EXERCISE BEHAVIOR DURING THE COVID-19 PANDEMIC OF ADOLESCENTS IN ZHOU KOU,CHINA

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พฤติกรรมการออกกำลังกายในช่วงสถานการณ์โควิด-19 ของวัยรุ่นในเมืองโจวโข่ว สาธารณะรัฐประชาชนจีน

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EXERCISE BEHAVIOR DURING THE COVID-19 PANDEMIC OF ADOLESCENTS IN ZHOU KOU,CHINA

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EXERCISE BEHAVIOR DURING THE COVID-19 PANDEMIC OF ADOLESCENTS IN ZHOU KOU,CHINA

BY

XIAOHAN LING

HAS BEEN APPROVED BY THE GRADUATE SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE MASTER OF SCIENCE IN SPORT AND EXERCISE SCIENCE AT SRINAKHARINWIROT UNIVERSITY

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The research purposes of this study include: examining adolescents' knowledge, attitudes, perceptions, and exercise behaviors during and after the COVID-19 epidemic; exploring the relationship between these factors; and comparing exercise-related knowledge, attitudes, perceptions, and exercise behaviors among different genders. An online questionnaire survey was conducted to collect data from 381 college students aged 18-24 years in Zhoukou City, Henan Province, China, and statistical analysis was performed using computer software. The results indicate that most respondents exercised with lower frequency and duration during the COVID-19 epidemic, although these levels improved afterward. Most respondents cited health as their primary reason for exercising. Female respondents exhibited lower levels of exercise-related knowledge, attitudes, and perceptions compared to male respondents, with average levels in each aspect being higher among males. There was no significant difference in knowledge regarding the number of exercise days per week (p-value > 0.05); however, significant differences were found in perception and attitude (p-value < 0.05). Regarding the number of days of exercise per week in the sample, there was no significant difference in knowledge (p-value > 0.05), but significant differences in perception and attitude were observed (p-value < 0.05).

Keyword : the COVID-19 Pandemic, Adolescence, Exercise Behavior, Knowledge, Attitude, Perception

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INTRODUCTION

Research background

On December 1, 2019, the first suspected case of COVID-19 was admitted to Jinyintan Hospital in Wuhan, Hubei Province, China. Since then, major hospitals in Wuhan have continued to receive patients with pneumonia of unknown cause. On December 29, the Wuhan Municipal Health Commission began an epidemiological investigation. On January 8, 2020, the expert group of the National Health Commission confirmed that the source of the outbreak was a new coronavirus. (Fan Fei, 2020) At the end of January 2020, the World Health Organization designated COVID-19 a global public health emergency. Emergency prevention and control of public health incidents have been launched across the country. Businesses were closed, shops closed, schools closed and people were kept at home. According to the relevant notice of the Ministry of Education and the actual needs of epidemic prevention and control, major universities in China have taken measures such as postponing the opening of the semester and online teaching. After the epidemic was effectively controlled, all walks of life resumed work and production in an orderly manner, and colleges and universities around the country began to reopen on the wrong peak.

As the prevention and control of the novel coronavirus epidemic has entered a stage of normalization, many universities around the country have adopted closed management to ensure the life, health and safety of returning students. Due to the phenomenon of the epidemic rebound that still appears from time to time across the country and strict closed management measures, adolescents have different degrees of negative emotions, among which anxiety and depression are more prominent. Physical activity plays an important role in improving the mental health of adolescents, and is of great significance in improving the quality of life of adolescents. (Zhao Yang, 2022)

Tian Weiwei (2021) found that physical exercise under the epidemic situation was more conducive to higher friendship quality. The exercise enthusiasm of exercisers has been improved, the cognition of physical exercise has been greatly changed, and

the purpose of exercise has been strengthened. Taking part in physical exercise can make exercisers have more social communication and improve their communication ability continuously, so that physical exercise can bring good communication and interaction and better promote the improvement of the quality of sports friendship. The mental state of the epidemic is prone to emotional, anxiety and other bad emotions. Through the good atmosphere, culture and happy experience brought by physical exercise, the bad emotions begin to slowly dilute, and the quality of sports friendship is constantly strengthened and improved.

Cai Shuilian (2022) found in her research that the practical difficulties faced by adolescents in sports activities under normal epidemic conditions include: under family isolation, adolescents are unable to go out for sports activities, and their outdoor activities are restricted to some extent. Affected by the epidemic, in accordance with the relevant requirements of the government must be silent at home, not to go out. Compared to the previous activities can be in the community or sports public facilities greatly reduced. Including some club events, regional events can not be normal. Schools were unable to carry out normal sports activities during the outbreak, and inter-school sports and inter-school friendship games were also affected.

The importance of this research

After the outbreak of COVID-19, the government, schools and families have done little to improve the mental and physical health of college students. This study uses a questionnaire survey to learn more about the physical activity of young people during the COVID-19 epidemic, and their sports behavior may have a certain relationship with their knowledge, attitude and perception. Through the analysis of the survey results, it will help government departments at all levels and university management departments to formulate physical exercise and mental health guidance according to the epidemic situation. At the same time, the method of movement is economical and easy to learn.

Research purpose

1.to Study knowledge, attitude, perception and Exercise behavior of adolescents during and after COVID - 19 epidemic

2.to Examine the relationship between knowledge, attitude, perception of exercise with exercise behavior during and after the COVID - 19 epidemic

3.to compare knowledge, attitude, perception exercise behavior between gender

Research scope

The period is from December 2019 to January 2024, and the location is Zhoukou, Henan Province, China.

Study the population

Adolescents aged 18-24 were selected as the study population, and college students in Zhoukou City, Henan Province, China were selected as the study objects.

Variables

1. Independent variables:
    1.1 knowledge
    1.2 attitude
    1.3 perception
2. Dependent variables:
    2.1 exercise behavior

Explanation of terms

The COVID-19 pandemic: The novel coronavirus outbreak refers to the novel coronavirus pneumonia. Since December 2019, some hospitals in Wuhan, Hubei On December 26, 2022, the National Health Commission issued a notice to change the name of the novel coronavirus pneumonia to pneumonia infected by the novel coronavirus.

Adolescence: Adolescence is a transitional period when children are transitioning into adult roles. They also refer to the human life group during the transition from child to adult. In this study, that means people aged 18-24.

