), which is used to measure emotional control ability. The

original POMS scale was developed by McNair in 1971 and adapted into a scale suitable for Chinese people by Professor Zhu Beili, an expert in sports psychology [2]. The questionnaire consists of 7 dimensions: tension, anger, fatigue, depression, energy, panic and self-esteem. Among them, tension, anger, fatigue, depression, panic and other negative dimensions, the higher the score, the worse the emotional control ability; Energy and self-esteem are on the positive scale, with higher scores associated with better emotional control. The table is the most widely used emotion measurement tool in sports psychology at present, with a scale validity coefficient of 0.71. The scores and evaluation methods of the scale are shown in Attached Table 2.

### 2.2.3 Mathematical statistics

SPSS17.0 statistical software was used to sort out and analyze the collected questionnaires.

## 3. Results and analysis

### 3.1 Demographic characteristics analysis of survey respondents

After excluding invalid questionnaires, a total of 910 students with an average age of  $20.58 \pm 1.23$  years old met the requirements through statistical analysis, among which 450 were male students, accounting for 49.5% of the valid number, and 460 were female students, accounting for 50.5% of the valid number.

### 3.2 Current situation of physical activity of college students

This study uses the Physical Activity Survey Scale for college students to investigate the subjects. In this scale, the contents investigated include the purpose of exercise, the way of activity, the time, frequency and intensity of physical exercise. In this paper, the data obtained will be analyzed and elaborated according to the categories in the scale.

Table 1 Purpose of college students' participation in physical exercise (%)

College students	body building	Entertainment and relaxation	Release pressure	Make friends	other
Boys	180	120	68	50	32
Girls	85	130	150	80	15

It can be seen from Table 1 that the main purposes of male students participating in physical exercise are to build up their bodies, have fun and relax, and then release pressure and make friends. The main purpose for female students to take part in physical exercise is to have fun, relax and release pressure, followed by strengthening the body and making friends.

Table 2 The ways college students participate in physical exercise activities

College students	Item of Exercise	place
Boys	Basketball football running badminton table tennis Wushu mountaineering swimming bowling golf	School playground gymnasium club swimming pool gym golf course
Girls	Brisk walking aerobics yoga running badminton ping-pong tennis mountaineering swimming	Gymnasium School playground swimming pool

Table 2 shows the statistics of physical exercise methods of college students in order from most to least. As can be seen from Table 2, in terms of physical exercise, male students mainly focus on competitive ball games, while female students mostly focus on walking, brisk walking and yoga. Boys have more ways to exercise and more places to play, while girls have less ways to play, and

the places are more concentrated in the gymnasium and school playground.

Table 3 Time, frequency and intensity of physical exercise of college students

College students	Time (Every time/hour)	Frequency (per week/time)	High strength	Medium strength	Low strength
Boys	0.5-2	1-2	65	350	35
Girls	1-1.5	0.2-0.3	25	283	152

It can be seen from Table 3 that male students spend more than 2 hours on physical exercise on average, while female students spend less time on physical exercise. Male students choose moderate intensity exercise far more than female students; Female students also choose intensive exercise far less than male students; Female students choose low intensity accounts for a large proportion.

### 3.3 Current state of mind of college students

The simple POMS scale used in this survey includes seven dimensions, such as tension, anger and depression. Among them, tension refers to the uneasiness of the individual when the spirit is in a high state of preparation; Anger is a negative feeling state that includes physiological and maladaptive behaviors resulting from hostile thoughts; Fatigue is a lack of physical strength caused by something in daily life; Depression is a state of persistent low mood in an individual; Panic is often manifested as individual forgetfulness, inattention and other phenomena; Energy is often expressed as an individual's vitality in daily life, including the enthusiasm to do things, positive attitude to things and optimistic state of mind; Self-esteem represents an individual's self-knowledge and the confidence and independence shown in dealing with things, including physical self-esteem<sup>[3]</sup>. In the five dimensions of tension, anger, fatigue, depression and panic, the higher the score, the worse the control ability of these emotions, the higher the score in the dimension of energy and self-esteem, the better the performance of individual positive emotions.

Table 4 Mental states of college students of different genders

	Boys	Girls	sum total
nervous	6.48±4.42	6.86±4.32	6.67±4.37
anger	7.48±5.46	6.32±5.68**	6.90±5.57
fatigue	5.91±4.41	5.92±3.98	5.92±4.20
depression	6.71±4.76	6.06±5.67*	6.36±5.21
energy	11.21±4.84	12.28±4.61*	11.76±4.72
panic	6.04±3.64	6.11±3.52	6.07±3.58
self-esteem	8.04±3.42	8.54±2.98*	8.29±3.2
TMD	113.32±20.03	110.42±22.63*	111.87±21.33

Note: Gender comparison, \*: P<0.05, \*\*P<0.01. TMD = The sum of 5 negative emotion scores minus the sum of 2 positive emotion scores (energy, self-esteem) +100.

