

# The application of high-intensity interval training in college physical education and the improvement of students' physical and mental quality

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## ABSTRACT

**Purpose:** With the increase of employment pressure in modern society and the influence of the long-term static learning mode, the obesity problem of college students is becoming more and more serious, which has become an important factor affecting their physical and mental health. The traditional methods of losing weight, such as dieting, are not effective and have health risks. High-intensity interval training (HIIT), as a new form of exercise, for patients, can significantly boost the basal metabolic rate, thereby aiding in fat burning and facilitating weight management. It also improves cardiopulmonary function, enhances heart health, reduces the risk of cardiovascular diseases, and promotes muscle growth, leading to better body composition. Furthermore, the exercise effects of HIIT help release endorphins, alleviating anxiety and depression and thus enhancing overall mental health. For study benefits, practitioners can develop personalized HIIT plans based on patients' health status and abilities, thereby enhancing the specificity and effectiveness of treatment. **Method:** This paper reviews the status quo of obesity in Chinese college students and its health problems, analyzes the limitations of traditional weight loss methods, and introduces the development history, research status, and mechanism of HIIT in enhancing exercise ability, reducing fat, and relieving depression in detail. **Result:** This paper further discusses the challenges and improvement strategies of physical education in colleges and universities and puts forward the necessity of introducing HIIT into physical education in colleges and universities and the concrete implementation plan. Finally, the paper summarizes the application effect and future development trend of HIIT in college physical education, aiming at providing useful reference for the reform and development of college physical education. **Conclusion:** Through the scientific and reasonable introduction of HIIT training programs, it is expected to effectively improve the health of college students and promote their all-round development.

**Keywords:** Applied research, high-intensity interval training (HIIT), improvement of students' physical and mental quality, physical education in colleges and universities

## Introduction

With the rapid development of society and the improvement of people's living standard, the physical and mental health of

college students has been paid more and more attention. Among them, obesity is particularly prominent; it not only affects the appearance of students but also is a potential risk factor for a variety of chronic diseases.<sup>[1]</sup> Bao Xiangyun *et al.*, 2024 proposed that in the face of intense employment pressure and accelerated pace of life, students are in a static state of learning during their college years and lack of adequate exercise, which leads to the increasingly serious problem of obesity. Therefore, exploring scientific and efficient ways to lose weight and improve the health

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Received: 08-08-2024

Revised: 04-11-2024

Accepted: 23-01-2025

Published: 25-04-2025

### Access this article online

#### Quick Response Code:



#### Website:

<http://journals.lww.com/JFMP>

#### DOI:

10.4103/jfmpc.jfmpc\_1376\_24

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**How to cite this article:** Wang X, Wu H, Meng Q, Chen J, Liu T. The application of high-intensity interval training in college physical education and the improvement of students' physical and mental quality. J Family Med Prim Care 2025;14:1513-20.

status of college students has become one of the important tasks of physical education in colleges and universities. Li Seung-ui, 2023 believes that high-intensity interval training (HIIT) is a new way of exercise, which is gradually favored by people with its unique training mode and remarkable health promotion effect. By alternating between high intensity and low intensity, HIIT is able to burn a lot of calories in a short period of time, improve the body's metabolic rate, and continue to burn fat after exercise to achieve fat loss effects.<sup>[2]</sup> In addition, Liu Yuqing *et al.*, 2023 proposed that HIIT can also significantly improve cardiopulmonary function, enhance muscle strength, and improve the overall quality of the body. These advantages make HIIT an ideal choice<sup>[3-5]</sup> for physical education and daily exercise in colleges and universities. However, despite its many advantages, the application of HIIT in college physical education still faces some challenges. Students' understanding of HIIT is limited or even misunderstood; HIIT has certain requirements on the physical quality and athletic ability of the trainer, and some students may be difficult to adapt to it. Therefore, this paper aims to explore the application of HIIT in college physical education and its influence on students' physical and mental quality, in order to provide useful reference for the reform and innovation of college physical education.

This paper first analyzes the status quo of obesity in Chinese college students and its impact on physical and mental health and then expounds the development history and research status of HIIT and its role in improving athletic ability, reducing fat and relieving depression. On this basis, this paper discusses the challenges and improvement strategies of physical education in colleges and universities and elaborates the advantages and implementation plans of HIIT training as a new choice to effectively improve students' physical fitness. Finally, this paper discusses and puts forward some suggestions to introduce HIIT training programs scientifically and reasonably in college physical education, in order to effectively improve the health status of college students and promote their all-round development. The study has been approved by the Medical Research Ethics Committee of the Physical Education School of Zhengzhou University on July 1, 2023.