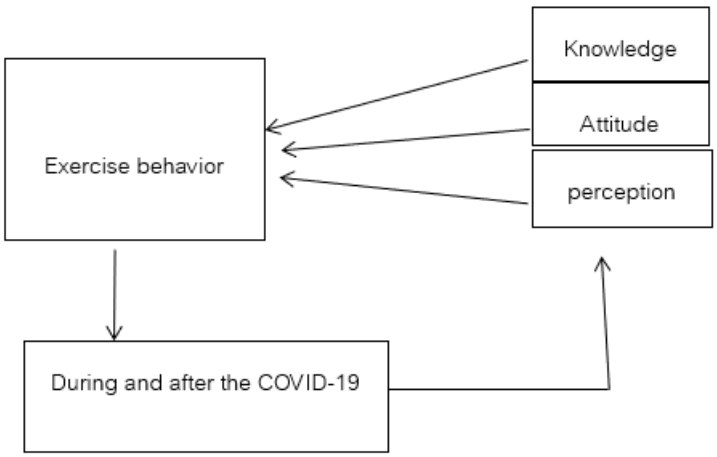
Exercise behavior: Liu Yimin (2002) defined sports behavior as: people consciously use a variety of ways and methods to achieve some special sports needs. For the goal and connotation of physical training, Xu Zixuan (2013) regards physical training as a planned and organized physical training with a certain intensity, frequency and duration that can be repeated. Combined with the definition

Knowledge: The sum total of knowledge and experience gained by people in the practice of transforming the world.

Attitude: Attitude is an individual's stable psychological tendency towards a specific object

Perception: Perception is a series of processes of awareness, feeling, attention and perception of internal and external information.

Research framework



Research hypotheses

1. knowledge, attitude and perception of Exercise were related to exercise behavior during the COVID-19 pandemic.

2. knowledge, attitude and perception of Exercise with exercise behavior during COVID-19 were different between gender

CHAPTER 2
LITERATURE REVIEW

1.Exercise behavior

1.1 Definition of exercise behavior

Physical exercise is the key to improving physical fitness and the core of participating in sports activities. It not only reflects the uniqueness of sports, but also distinguishes sports from other behaviors. In order to achieve sports goals and meet social and personal needs, it mainly relies on various physical exercises, and other physical activities are ultimately to support these exercises. Lotan et al. (2005) defined physical exercise as physical activity directly related to physical health and well-being in their study on physical exercise and physical health. In the study on the impact of physical exercise on cardiorespiratory endurance, Melissa (2018) et al. defined physical

exercise as physical activities that can improve individual cardiorespiratory endurance and improve health level.

1.2 Benefits of exercise

Wang Fuqin (2012) believes that as a health behavior, physical exercise can improve people's health level and reduce the impact of health inequality brought by social and economic status.

Li Xiaotian, Ma Xiaoni et al. (2023) believe that physical exercise can inhibit the number of medical visits of residents and is more effective in improving health inequality.

Bowen R, Balbuena L (2013) et al believe that physical exercise, as an auxiliary psychotherapy, can have a very good effect on improving mental health. Physical exercise can help maintain emotional stability and effectively relieve anxiety and depression.

In terms of sports psychology, a large number of clinical and animal studies have shown that physical exercise has a good effect on cognitive function, especially aerobic exercise can affect the development of children's cognitive ability, thus affecting children's self-control. Schondube's (2017) research shows that regular exercise can improve their self-control ability and reduce their impulsivity. In terms of sports human science, DeSire et al. (2021) adopted a controlled experiment method to explore the effectiveness of physical exercise in treating patients with knee osteoarthritis. Lan (1995) took 110 subjects aged 50-78 years old from a community in Europe as the control group and the experimental group, and conducted a Taijiquan intervention study on the experimental group. The results showed that the cardiopulmonary function of the elderly who regularly participated in Taijiquan exercise was significantly better than that of those who did not regularly exercise.

1.3 Type of exercise

Isometric exercise: Exercise designed to increase muscle tension against a fixed resistance. Heavy exercise such as weight lifting; Less intense static training methods such as handstands and yoga. Also called isometric motion is static motion.

Isotonic exercise: when the muscle contracts, the muscle fibers are shortened, and the load on the muscle is unchanged, and the muscle tension does not change significantly during the exercise, so the name isotonic exercise, such as walking, jogging and relatively easy swimming. Also known as isotonic exercise is aerobic exercise.

Aerobic exercise: A form of exercise that primarily uses aerobic metabolism to provide the energy required for exercise. In this type of exercise, there is a linear relationship between exercise load and oxygen consumption. Aerobic exercise includes activities such as swimming, jogging, and cycling.

Anaerobic exercise: A classification based on the metabolic process of skeletal muscle during exercise, which relies on the development of anaerobic metabolic energy supply systems. Anaerobic exercise generally refers to the energy supply state of muscles when they perform high-intensity or explosive activities under oxygen-free conditions. These types of exercises tend to be high-intensity and short-duration because they quickly cause fatigue and take a long time to recover to a non-fatigued state. Examples of anaerobic exercise include weight training and short-distance sprinting.

1.4 Current research status of exercise behavior

Scholar Blumenthal (1999) analyzed that for elderly patients with major depression, the use of standard drugs combined with aerobic exercise is more effective, and the results showed that physical exercise can replace antidepressant drugs to treat the disease. Han Chunying (2009) investigated the physical health status of 1600 Hui adolescents in Xinjiang, and found that although the Hui adolescents in Xinjiang were aware of the benefits of exercise, they still had less exercise time and low exercise frequency. Compared with the standard of participating in more than three times a week, each time more than 30 minutes, and achieving moderate intensity, there is a big gap.

According to the study of Wang Guozhong (2022), the current physical exercise situation of adolescents is not ideal, they lack correct cognition of physical exercise, choose only one physical exercise program, have little interest in emerging

projects, and participate in exercise time and frequency. Adolescents' physical exercise behavior is mainly influenced by three factors: individual, social and school. The improvement of adolescents' physical health level is slow.

2.Adolescents

2.1 Definition of adolescents

Adolescence is a transitional stage of physical and mental development that usually occurs between adolescence and legal adulthood. Roberts, Michelle (2005) argue that adolescents are generally defined as those between the ages of 10 and 24, but due physical, psychological, or cultural performance may begin earlier and end later, with cognitive development (especially in the prefrontal cortex, which is responsible for impulse control) and physical size development (especially in males) continuing well into their 20s.

A comprehensive understanding of adolescents requires a variety of perspectives, including psychology, biology, neurocognitive science, history, sociology, education, and anthropology. From all perspectives, adolescents are generally considered to be the transition period between children and adulthood, and the cultural purpose is for children to prepare for the role of adults. Wu Lili (2018) mentioned in his research that the concept of "adolescents" has been widely debated in the academic community. In the Dictionary of Adolescent Studies, adolescents are defined as the whole age period from the beginning of childhood until the end of middle age. In the field of psychology, A number of changes occur in the body during puberty, including the gradual maturation of sexual organs, increased height, weight gain, and significant changes in brain structure and organization. Cognitive changes include increased knowledge and a better grasp of abstract and rational thinking.