As can be seen from Table 4, the total score of boys' state of mind is higher than that of girls, and there are differences between the two. In the two dimensions of anger and depression, boys score higher than girls; In the five dimensions of stress, fatigue, panic, energy and self-esteem, boys scored lower than girls<sup>[4]</sup>. There are differences between boys and girls in the state of mind, and there are significant differences between boys and girls in the dimensions of anger and energy, and there are differences between boys and girls in the dimension of self-esteem. There was no significant difference between boys and girls in the four dimensions of stress, fatigue, depression and panic. Self-esteem includes psychological self-esteem and physical self-esteem. Girls' emphasis on their bodies improves their physical self-esteem, while boys' self-esteem is mainly reflected in psychological self-esteem. Their physical self-esteem is lower than that of girls, which also results in boys' self-esteem being lower than that of girls. To sum up, boys' state of mind is better than girls'.

Boys' concentration is weaker than girls' and their management of anger and other negative emotions is poor. In the management of other negative emotions, although better than girls, but there is no significant difference with girls.

Table 5 State of mind of college students who often participate in and occasionally participate in exercise

	Take part in regularly	Occasionally attend	sum total
nervous	6.25 ±4.51**	6.92 ±4.54	6.59 ±4.52
anger	7.14 ±5.66**	5.96 ±5.51	6.55 ±5.58
fatigue	5.64 ±3.64**	6.21 ±5.35	5.93 ±4.49
depression	6.30 ±4.83**	5.65 ±5.38	5.98 ±5.10
energy	11.09 ±5.17*	11.79 ±4.47	11.44 ±4.82
panic	5.67 ±3.42**	8.43 ±2.96	7.05 ±3.19
self-esteem	8.17 ±3.48	8.43 ±2.96	8.3 ±3.22
TMD	111.73 ±20.20**	110.66 ±23.84	111.195 ±22.02

Note: Gender comparison, \*: P<0.05, \*\*P<0.01.

In Table 5, two people who exercise twice a week and rarely exercise are selected for statistical analysis. As can be seen from Table 5, college students who often participate in physical exercise and those who occasionally participate in physical exercise have different mood states. Students who often participate in physical exercise generally have higher emotional management than those who occasionally participate in physical exercise<sup>[5]</sup>. It has obvious advantages in the management of negative emotions, which indirectly shows that physical exercise can promote negative emotions. But the effect on positive emotions was not obvious. According to the survey results, in the comparison of the score of mood state between students who often take physical exercise and students who occasionally take physical exercise, except for the self-esteem dimension, there is no difference between them. In other dimensions of mood state, students who often take physical exercise are better than students who occasionally exercise.

## 4. Summary

### 4.1 The physical activity degree of female college students is lower than that of male college students

Sum With the continuous and sporadic outbreak of the novel coronavirus epidemic, college students' desire for physical exercise is increasing, but they are slow to take action, especially girls. Influenced by the environment for many years, women shout loudly in terms of physical exercise, but their awareness is not strong enough, and their actions are slow. Especially the female college students in the third year, the frequency and time of physical activity decreased compared with that in the second year.

### 4.2 College students who often participate in physical exercise have a better mood than those who occasionally participate in physical exercise

Through this questionnaire survey, it is found that the mood state of college students who occasionally participate in exercise is not ideal, and their performance is deficient in various dimensions, especially in the fields of self-esteem, confidence and depression. Moreover, college students in sophomore and junior years are unable to manage their emotions well. Physical activity cannot play a decisive role in mood state, but it is positively correlated with mood state to a large extent, and the amount of physical activity can promote the improvement of negative emotions to a certain extent, but the promotion effect of positive emotions is not as obvious as that of negative

emotions. This is consistent with the research results at home and abroad. In this survey, due to regional limitations, the sample size is small, so it can only describe and evaluate groups within a small range, and it is a little difficult to map large groups in the whole region.

## Acknowledgments

This work was supported by Innovation and Entrepreneurship Training Project of Linyi University in 2022, a study on the influence of physical exercise on the mood state of college students during the COVID-19 epidemic - A case study of Shandong Province, Project number: K2022101452330.

## References

- [1] Xu Dongxue. *A Comparative Study on Body Self-esteem of exercisers in Shanghai Yi Zhao Wade Fitness Club [D]*. Shanghai Normal University, 2015.
- [2] Chen Feifei. *The Relationship between Body self-esteem and Physical Exercise Participation of Children [J]*. *Journal of Chengdu Physical Education University*. 2012.10, 38:73-76.
- [3] Chen Dawei. *The Influence of Physical Activity on Emotional Health [J]*. *Sports and Science*, 2002, 23(2):46-47, 36.
- [4] Cui Rong. *Investigation and Research on the Opening of Primary and Secondary School Sports Venues in Bao'an District of Shenzhen [D]*. Central China Normal University, 2017.
- [5] Liu Y L. *Comparison of the Influence of air volleyball and square dance Exercise on the subjective well-being of middle-aged and elderly people [D]*. Shanghai Institute of Sport, 2020.