### The status quo of obesity among college students in China

College students are facing the pressure of increasingly fierce employment competition, and at the same time, they are in a static state of learning for a long time and lack of enough exercise, resulting in an increasingly prominent problem of obesity. According to the results of a national survey on students' physical fitness and health conducted by the Ministry of Education in 2011 and 2015, the prevalence of obesity among Chinese people aged 8 to 23 has been on the rise. In both urban and rural areas, the prevalence of obesity among boys and girls has increased<sup>[6]</sup> significantly.<sup>[7]</sup> Obesity not only affects an individual's appearance but also is more likely to lead to a series of health problems, such as high blood pressure, hyperlipidemia, and diabetes, and even

leads to low self-esteem, depression, and other negative emotions. However,<sup>[8]</sup> Chen Shuhong, 2022, faced with the problem of obesity, many students choose to lose weight in unscientific ways such as dieting, which undoubtedly aggravates the health risks. To deal with the serious situation, the Ministry of Education, the State Administration for Market Regulation, and the National Health and Health Commission jointly issued specific regulations on food safety and health management in schools. The new regulation specifies that schools must strengthen food safety and nutrition management, implement restrictions on on-campus grocery stores, and strictly prohibit the sale of foods with high sugar and fat content. It also highlights the need to strengthen monitoring of overweight and obesity among students in order to effectively control the spread of the problem.

### Development history and research status of high-intensity interval training

HIIT is a kind of multifrequency, HIIT program, which is characterized by high intensity but short duration, and includes an intermittent rest and recovery period, which makes it more acceptable and persistent than traditional endurance training. Since the early 20th century, HIIT has become a core training method for track and field athletes, and in the years since, it has gradually gained the attention of the professional sports community. Through practice and research, it has been shown that HIIT can greatly improve the endurance and maximal oxygen uptake of athletes, so it has been more and more widely used in the training of endurance sports. (Cao Chenyu, 2023 *et al.*) In addition to its application in the field of sports, HIIT has also been confirmed to have positive effects<sup>[9,10]</sup> on the exercise of the general population and the rehabilitation process of chronic diseases. HIIT not only helps to promote the metabolism of fat and enhance the endurance of aerobic exercise but also improves the sensitivity of human body to insulin response and enhances the function of vascular endothelium. In particular, it is worth mentioning that the excellent performance of HIIT in weight loss is because of not only the energy consumption during exercise but also, more importantly, the excessive oxygen consumption stage after exercise, when the body mainly relies on fat as energy.

In recent years, HIIT has even begun to be used as a rehabilitation exercise prescription for people with heart disease and diabetes. Multiple studies have also supported HIIT's widespread utility. For example,<sup>[11]</sup> Tabata, 1996 found that although HIIT and continuous training were equally effective in improving aerobic capacity, HIIT showed obvious superiority in improving anaerobic capacity. Bartlett *et al.*'s<sup>[12]</sup> study showed that HIIT had significant positive effects on regulating skeletal muscle metabolism and enhancing cardiovascular function. Not only that, the participants' perseverance performance during exercise and the pleasure they experienced after the exercise were also more prominent.<sup>[12]</sup> McRae *et al.*,<sup>[13]</sup> through a study of systemic aerobic resistance training, found that interval training was more effective in improving muscle endurance than other training modes, and the participants' enthusiasm and motivation for

participation were also greatly improved. In addition,<sup>[14]</sup> Schjerve *et al.* conducted a detailed comparative study of various types of exercise. Their results show that HIIT has a significant effect on improving vascular endothelial function and preventing cardiovascular disease. Especially for young adults, HIIT was significantly more effective in reducing fat than continuous exercise. Multiple studies have shown that HIIT is also superior to traditional continuous endurance training in improving aerobic capacity and accelerating fat metabolism. Moreover, HIIT has incomparable unique advantages in enhancing anaerobic exercise ability. Its shorter exercise duration also makes people more acceptable and interested in it, which has a positive impact on the psychological level. It is worth mentioning that as early as 1959, German physiologist Hans Reindell carried out a groundbreaking systematic practical research and in-depth discussion on HIIT, which laid<sup>[15]</sup> a solid foundation for later scientific research and exploration.