2.2 Adolescent development

According to the study of Zhang Weibin and Zhang Tong (2023), pelvic development is the biggest characteristic of women, and the stage of adolescent development is the main determinant of bone mineral density in girls, and the influence of hormonal changes on bone development is dominant in the period of adolescent

growth spurt. In adolescent males, the high secretion of male hormones accelerates the decomposition of fat and promotes muscle synthesis, increasing the proportion of muscle in body weight from 42% at age 5 to 54% at age 18, and the earlier the development of males have superior lean muscle conditions, so they perform better in strength, speed and explosiveness. Special attention should be paid to protein supplementation for adolescent athletes in speed and strength sports, because protein is very important for muscle growth and strength. Vitamin-rich water, protein powder, sports food, fatty acids, probiotics and plant extracts can supplement nutrients that are not adequately obtained in daily diets to some extent. In addition, additional food sources of calcium, vitamin D, potassium, iron and folic acid may also improve the dietary intake of adolescent athletes. During the physiological development of adolescents, rapid growth in height and weight and the development of secondary sexual characteristics are significant features of adolescence. When an individual's growth and development enters adolescence, it will usher in the second peak of personal physiological development. The most important manifestations of this stage include the improvement of physical functions, changes in appearance, and sexual development and maturity. As these changes occur, the individual's appearance gradually approaches adult features. In the process of psychological development, adolescents have insufficient experience and low level in terms of cognitive level and mode of thinking, showing one-sidedness in thinking, often showing contradictions in psychological performance, reflecting imbalance, and curiosity and interest in the opposite sex due to sexual maturity. At this stage, the individual self-awareness of adolescents increases, including the generation of "adult sense", strong self-esteem needs, etc.; There are cognitive differences and cognitive styles among individuals in the group. The coexistence of contradictions in emotional development, more intimate with peers in interpersonal communication, separation from adults and other characteristics.

2.3 Problems of adolescents

Zou Zhichun and Chen Peijie (2010) found that the results of national students' physical fitness monitoring in recent years showed that the physical fitness and health level of Chinese adolescents continued to decline for many years, and the scores of strength, endurance and other quality tests declined in general. A number of epidemiological surveys have also found that the number of adolescent obesity, "bean sprouts" body type and people with myopia has increased sharply, and some risk factors can continue to adulthood, becoming the source of subsequent "sub-health".

Tan Bo (2020) tested the physical health of 500 adolescent students in Heilongjiang Province through the test method, and the test results showed that 5 out of 10 students were seriously overweight, and the obesity rate increased significantly compared with the previous level. Most of the students failed the visual acuity test of left and right eyes, and the myopia rate showed a low age development. Students' athletic ability is declining, and there is a lack of physical exercise in daily life.

Feng Zhengzheng and Zhang Dajun (2005) found that the incidence of depressive symptoms was 25%-40%, and the incidence of depressive symptoms in adolescents was 22.81%. Adolescent depression will have a negative impact on the current or future life, and increase the risk of suicide, which has serious potential harm to societ. Late maturation of boys and early maturation of girls in adolescence has a negative effect and influence on individual development. Late maturation of boys is slow in individual development, resulting in physical thinness and low self-evaluation compared with peers, forming negative self-perception and self-concept, and prone to behavioral biases such as aggression against others.

2.4 Exercise status of adolescents

Wu Feng (2020) found that under the influence of subjective and objective factors such as traditional educational values and sports facilities, the physical exercise education of young people is not paid attention to, their own awareness of physical exercise is weak, and their willingness to exercise cannot be satisfied, which affects the healthy physical development of young people. For young people at school age, the basic way to improve their physique and build a strong body is to participate in sports.

At the same time, sports must follow the law of physical development, which requires gradual and individualized teaching, scientific planning and appropriate intensity, teaching scientific sports knowledge, and shaping good exercise habits and sports values. Physical exercise needs to consume a certain amount of physical strength, and sometimes it will produce a variety of discomfort such as fatigue, muscle soreness and so on. A large number of surveys have proved that today's adolescents generally lack the spirit of hard work, especially the only child. The special breeding environment caused them to be afraid of suffering, afraid of fatigue, afraid of dirty, delicate, lazy, seeking comfort in life and other bad psychological qualities, in the absence of strict rules, they will not consciously take the initiative to participate in physical exercise.

Tang Mi, Luo Chunlin, and He Diancchen (2020) found that most adolescents in Heilongjiang Province can regularly participate in out-of-school physical exercise, and the exercise time and intensity are significantly better than in-school physical education and extracurricular physical exercise. The traditional sports such as long-distance running, table tennis, badminton, skipping rope, shuttlecock, basketball, swimming and football are the main sports to participate in off-campus physical training, and few rely on professional coaches to guide sports skills. Participation in physical exercise is mainly concentrated in the small intensity of physical fitness and games and entertainment.

2.5 Factors influencing adolescents' exercise

Nowadays, there are still some deviations in the educational concept of parents. Most parents only care about the learning of adolescents, but do not pay attention to their physical health, which is one of the important factors causing the decline of physical health of adolescents in our country. Liu Xue et al. (2022) believe that the earliest education for adolescents comes from the family, and the importance parents attach to sports determines whether adolescents can have a healthy physique to some extent.

Adolescents spend a large part of their time in school, and school is a place for adolescents to learn happily, but also a place for them to grow up. However, due to

the influence of exam-oriented education, most schools do not attach importance to physical education. Jiang Libing et al. (2016) believe that there are deviations in the educational goals of schools, which unilaterally pursue the enrollment rate and ignore the development of students' physical quality. It is a common phenomenon that physical education is occupied by other teachers. The effect of physical education is not ideal, and the physical education of exam-oriented education does harm to the physical health of adolescents. The school education evaluation system only inhibits the development of adolescents' physical quality.

Adolescents' physical education cognition is the internal factor that affects their physical health. They do not take the initiative to participate in sports activities, take a negative attitude toward physical education, think that physical education is boring, mistakenly think that physical exercise is useless for future learning cultural knowledge, and lack of health knowledge will lead to their physical decline.

2.6 The novel coronavirus

Novel coronavirus pneumonia (COVID-19) is an emerging respiratory infectious disease caused by the SARS-CoV-2 virus. Its main clinical manifestations include fever, dry cough and fatigue. A small number of patients may not show obvious clinical symptoms after being infected with the new coronavirus.Different clinical types have different manifestations [1]. The global outbreak of COVID-19, which began in late 2019, poses a significant threat to public health. With the emergence of vaccines against the novel coronavirus and active and effective human prevention measures, the human immune barrier has been extensively formed, making the novel coronavirus pneumonia in different countries and regions have been effectively controlled. However, the characteristics of strong infectivity, rapid spread and diverse transmission routes limit people's gathering and travel, and to a certain extent, affect the public's physical exercise behavior. On 30 January 2020, COVID-19 was identified as a global public health emergency.

To prevent the spread of the virus to the greatest extent possible, China has adopted a series of prevention and control measures, as close contacts with patients for isolation treatment, medical supervision and home isolation, in the isolation state, due to the interruption of travel plans, various social media lack of excessive information overload, such as panic buying of necessities, and so on Threads must be regulated and managed. Of the symptoms associated with an individual's mental health, anxiety is the most common. The suddenness and unpredictability of the situation may trigger mass psychological stress reactions, resulting in public panic or anxiety. The novel coronavirus epidemic is sudden and long-term, and its various unknowable and uncontrollable factors will cause excessive fear, worry and anxiety among the public, which will not only show physical discomfort, but also cause mental damage to people.

Many empirical studies have shown that physical activity, as an adjunct treatment for mild to moderate mental disorders, plays an important role in the alleviation and improvement of depression and anxiety. Physical exercise can not only boost immunity, but also promote mental health. It can improve the efficiency of health services through the integration of resources and mutual coordination between sports and health systems. Dong Yufu's (2004) research during the SARS epidemic also showed that exercise can significantly reduce the tension and anxiety caused by sudden public crises. During the COVID-19 epidemic, regular and quantitative physical exercise is also recommended as an important means to regulate individual mental health. Zhao Yang (2022) found that under the influence of the COVID-19 epidemic, adolescents' anxiety, boredom, depression and pressure are all increasing. Qin Guoyang (2023) found that adolescents' physical exercise can directly affect their risk perception ability of COVID-19. Zhou Chunmei and others have found that on Sina Weibo, young people show different psychological stress and emotions towards random events during the novel coronavirus epidemic. In the face of COVID-19, the number of adolescents with positive feelings increased by 10 percent in 2021 compared with 2020, and the number with negative feelings decreased by 11.7 percent. The heroic deeds of medical staff and volunteers are the main factors for adolescents to have positive

emotions, while the initial exploration by government service departments has not reached the expected results and there is no effective medicine for the novel coronavirus are the main reasons for adolescents to have negative emotions. Fu Zhenghui et al. (2022) found that children and adolescents had a high incidence of mental health problems during the normalization of the epidemic, and psychological problems such as loneliness, loss and irritability were common. According to the study of Wang Cong et al. (2022), adolescents face multiple stresses due to the COVID-19 pandemic, including concerns about infection, life changes, isolation measures, and social restrictions. These factors interact with individual and social vulnerabilities to affect adolescents' mental health.

Tian Weiwei (2021) found that physical exercise under the epidemic situation was more conducive to higher friendship quality. The exercise enthusiasm of exercisers has been improved, the cognition of physical exercise has been greatly changed, and the purpose of exercise has been strengthened. Taking part in physical exercise can make exercisers have more social communication and improve their communication ability continuously, so that physical exercise can bring good communication and interaction and better promote the improvement of the quality of sports friendship. The mental state of the epidemic is prone to emotional, anxiety and other bad emotions. Through the good atmosphere, culture and happy experience brought by physical exercise, the bad emotions begin to slowly dilute, and the quality of sports friendship is constantly strengthened and improved.

A study by Zhu Wenqi and Feng Xiaohui (2022) found a significant increase in the proportion of overweight and obese adolescents in cities. The school courses are taught online, and the students face large electronic screens such as TV, computer, mobile phone and tablet for a long time, coupled with heavy homework after school, the detection rate of poor vision continues to rise, and the problems of scoliosis and obesity become more and more serious. Overall physical fitness level index decreased. During the epidemic, static activities of adolescents increased, outdoor activities and physical activities decreased significantly, speed, endurance, explosive power decreased

significantly, physical coordination decreased, physical function, especially cardiorespiratory endurance level decreased. Related medical research shows that breathing, obesity and the decline of cardiovascular function during adolescence are the causes of fatal diseases such as diabetes and coronary heart disease after middle age. Affected by the epidemic, the economic recession, the narrowed social range, the depressed family atmosphere, and the epidemic rumors have caused a certain negative impact on the psychology of young people. They do not eat, sleep, study, exercise, communicate, and often conflict with their families, and some young people have psychological problems such as fear, anxiety, insomnia, depression, and somatization.

3. Factor of Exercise

3.1 Knowledge of Exercise

According to the research of Du Changliang and Liu Dongsheng (2023), exercise knowledge refers to the language and written information of various physical exercises confirmed by specific integration and practice, as well as the "tacit knowledge" of beliefs, beliefs, values, habits, experiences, tempering, techniques and abilities related to sports. Its characteristics include: (1) integration of knowledge in multiple fields. (2) It must take physical exercise practice as the goal orientation. (3) Only a small part of the essence of physical training knowledge is explicit, and most of it tends to recessive knowledge. (4) Physical training knowledge transfer is difficult to standardize and pass on to others. (5) The knowledge transfer efficiency of physical exercise is inherent in the technical process of physical exercise and the social process of the interaction of physical exercise practitioners.

3.2 Attitude of Exercise

Exercise attitude (subjective standard, behavioral control sense, goal attitude, behavioral cognition, behavioral intention, etc.) plays different roles in the formation of exercise behavior at different stages. The study of Fu Dong (2014) showed that the overall evaluation of sports attitude was positively correlated with physical health level.Positive exercise attitude helps adolescents to participate in exercise better, and can effectively regulate their self-emotion and attention during exercise, so as to obtain

a more positive exercise experience. Xie Long et al. (2009) found that the direct effect of exercise attitude on exercise behavior is not obvious, but behavioral intention in its dimension plays an important role in the formation of exercise behavior, and factors such as emotional experience, subjective standards and sense of behavioral control are more prominent. Based on the "emotional reflection theory", Phipps et al. (2021) revealed the relationship between emotional attitude and physical activity behavior in exercise attitude. Emotional attitude can not only directly predict physical activity behavior, but also indirectly predict behavior through activity intention. Graham et al. (2011) The combined effect of exercise attitude and exercise behavior may have a greater impact on future physical activity than that of individual behavior. Exercise attitude can predict the subsequent moderate to high intensity physical activity, and the enhancement of attitude is conducive to the improvement and maintenance of physical activity.