## HIIT exercise prescription role

### *The role of HIIT in enhancing athletic ability*

HIIT has become a highly respected form of training in the modern fitness field. It is characterized by its high intensity and short duration, and while it is often thought of as relying mainly on anaerobic energy, its practical effects are much more than that.<sup>[16]</sup> (Liyong Qiu, 2022) The finding that HIIT has shown superior results in improving aerobic and anaerobic exercise capacity compared with long periods of medium-low intensity training has already inspired widespread attention and further research. When exploring the effect of HIIT on skeletal muscle, it is found that this training mode can greatly improve the metabolic capacity of skeletal muscle because it promotes the production of citrate synthetase and cytochrome C oxidase in mitochondria.<sup>[17]</sup> Shuang Liu, 2022 believes that these two enzymes play a crucial role in the function of mitochondria, which are the power factories that provide energy in cells. In addition, HIIT can also increase the content of muscle glycogen and glucose carrier protein 4, which not only provides more energy reserves for muscles but also helps to improve the efficiency of muscle glucose utilization, thus further enhancing the exercise endurance of the human body. In addition to the positive effects on skeletal muscle, HIIT also produces a significant improvement in the cardiovascular system.<sup>[18]</sup> By performing HIIT, the systolic and diastolic functions of the heart have been significantly enhanced. This means that the heart is able to pump blood more efficiently, providing adequate oxygen and nutrients to various tissues and organs throughout the body. At the same time, HIIT also increases the maximum cardiac output and increases the body's peak oxygen uptake, all changes that directly reflect improved cardiorespiratory function.

In terms of anaerobic endurance, HIIT also showed its unique advantages. Lactate dehydrogenase activity is a key factor in muscle's ability to produce lactic acid. During high-intensity exercise, a large amount of pyruvate is catalyzed by lactate dehydrogenase to be converted into lactic acid.<sup>[19]</sup> (Li Hongwei, 2022) Interestingly, HIIT can significantly improve physical performance by increasing the number of medium-chain

triglycerides on muscle cell membrane, thereby speeding up the transmembrane transport and clearance of lactic acid, effectively reducing the accumulation of lactic acid in muscle cells. This effect is difficult to match with the medium- and low-intensity exercise. It is worth noting that during the HIIT training interval, hydrogen ions in skeletal muscle will diffuse to the outside of the cell at a higher rate and can quickly return to the pretraining state. This process not only improves the muscle's anaerobic glycolysis capacity but also enhances the body's ability to withstand lactic acid. This means that people who train with HIIT are able to stay productive longer during high-intensity exercise and are less susceptible to lactic acid buildup.<sup>[20]</sup> (Zhang Xinran, 2020) Lactic acid metabolism plays a pivotal role in high-intensity exercise. Through multiple high-intensity exercise, the process of lactic acid metabolism is repeated, and the blood lactic acid value will gradually increase. This process not only challenges the body's tolerance limit but also stimulates the body's ability to adapt to lactic acid. Over time, the body will gradually become accustomed to operating in a high lactic acid environment, thereby improving anaerobic endurance.

In summary, HIIT achieves overall improvement of aerobic and anaerobic exercise capacity through a comprehensive action on the skeletal muscle and cardiovascular system as well as fine regulation of lactic acid metabolism. This type of training not only is efficient and time-saving but also can bring about significant physical changes in a short period of time. HIIT is a training method worth trying for both professional athletes and regular fitness enthusiasts. Through scientific and reasonable arrangement and unremitting efforts, I believe that everyone can find their own health and strength in HIIT training.

In addition, HIIT's flexibility and diversity have also won it a wide audience. Different training movements, intensity, and interval times can be combined to create countless training regimens to meet the needs of different populations. Whether it is to build muscle, lose fat, or improve cardiorespiratory function, HIIT offers a personalized solution. The popularization and promotion of this training method will undoubtedly bring more choices and possibilities for the healthy life of modern people. In the field of fitness in the future, HIIT is expected to continue to exert its unique advantages and lead a new fitness trend.

### *The role of HIIT in fat loss*

HIIT has gained prominence globally in recent years, breaking into the top 20 fitness workouts in the world for the first time, a trend that reflects its widespread recognition and growing influence in the fitness field. Especially in the area of fat loss, HIIT is gradually becoming the go-to workout for people seeking a healthy posture. In the past, it was widely believed that high-intensity exercise relied primarily on glycogen as a source of energy, rather than fat. However, modern research in sports science has found that when evaluating the effectiveness of fat loss, it is important to focus on both the energy expenditure during exercise and the excess oxygen consumption after exercise. The change of this concept provides a theoretical basis for the

application of HIIT in fat reduction. Excess oxygen consumption is a key physiological parameter, which is directly affected by the intensity of exercise. It is important to note that even high-intensity workouts of relatively short duration are able to significantly increase fat burning after exercise. This phenomenon coincides with the characteristics of HIIT, making this type of training uniquely advantageous in terms of fat loss.

High levels of body fat pose a major threat to health, especially the accumulation of visceral fat in the abdomen. This type of fat is considered by the medical community to be a pathogenic tissue, and its excessive accumulation can significantly increase mortality. Therefore, the primary goal of a fat reduction exercise is to reduce visceral abdominal fat. In order to achieve this goal and to ensure the fat loss effect, the exercise intensity needs to meet a certain standard, which is called the lactate threshold. Although traditional sustained aerobic exercise is popular, its intensity is often low, and it is difficult to achieve the effect of effectively burning visceral abdominal fat. It is against this backdrop that HIIT has come to the fore. Studies have shown that, for the same amount of energy expended, HIIT is as effective as traditional continuous training in reducing overall fat content. However, (Songjiang Zhang, 2024) HIIT's advantages were highlighted when the focus was on visceral fat in the abdomen. Not only is it more effective in reducing this harmful fat but also it takes less time. The findings certainly provide a more efficient option<sup>[21]</sup> for busy modern people to lose fat. So why has HIIT achieved such remarkable results in fat loss? It is closely related to the physiological response it triggers. As the intensity of exercise increases, the sympathetic nerve, which controls the muscles, stimulates the production of adrenaline at a faster rate. At the same time, the production of thyroid hormone and growth hormone also increases. Changes in these hormones trigger a series of adaptive adjustments that increase your basal metabolic rate and stimulate your body to continuously burn fat. This sustained fat consumption is the key to the apparent fat reduction effect of HIIT. In addition to the significant fat loss effect, HIIT has other advantages that should not be ignored. First, it increases sustained energy expenditure after exercise, which means your body continues to burn fat even after your workout is over. Second, HIIT improves your basal metabolic capacity, allowing your body to burn energy more efficiently even at rest. These advantages work together to make HIIT a highly effective and easy to stick with for fat loss.

To sum up, HIIT is gradually becoming a powerful weapon in the field of exercise fat loss due to its unique physiological mechanism and remarkable effect on fat loss. It can not only effectively reduce harmful fat tissue such as abdominal visceral fat but also achieve this goal in a relatively short period of time. For those modern people who pursue a healthy posture, HIIT is undoubtedly a choice worth trying to reduce fat.

### *The role of HIIT in relieving depression*

In China's college environment, the student group has a remarkable diversity. They come from all over the world,

carrying their unique family background, growing environment, and distinct personality. This diversity undoubtedly enriches campus life, but it also brings a series of complex psychological challenges. Students tend to feel great psychological pressure, especially when dealing with complicated interpersonal relationships, heavy academic pressure, and various uncertainties about their future employment. These factors have become the main reasons for the frequent occurrence of psychological problems among college students.