3.3 Perception of Exercise

In the study of Lei Jieyu (2023), the perception of exercise is divided into two types: perception of benefit and perception of risk. External stimuli can cause the body's perception experience, and the body's perception can predict whether an individual will make a behavioral response. Exercise perception is often regarded as a variable of individual psychological state, which refers to the information summary of the positive or negative effects of physical exercise obtained by individuals through their own experience or cognition. It not only represents the objective results of physical exercise, but also includes the subjective cognition and evaluation of individuals. The perceived benefit of exercise has a positive effect on the continuous exercise behavior of college students, and the individual's decision whether to maintain the exercise behavior will be affected by the perceived benefit of exercise. College students gain positive effects during the exercise process, such as enhancing cardiopulmonary function, increasing muscle strength, improving metabolism and immune system, will further enhance self-confidence, improve happiness, reduce stress and anxiety, etc. These positive feelings and experiences will encourage people to continue exercise

behavior. As a kind of physical factors of college students' exercise perception, risk perception is an individual's subjective feeling, experience and cognition of objective risks. Exercise risk perception has a negative effect on college students' continuous exercise behavior. When we realize that physical exercise may bring risks to physical and mental safety, such as the quality of the site, crowded crowd, etc., it will affect the occurrence of sports participation behavior of college students.

CHAPTER 3
RESEARCH METHOD

This study investigates the exercise behavior of adolescents during the epidemic period of novel coronavirus pneumonia. The research steps are as follows:

1. Population and sample
2. Create research tools
3. Data collect
4. Data analyze

Population and sample

Population

There are 25,041 undergraduate students in Zhoukou, Henan Province, China. The students are basically between 18 and 24 years old.

Sample selection criteria

Sample selection : A total of 381 adolescents aged 18-24 years were selected from the study population using (Taro yamane, 1970)

Exclusion criteria

1. Did not complete the questionnaire
2. The sample group signed the document agreeing to participate in the study agree to participate

Create research tools

We used a questionnaire survey to investigate the exercise behavior of adolescents during the COVID-19 epidemic. There are four pats:

- The first part is a general information questionnaire.
- The second part is a questionnaire survey on adolescents' sports knowledge during the epidemic period of COVID-19. Adolescents only need to choose Yes or No.

- The third part is the survey form of young people's attitude towards sports during the COVID-19 epidemic. Respondents were asked to tick their choice from the following four options: 4 strongly agree, 3 agree, 2 disagree, and 1 strongly disagree.

- The fourth part is the survey form of young people's awareness of sports during the COVID-19 epidemic. Respondents were asked to tick their choice from the following four options: 4 frequently 3 sometimes 2 occasionally 1 never.

Steps to create a research tool

1. Researchers set research objectives. Research that is related to and within the same scope as the investigator's goals.

2. Sort out the problems in Bloom's behavioral cognition category.

3. Create a questionnaire to cover the topic studied and consult a consultant for analysis and improvement.

4. Submit the questionnaire to the chair and the preliminary review committee for revision.

5. The questionnaire was submitted to 5 experts to test the language accuracy, content validity and obtain relevant suggestions.

6. Compile questionnaires and submit them to teachers, tutors, chairs and thesis control teachers.

7. To test the reliability of the questionnaire by try Out the prediction of the questionnaire in a non-sample group of 30 people in order to find out the correlation coefficient

8. Use questionnaires to collect data.

Data collection

1. Submit an ethics application to the Graduate School of Srinakharinwirot University in order to request expert assistance in the questionnaire survey.

2. Submit an application to the graduate School of the university allowing students to issue questionnaires, and obtain the approval of the university to conduct questionnaires.

3. Researchers collect complete and accurate data.

4. Organize, analyze and make statistical analysis of the acquired data.

Data processing and analysis

1. Researchers check the integrity of the information and issue the most complete questionnaire

2. Researchers analyze the data using SPSS (26.0) computer programs

2.1 After collecting questionnaire feedback information, analyze and list the frequency and percentage of variables

2.2 The mean value, standard deviation, data percentage and F-test of sports knowledge behavior, behavioral attitude and cognitive awareness questionnaires of adolescents during the COVID-19 epidemic were analyzed.

3. Find the relationship between motor behavior generated by knowledge, attitude and perception. Through the analysis, the exercise situation of adolescents during the COVID-19 pandemic was obtained and the research hypothesis was answered.

CHAPTER 4
RESEARCH RESULT

After sorting out and analyzing the data collected by the questionnaire, the following tables and conclusions are obtained

Table 1 Frequency and percentage of basic information

Basic information	variable	frequency	%
sex	male	238	62.467
	female	143	37.533
age	Less than 18 years old	5	1.31
	18-24 years old	372	97.64
	Over 24 years old	4	1.05
Days of exercise during the epidemic	Less than 3 days	284	74.541
	3-5 days	72	18.898
	More than 5 days	25	6.562
Time for each exercise	Less than 30 minutes	277	72.703
	More than 30 minutes	104	27.297
Days of exercise per week after the pandemic	Less than 3 days	201	52.756
	3-5 days	136	35.696
	More than 5 days	44	11.549

Table 1 show the basic information. The number of male samples is 238, accounting for 62.47%, and the number of female samples is 143, accounting for 37.53%. There were 5 people under the age of 18, accounting for 1.31%; 372 people between the ages of 18 and 24, accounting for 97.64%; 4 people over the age of 24, accounting for 1.05%; During the COVID-19 epidemic, 284 people exercised less than 3 days per week, accounting for 74.54%; 72 people exercised 3-5 days, accounting for 18.90%; 25 people exercised more than 5 days, accounting for 6.56%; Among the samples, 277 people exercised for less than 30 minutes each time, accounting for 72.70%, and 104 people exercised for more than 30 minutes each time, accounting for 27.30%. After the COVID-19 epidemic, 201 people exercised less than 3 days per week, accounting for 52.76%; 136 people exercised 3-5 days per week, accounting for 35.70; 44 people exercised more than 5 days per week, accounting for 11.54%.

Table 2 Frequency values and percentages of exercise purposes

Purpose of exercise	frequency	%
For health	238	62.467
For fun	32	8.399
Keep fit	57	14.961
For competition	4	1.05
Other	50	13.123

Table 2 show that the number of healthy people in the sample is 238, accounting for 62.47%, for the purpose of exercise. For fun, 32 people, accounting for 8.40%; The number of people who kept their body shape was 57, accounting for 14.96%; The number of competitors was 4, accounting for 1.05%; The number of others (or no exercise) was 50, accounting for 13.12%.

Table 3 Variance analysis of dependent variables and days of exercise per week

variables		SS	df	MS	F	p-value
Knowledge	Between groups	0.052	2	0.026	0.712	0.492
	Within the group	13.82	378	0.037		
	total	13.872	380			
Attitude	Between groups	1.807	2	0.903	3.262	0.039
	Within the group	104.682	378	0.277		
	total	106.488	380			
Perception	Between groups	5.481	2	2.741	7.542	0.001
	Within the group	137.369	378	0.363		
	total	142.851	380			

Table 3 uses analysis of variance (ANOVA) to study the differences in knowledge, attitude, and perception of exercise days per week. The impact of samples with different exercise days on knowledge is not significant (p-value >0.05), indicating that the impact of samples with different exercise days on knowledge is consistent and there is no difference. The number of exercise days has a significant impact on attitudes and perceptions (p-value<0.05), indicating that there are differences in attitudes and perceptions among samples with different exercise days.