It is worth mentioning that obese students seem to be more vulnerable in these psychological problems. (Lu Rongrong, 2023)<sup>[22]</sup> They often feel low self-esteem because they are dissatisfied with their physical image, and this emotion is highly likely to further evolve into depression. This psychological state not only affects their academic performance but also is more likely to have a long-term negative impact on their future physical and mental health and development. It is in this context that the value of sports comes into play. Not only it is a form of exercise used to improve physical fitness but also, more importantly, it is also regarded as an effective psychological intervention. By participating in sports, students can not only improve their physical fitness but also get an effective adjustment on a psychological level. Especially in the fight against depression, the role of sports cannot be ignored. Scientific research has confirmed that moderate exercise can promote the synthesis and release of depression-related neurotransmitters, such as dopamine and endorphins, which are the body's "happy substances" and can significantly improve a person's mood. Exercise also promotes the expression and delivery of neurotrophic factors, which are essential for the growth and repair of neurons and thus help protect against depression. Among the many forms of exercise, continuous aerobic exercise is widely regarded as an effective way to relieve depression. This kind of exercise is characterized by a long duration and moderate intensity, which can gradually release the pressure of the human body in the exercise and feel the physical and mental stretch and relaxation. Moreover, its effect can be enhanced with the extension of the exercise time, providing students with a sustainable way to maintain mental health. However, the effects of anaerobic exercise were relatively limited. Wen Kuan *et al.*, 2022 clearly pointed out that because of its short duration and high exercise intensity, it is difficult to play an antidepressant role over a long period of time. Although anaerobic exercise has its unique advantages in enhancing muscle strength and explosive power, its effect on the maintenance of mental health is obviously not as significant as aerobic exercise. In recent years, a type of exercise called HIIT has gradually attracted<sup>[23,24]</sup> attention. This type of exercise combines the characteristics of aerobic and anaerobic exercise, through the alternating of high intensity and low intensity, which not only can burn a lot of calories in a short period of time but also improve the body's metabolic rate, and more importantly, it has been found to have a significant effect on improving depression.

Compared to traditional aerobic exercise, HIIT has shown faster and more significant results in alleviating depressive symptoms.



This is probably due to the strong stimulation of HIIT on the central nervous system, which can significantly affect the function of the hypothalamus, pituitary gland, and adrenal axis, thus effectively promoting the production and release of neurotransmitters and neuronutrients. These substances play an important role in improving mood and relieving stress. At the same time, HIIT alternates between high- and low-exercise intensity. At the same time, it can also reduce the oxygen load of the central organs, effectively relieve the fatigue brought by exercise, and then enhance the pleasure of exercise.

To sum up, sports play an important role in the maintenance of college students' mental health. Both continuous aerobic exercise and the emerging HIIT provide an effective way for students to adjust their mental health. Especially in the fight against depression, the role of these forms of exercise cannot be ignored. By taking an active part in sports, college students can not only improve their physical fitness but also get a comprehensive adjustment and development on the psychological level.

### **HIIT -- comprehensively improves students' physical and mental quality**

#### ***Challenges and improvement strategies of physical education in colleges and universities***

Although physical education in colleges and universities has always been a key link to promote the all-round growth of students, the effect and benefit of physical education are generally unsatisfactory due to the constraints of traditional teaching concepts and various practical conditions, coupled with the low enthusiasm of students for physical exercise and the decline of the overall physical function. This is an urgent problem to be solved because physical education not only is related to students' physical health but also affects their overall development. At present, there are some problems in the setting of physical education teaching goals in colleges and universities. At present, the main problem is that it focuses too much on the assessment of sports skills but ignores the practical problems such as the promotion of students' comprehensive sports ability, the improvement of physical and mental health, and the reduction of fat. In addition, physical education teaching also fails to fully consider the impact of physical education on students' future employment and career development. This kind of teaching goal setting is obviously unable to meet the modern society's demand for all-round development. In order to change this situation, we need to update the teaching concept first. Physical education in colleges and universities needs to integrate the idea of lifelong physical education, pay equal attention to the cultivation of physical quality and psychological quality, and constantly innovate the teaching mode to meet the needs of the new era. At the same time, it is also necessary to deeply reflect on the teaching content. At present, the content design of college physical education courses usually depends on the professional field of teachers, which leads to excessive emphasis on the learning of sports skills, but neglects the cultivation of students' physical literacy and sportsmanship. This approach

is obviously not comprehensive and cannot meet the needs of students' all-round development.

In addition, the participation of students is also an important factor affecting the effect of physical education teaching. Due to the resistance to traditional endurance sports and the limited time for classroom exercise, students' exercise results are often poor. This calls for more effective teaching methods to stimulate students' interest in learning and increase their participation. The curriculum is also a key factor affecting the quality of PE teaching. Nowadays, the college physical education curriculum is more and more inclined to entertainment, while the importance of fitness is ignored. Although such a shift can stimulate students' enthusiasm for physical education and improve their participation in class, it has also led to a significant decrease in the actual intensity and amount of exercise. This trend obviously contradicts the principle that "health comes first". Therefore, it is urgent to readjust the physical education curriculum, with the improvement of students' physical quality as the primary goal. By appropriately increasing the exercise load as well as designing and implementing targeted training programs, we are expected to fundamentally solve the problem of students' weak physique.

In order to achieve these improvements, we also need to improve the assessment system. While assessing students' mastery of sports skills, students' physical condition and will quality should also be taken as an important part of the assessment. This can not only evaluate the effect of students' sports learning more comprehensively but also further improve the degree of students' attention and promote their all-round development. Finally, it is necessary to popularize the basic knowledge of fitness and fat reduction through physical education courses to help students establish a healthy lifestyle. In addition, through the timely evaluation and reward mechanism, students can enhance the importance of physical education courses and further guide them to develop the concept and habit of lifelong physical education. This can not only improve students' physical fitness but also lay a solid foundation for their future development.

#### ***HIIT training: A new option to improve students' physical fitness efficiently***

HIIT has gained popularity worldwide in recent years. This type of exercise has been accepted and loved by more and more people for its efficient, fast, and diverse characteristics. Especially for college students, HIIT has shown excellent results in improving students' physical fitness, eliminating and preventing obesity, and alleviating depression. First of all, the training method of HIIT is very flexible, which can be personalized adjusted according to individual physical conditions and exercise needs. This variety of exercises enables each student to find a training mode that suits him or her. At the same time, HIIT also has the advantage of time economy. Due to the characteristics of HIIT, it can achieve good exercise results in a short time, which is undoubtedly a huge attraction for college students who are short of time after school. However, despite its many advantages, HIIT is not popular among college students at present. Many

students still have a relatively limited understanding of HIIT or even misunderstanding. Therefore, it is necessary for schools to conduct special training so that more students can understand and master this efficient way of exercise. In addition, schools can also carry out related physical education courses and incorporate HIIT into the teaching plan so that students can systematically learn the movement essentials and training methods of HIIT in the physical education class. It is worth mentioning that HIIT does not have high requirements for sports venues and environments. Many HIIT exercise programs can be conducted indoors, which undoubtedly provides more exercise options for college students in inclement weather conditions. In the physical education class, students can learn and master the essentials of HIIT movements, and they can also practice independently in their spare time. Through communication and mutual supervision, students can not only improve the exercise effect but also enhance the friendship and teamwork ability between classmates. HIIT sports are very rich; students can progress, according to their actual situation, from easy to difficult, with step-by-step training. With the gradual improvement of the difficulty of training, students will feel the joy and sense of achievement of constantly breaking through themselves. This positive psychological experience can not only exercise students' physical quality but also cultivate their will quality and teamwork spirit. On the other hand, the physical test of Chinese colleges and universities mainly focuses on the assessment of strength, endurance, and speed and other indicators. However, these indicators are often difficult to fully depict a person's overall athletic ability and physical and mental health, especially in the assessment of physical flexibility and stability, and other motor functions appear to be insufficient. Existing test programs have some limitations. Therefore, it is necessary to include HIIT in the physical testing process in order to assess students' physical and mental condition more fully. In this way, teachers can formulate and carry out different forms of HIIT training according to the individual differences of students. Personalized exercise programs help students improve their physical and mental health and enhance their comprehensive athletic ability. In this way, we not only can make the physical fitness test more scientific and comprehensive but also stimulate students' interest and enthusiasm in learning and lay a solid foundation for their all-round development.

### Implications for primary care physicians in utilizing HIIT to address obesity among college students

The application of HIIT to combat obesity among college students offers several significant implications for primary care physicians, aiding them in more effectively guiding and managing student health:

- (1) **Personalized Training Plans:** Primary care physicians should recognize that each student's physical condition, athletic ability, and health status are unique. Therefore, when devising HIIT training plans, it is crucial to fully consider individual differences and tailor personalized training programs. By assessing students' cardiopulmonary function, muscle strength, endurance levels, and mental health status, primary care physicians can customize the appropriate HIIT intensity

and frequency for each student, ensuring the safety and effectiveness of the training.