Table 4 Comparison of exercise behavior between each exercise duration

	Duration of each exercise(Mean±S.D.)		t	p-value
	Under 30 minutes(*n*=276)	More than 30 minutes(*n*=105)		
Knowledge	1.45±0.19	1.46±0.19	-0.588	0.557
Attitude	2.71±0.51	2.86±0.56	-2.399	0.017*
Perception	2.81±0.60	2.96±0.64	-2.202	0.028*

* p-value <0.05 ** p-value <0.01

In Table 4, we used the independent sample T-test to analyze the differences in knowledge, attitude and perception of each exercise duration. The results showed that the samples of each exercise duration had no significant difference in knowledge (p-value >0.05). There were significant differences in attitude and perception among the samples of each exercise duration (p-value <0.05). Specific analysis shows that: The duration of each exercise showed significance at the 0.05 level on attitude (t=-2.399, p-value=0.017). Specific comparison shows that the average value for less than 30 minutes (2.71) is significantly lower than the average value for more than 30 minutes (2.86).

The duration of each exercise shows significance at the 0.05 level for perception (t=-2.202, p-value =0.028), and the specific comparison shows that the average value (2.81) for less than 30 minutes will be significantly lower than the average value for more than 30 minutes. (2.96).

Table 5 Comparison of exercise behaviors between genders

variables	sex	Mean	S.D.	t	p-value
knowledge	male	1.431	0.205	-2.687	0.008**
	female	1.481	0.156		
Attitude	male	2.712	0.593	-2.017	0.044*
	female	2.813	0.382		
perception	male	2.787	0.661	-2.826	0.005**
	female	2.957	0.503		

* p-value <0.05 ** p-value <0.01

In Table 5, we use independent samples t-test to study gender differences in knowledge, attitudes, and perceptions. It is concluded that the knowledge, attitude and perception of samples of different genders are all significant (p-value<0.05), indicating that there are differences in knowledge, attitude and perception of samples of different genders. Specific analysis shows: There is a significant difference between gender on the level of exercise knowledge (t=-2.687, p-value=0.008), and the comparison shows that the male average (1.43) is significantly lower than the female average (1.48). There is a significant difference in the level of attitude towards exercise between genders (t=-2.017, p-value=0.044). Comparative differences show that the male average (2.71) is significantly lower than the female average (2.81). There is a significant difference in the perceived level of exercise between genders (t=-2.826, p-

value=0.005). Comparing the differences shows that the male mean (2.79) is significantly lower than the female mean (2.96).

Table 6 Comparison of attitude behavior and behavior awareness exercise behavior

variables		SS	df	MS	F	p-value
knowledge	Between groups	0.124	4	0.031	0.864	0.486
	Within the group	13.508	376	0.036		
	total	13.632	380			
Attitude	Between groups	2.969	4	0.742	2.737	0.029
	Within the group	101.983	376	0.271		
	total	104.952	380			
perception	Between groups	7.081	4	1.77	4.931	0.001
	Within the group	134.991	376	0.359		
	total	142.072	380			

Analysis of Variance (ANOVA) was used to study the differences in knowledge, attitude and perception of sports purposes. From Table 6: Samples for different sports purposes do not show significant knowledge (p-value>0.05), which means that samples for different sports purposes all show consistency in knowledge, and there is no difference, so post-test analysis is not necessary. The samples for exercise purposes showed significant effects on attitude and perception (p-value<0.05), indicating that samples for different exercise purposes had differences in attitude and perception, so post-test analysis could be carried out specifically.

Table 7 Comparison of exercise behaviors in attitude and perception

variables	Purpose(I)	Purpose(J)	M.D (I-J)	p-value
Attitude	For health	For fun	-0.121	0.219
		Keep fit	0.052	0.501
		For competition	0.761	0.004**
		No exercise	0.041	0.617
	For fun	Keep fit	0.172	0.135
		For competition	0.881	0.002**
		No exercise	0.161	0.172
	Keep fit	For competition	0.709	0.009**
		No exercise	-0.011	0.911
	For competition	No exercise	-0.72	0.008**

Table 7 (Continued)

variables	Purpose(I)	Purpose(J)	M.D (I-J)	p-value
perception	For health	For fun	0.022	0.844
		Keep fit	0.084	0.34
		For competition	0.916	0.003**
		No exercise	0.314	0.001**
	For fun	Keep fit	0.062	0.639
		For competition	0.894	0.005**
		No exercise	0.292	0.032*
	Keep fit	For competition	0.832	0.008**
		No exercise	0.23	0.049*
	For competition	No exercise	-0.602	0.054

* p-value<0.05 ** p-value<0.01

Table 7 shows that, In terms of attitude, there was a significant level of 0.05 for exercise purpose (F=2.737, p-value=0.029), and the average scores of the groups with obvious differences were: for health > competition; For Fun > Competition; Stay in shape > Compete; Other (or no sports) > Competition.

In terms of perception, the exercise purpose showed 0.01 level of significance (F=4.931, p-value=0.001), and the average scores of the groups with obvious differences were: for health > competition; For health > other (or no exercise); For Fun > Competition; For fun > Other (or no exercise); Stay in shape > Compete; Staying in shape > Other (or not exercising at all).

CHAPTER 5
RESULT AND DISCUSSION

Study people and study samples

population

College students in Zhoukou City, Henan Province, China, were selected as the research objects, and adolescents aged 18-24 were selected as the research population, among which the number of undergraduate students in Zhoukou was 25,041.

Research sample

381 adolescents aged 18-24 were selected by random simple sampling method(Taroyamane,1970)

Research tool

We used the questionnaire on adolescents' exercise behavior during the COVID-19 epidemic as a research tool, which was divided into four parts. Questionnaires were submitted to 5 subject matter experts to check content validity 0.80, reliability 0.72 and language accuracy, and to make various recommendations.

Data collation and analysis

1. Check data integrity and find basic statistics.
    1.1 Average value
    1.2 standard deviation
2. Compare and find differences.

Result

From the study:

1. During the period of COVID-19, the exercise habits of adolescents were as follows: most of them exercised less than 3 days a week, 284 of them, accounting for

74.54%; Secondly, 72 people exercised 3-5 days a week, accounting for 18.90%; There were 25 people who exercised for more than 5 days, accounting for 6.56%.

2. During the period of COVID-19, the exercise duration of adolescents was as follows: most of them exercised for less than 30 minutes each time, 277 of them, accounting for 72.70%; There were 104 people who exercised for more than 30 minutes each time, accounting for 27.30%.

3. During the COVID-19 epidemic, the majority of adolescents exercised for health purposes, with a total of 238 (62.47%); In order to keep fit, 57 people, accounting for 14.96%; Other (or did not exercise) 50 people, accounting for 13.12%; For fun, 32 people, accounting for 8.40%; In order to compete, 4 people, accounting for 1.05%.

4. After the COVID-19 epidemic, 201 adolescents exercised less than 3 days a week, accounting for 52.76%; 136 people exercised 3-5 days a week, accounting for 35.70; There were 44 people who exercised more than 5 days a week, accounting for 11.54%. Compared with the period of the novel coronavirus epidemic, the proportion of people who exercised 3-5 days a week and more than 5 days a week increased significantly, while the proportion of people who exercised less than 3 days a week decreased significantly.

5.The difference between weekly exercise frequency and dependent variables (knowledge, attitude, cognition) was compared and analyzed. The conclusion was that there was no significant difference between weekly exercise frequency and motor behavior knowledge. There were significant differences in attitude and perception of exercise with weekly exercise frequency (p-value <0.05).

6. By comparing and analyzing the differences between each exercise duration and the dependent variables (knowledge, attitude and perception), we can conclude that there is no significant difference in the knowledge of exercise behavior for the samples and it is consistent. There were significant differences in attitude and perception among the samples (p-value< 0.05). The difference of specific values shows that the average value of exercise attitude under 30 minutes (2.71) is significantly lower

than the average value over 30 minutes (2.86). The mean of exercise perception under 30 minutes (2.81) was significantly lower than the mean of more than 30 minutes (2.96).

7. Comparing male and female exercise behaviors, it is found that samples of different genders have significant effects on knowledge behaviors, attitude behaviors and behavioral awareness (p-value<0.05), which means that samples of different genders have differences in knowledge behaviors, attitude behaviors and behavioral awareness. Among them, gender showed 0.01 level significance for knowledge behavior (t=-2.687, p-value=0.008), and the specific comparison difference showed that the average value of male (1.43) was significantly lower than that of female (1.48). Gender showed a 0.05 level significance for attitude behavior (t=-2.017, p-value=0.044), and the specific comparative difference showed that the mean value of male (2.71) was significantly lower than that of female (2.81). Gender showed 0.01 level significance for behavior awareness (t=-2.826, p-value=0.005), and the specific comparison difference showed that the average value of male (2.79) was significantly lower than that of female (2.96).

8. The comparison of the three items of knowledge behavior, attitude behavior and behavioral awareness by exercise purpose shows that samples with different exercise purpose do not show significant effect on knowledge behavior (p-value>0.05), which means that samples with different exercise purpose all show consistency in knowledge behavior without difference. The samples for exercise purposes showed a significant effect on attitude behavior and behavior awareness (p-value<0.05), which means that samples for different exercise purposes have differences in attitude behavior and behavior awareness, and post-test analysis can be conducted specifically.

9. Exercise purpose showed a 0.05 level of significance for attitude behavior (F=2.737, p-value=0.029), and the average scores of the groups with significant differences were as follows: for health > competition; For Fun > Competition; Stay in shape > Compete; Other (or no sports) > Competition ".

10. The purpose of exercise showed 0.01 level of significance for behavioral awareness (F=4.931, p-value=0.001), and the average scores of the groups with obvious differences were as follows: for health > competition; For health > other (or no exercise); For Fun > Competition; For fun > Other (or no exercise); Stay in shape > Compete; Staying in shape > Other (or not exercising at all).

Discussion

COVID-19 began to break out in the world at the end of 2019, posing a great threat to public health. The characteristics of the virus, such as strong infectiousness, rapid spread and diverse transmission routes, limit people's gathering and travel, and to a certain extent affect the physical exercise behavior of the public, especially the young people aged 18-24 who are frequently physically active. Through our research, we found that nearly 80% of adolescents have been infected with COVID-19 during the epidemic, and half of those infected have mild infection. Due to the damage of virus infection to physical health, as well as social management and containment, more than 70% of adolescents exercise less than three days a week, and more than 70% of adolescents exercise less than half an hour each time. However, before the epidemic, Sun Hongyan (2022) showed that the proportion of adolescents exercise less than three times a week is about 6. The proportion of young people who do not exercise for more than half an hour each time is only close to five, which shows that the epidemic has caused certain troubles for young people to carry out physical exercise.Li Liang (2022) found that during the COVID-19 epidemic, whether an individual can insist on exercising more is not only affected by external environment or weather factors, but also affected by internal psychological conditions, such as anxiety and fear of contracting COVID-19.
In our study, we found that during the COVID-19 epidemic, women's attitude, knowledge and perception of exercise behavior were all higher than men's, which may be because the epidemic caused more trouble to men's physical exercise than women's. Yan Zhenlong's (2019) study found that when there was no epidemic, Less than 30% of female students participated in physical exercise three or more times a week, while nearly 50% of male students participated in physical exercise three or more times a

week. Nearly 80% of male students participate in two or more physical exercises per week.

By comparing the exercise frequency of adolescents during and after the epidemic, we found that after the epidemic, the proportion of adolescents who exercised 3-5 days per week nearly doubled, the proportion of adolescents who exercised more than 5 days per week also increased, while the number of adolescents who exercised less than 3 days per week decreased significantly. According to Yao Wu (2023) and other studies, at present, most patients have recovered from the novel coronavirus infection, but after the end of the acute infection period, long-term hospitalization or home recuperation after the novel coronavirus infection will lead to a significant decline in muscle strength and endurance, and physical exercise can help restore strength and endurance. The second edition of the Rehabilitation Guidance Manual issued by the World Health Organization has included "regular physical exercise" in the rehabilitation recommendations for people infected with the novel coronavirus. At present, most of the infected people in China have met the criteria for returning to exercise recommended by relevant literature.The study of Li Mengrui and Li Fang (2023) found that after the epidemic, college students' awareness of physical exercise has improved compared with that before the outbreak of the novel coronavirus epidemic, and the degree of emphasis and recognition of physical exercise has increased. The frequency and intensity of physical exercise have increased, and the outbreak of the novel coronavirus epidemic has enhanced the enthusiasm and initiative of college students in physical exercise. This may be due to the fact that after the outbreak of the epidemic, students experienced the benefits of physical exercise and changed their views on physical exercise, no longer thinking that physical exercise is only an optional form of entertainment. Under this background, schools, families and society should carry out physical activity from multiple angles, create an atmosphere for physical exercise, and guide students to take the initiative to participate in it. Develop a lifelong exercise of physical health awareness and behavior.