- (2) **Comprehensive Health Management:** Primary care physicians should view HIIT as part of a comprehensive health management plan, rather than a standalone exercise therapy. When developing HIIT training plans, attention should also be paid to students' diet, sleep, and mental health, with comprehensive health guidance and recommendations provided. Through comprehensive health management, primary care physicians can help students establish healthy lifestyles, fundamentally addressing obesity issues.
- (3) **Monitoring and Evaluation:** After students commence HIIT training, primary care physicians should regularly assess their physical condition to ensure the rationality and effectiveness of the training plan. By monitoring indicators such as weight, body fat percentage, and cardiopulmonary function, primary care physicians can promptly adjust the training plan to prevent overtraining or insufficient training. Additionally, physicians should pay attention to students' subjective feelings, such as fatigue levels and postexercise recovery, to ensure their physical and mental wellbeing.
- (4) **Education and Advocacy:** Primary care physicians should strengthen the promotion and education of HIIT-related knowledge, helping students understand the scientific principles and training methods of HIIT. Through lectures, distribution of promotional materials, and other means, primary care physicians can enhance students' health awareness and interest in exercise, encouraging their active participation in HIIT training. Simultaneously, physicians should popularize correct exercise concepts and methods to prevent students from blindly following trends or adopting unscientific weight-loss methods.
- (5) **Collaboration and Coordination:** Primary care physicians should maintain close cooperation with relevant departments such as the school's sports department and psychological counseling center, jointly safeguarding student health. Through resource sharing, information exchange, and other means, these departments can form a synergy to provide students with comprehensive health services. When formulating and implementing HIIT training plans, primary care physicians should also fully consider factors such as students' course schedules and rest times, ensuring the feasibility and sustainability of the training plans.

## Discussion

The seriousness of the obesity problem in colleges and universities cannot be ignored. It not only affects the appearance of students but also poses a threat to their physical and mental health. As a risk factor for many kinds of chronic diseases, the prevention and control of obesity has become one of the important tasks of physical education in colleges and universities. Although the traditional methods of losing weight such as dieting may be effective in the short term, the long-term effect is limited and there are health risks. Therefore, it is very important to

explore scientific and efficient ways to lose weight to improve the health of college students.

HIIT, as a new form of exercise, has shown significant advantages in promoting health through its unique training mode. Zhou Yueyuan, 2020 believes that HIIT can not only burn a lot of calories in a short period of time and improve the metabolic rate of the body by alternating high intensity and low intensity but also continuously consume fat after exercise to achieve the effect<sup>[25]</sup> of fat reduction. In addition, HIIT can also significantly improve the cardiopulmonary function, strengthen muscle strength, and improve the overall quality of the body. These advantages make HIIT an ideal choice for college physical education and daily exercise. However, despite its many advantages, the application of HIIT in college physical education still faces some challenges. First of all, students' understanding of HIIT is limited and even misunderstood. Therefore, schools need to popularize HIIT knowledge through special training, physical education courses, and other ways to improve students' awareness and participation. Second, HIIT has certain requirements for the physical quality and athletic ability of the trainers, and some students may be difficult to adapt. This requires teachers to give personalized guidance according to the actual situation of students in the implementation process to ensure the safety and effectiveness of training. In addition, physical education in colleges and universities needs further innovation and improvement in promoting students' physical and mental health. First of all, the teaching objectives should be more comprehensive and specific, focusing not only on the improvement of students' sports skills but also on the improvement of physical and mental health and the solution of practical problems such as fat reduction. Second, the teaching content should be more diversified and personalized to meet the needs and interests of different students. For example, more diverse HIIT training programs could be introduced to meet the exercise needs of different students. At the same time, the cultivation of students' sportsmanship should also be strengthened to improve students' teamwork ability and competitive level. In terms of curriculum setting, physical education in colleges and universities should pay more attention to fitness and effectiveness. Some targeted training programs can be added, such as fat reduction course and cardiopulmonary function improvement course, so as to meet students' needs for health. At the same time, the connection and integration between courses should be strengthened to form a complete curriculum system to provide strong support for students' all-round development. Finally, physical education in colleges and universities also needs to improve the assessment system to ensure the comprehensiveness and fairness of the evaluation. In addition to the assessment of sports skills, students' physical and mental health should also be included in the evaluation scope. At the same time, attention should also be paid to the combination of process evaluation and terminal evaluation, so as to reflect the effect and progress of students' sports learning more comprehensively.

To sum up, HIIT, as an efficient way of exercise, has a wide range of application prospects in college physical education. By

introducing HIIT training programs scientifically and reasonably, strengthening physical exercise and health education of students, it can effectively improve the health status of college students and promote their all-round development. At the same time, physical education in colleges and universities needs to be constantly innovated and improved to meet the needs and challenges of the new era.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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