The attitude of exercise behavior, for health, for fun, for the body are obviously different from competition, competition and no exercise are obviously different; In terms of perception, there are obvious differences between health, fun and keeping fit and competition, and there are obvious differences between health, fun and keeping fit and no exercise. Jiang Yunqiao et al. (2023) pointed out that exercise has many positive effects on adolescents, especially in relieving stress. Participating in sports activities allows adolescents to temporarily divert their attention away from the stressors of daily life. In addition, exercise promotes the secretion of natural pleasure substances such as endorphins, which helps regulate and improve emotions. Through physical exercise, adolescents can also enhance their self-confidence and self-esteem, and develop a more positive attitude when they find a sport they are good at.The research of Li Jianrong (2007) shows that adolescent students are in a critical period of growth and development, with large body shape and plasticity. Regular physical exercise has many benefits for the body growth of adolescents, including promoting blood circulation to bone tissue, thickening bone density, making bones stronger and stronger, improving bending resistance, stronger muscle contraction, and more flexible and firm joints. These changes are conducive to the normal development of the student's body shape. In addition, when engaging in physical exercise outdoors, sunlight exposure can make the chemical 7-dehydrocholesterol in the human body become life-sustaining D. Vitamin D allows bones to better absorb and use calcium in the blood, which accelerates bone growth. Surveys show that students who regularly engage in physical exercise are 4-8 cm taller than average students of the same age.

Suggestions for further research

1. Expand the scope of the study, such as distributing questionnaires to different regions and different age groups.

2. Enrich the content of the questionnaire, add more variables to the questionnaire, and make the research questions more detailed and in-depth, such as the specific type of exercise and exercise items.

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APPENDIX

Appendix A

Questionnaire

Questionnaire survey on exercise behavior of adolescents during the COVID-19 pandemic

Part 1: Basic information

Note: Please tick √ below and answer the question according to the actual situation;

1. What is your age

☐ Under 18 years old ☐ 18-24 years old ☐ over 24 years old

2. Your weight..... KG Height..... CM

3. Gender ☐ Male ☐ Female

4. How many times per week did you exercise during the COVID-19 pandemic

☐ Less than 3 days ☐ 3-5 days ☐ More than 5 days

5. How long do you exercise each time

☐ Less than 30 minutes ☐ ☐ More than 30 minutes

6. How many times per week do you exercise after COVID-19

☐ Less than 3 days ☐ ☐ 3-5 days ☐ ☐ more than 5 days

7. Have you ever been infected with COVID-19

☐ Yes ☐ ☐ No

8. What is your risk of contracting COVID-19

☐ Generally ☐ ☐ mild ☐severe

9. What is the purpose of your exercise

☐ For health ☐ ☐ for fun

☐ Stay in shape ☐ ☐ compete

☐ Other (Or never exercise)

10. During the COVID-19 outbreak, do you follow sports and health news? And how do you follow them

☐Never followed ☐ ☐followed

Part2: Knowledge of exercise behaviour during the COVID-19 pandemic

question	yes	deny
1.Exercise helps to strengthen human immunity		
2.Choosing nutritious foods has a greater impact on your body than exercise		
3.Deep sleep is not essential to health		
4.Lifting dumbbells doesn't make your muscles stronger		
5.Vigorous exercise is good for your health		
6.The maximum heart rate can be calculated by subtracting age from 220		
7.HIT exercises are exercises that help your body develop		
8.Wearing a mask during exercise can help prevent COVID-19 and strengthen the respiratory system		
9.Exercise 3-5 days a week is appropriate		
10.People with COVID-19 can exercise		

Part 3: Attitudes towards exercise behaviour during the COVID-19 pandemic

question	Completely disagree	disagree	agree	in full agreement
1.Exercise can prevent COVID-19				
2.Exercising during COVID-19 is difficult				
3.Vigorous exercise has a positive effect on				

preventing new crown				
4.Energize every workout				
5.You get in better shape after exercise				
6.Exercise relieves stress				
7.Sports can enhance one's self-confidence				
8. Exercise can reduce medical costs				
9.Exercise helps you sleep				
10.Exercise helps to build up appetite				

Part 4: Perception of exercise behavior during the COVID-19 pandemic

question	never	once in a while	sometimes	always
1.Exercise until you sweat				
2.Keep your distance from others while exercising				
3.Disinfect frequently with alcohol				
4. Exercise for				

more than 30 minutes at a time				
5.Stop exercising immediately if your body is abnormal				
6. Exercise in a well-ventilated area				
7.Eat nutritious foods				
8.Eat at least 1 hour before exercise				
9.Take Isatidis regularly				
10.Fitness equipment is checked before and after use				

Appendix B

Approval Form for Ethical Review of Research Experiments

Approval Form for Ethical Review of Research Experiments of Zhoukou Normal University

Approval Form for Ethical Review of Research Experiments of Zhoukou Normal University

Project Title	Exercise behavior during the covid-19 pandemic of adolescents in Zhou Kou,China		
Project source	Not have		
Project Leader	Ling Xiao han	College	Faculty of Physical Education
Review category	☐ Apply for animal experimentation ☐ Declaration of scientific research projects ☑Other		

(The main researeh content and the ethical experimental program involved, including the purpose of animal experiments, experimental methods, observation indexes, and methods of disposing of animals after the experiments)

Overview： To explore the exercise behavior of adolescents in Zhoukou during the COVID-19 epidemic, the factors affecting exercise behavior, the relationship between exercise behavior, and the exercise situation after the epidemic.

Erhical Target： Adolescents aged 18-24 in Zhoukou city

Experimental Protocol： A random simple sampling method was used to select 380 adolescents for questionnaire survey, and the collected questionnaire data were sorted and analyzed. Before the start of the experiment, the selected subjects will participate voluntarily, understand the experiment process, ensure that they are fully informed and respect their wishes; Inquire and investigate the health status of the subjects to determine their mental health. All subjects did not receive any type of instruction or training. The grouping process of subjects is objective and random. The applicant and relevant researchers have accumulated rich experimental experience in the early stage, and will strictly protect personal privacy and prevent the disclosure of relevant information.

Applicant (project leader) commitment：

The above information is true. If approved, I will conduct research in strict accordance with the provided program, abide by the ethical code of scientific research and experiment and relevant regulations, and voluntarily accept the supervision and inspection of the academic committee of the university. If I violate the regulations, I will voluntarily accept the corresponding punishment.

Signature of applicant (project leader): Ling Xiao han

Date:2024.8.1

Physical Education College:

Reviewed by the Physical Education Institute，the design specifications, research content and process of the project are in line with the ethical requirements of scientific research experiments promulgated by the state, and it is agreed that the project will be implemented as planned.

Physical Education College of Zhoukou Normal University

Date：2024.8.1

University Academic Council review comments:

1.Applicant qualification： ☑meet the requirements ☐do not meet the requments
2.Experimental program： ☑Appropriate ☐Inappropriate
3.Conclusion of the review： ☑Agree ☐Discuss after modification ☐Disagree

Academic Committee of Zhoukou Normal University

Date：2024.8.1

VITA