

# The Prevention and Nursing Care of Common Injuries in Long-Distance Running of College Students

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## ABSTRACT

As a favorite sport of teachers and students, long-distance running can enhance physical fitness. However, due to nonstandard movements in sports, teachers and students get injured physically. Taking the prevention of long-distance running injuries of teachers and students in colleges and universities as the research goal, this article investigates the teachers and students of a physical education college in Shanxi Province by means of questionnaire survey, counts the functional indexes of teachers and students in long-distance running for one year and analyzes the injuries. The results show that the injury rate of teachers and students is 45.5%; Teachers and students with only one injury are the most, and knee injuries are the most common, with a mild injury rate of 60.98% and concentrated in November-December and June-July. The main reasons for the injuries of teachers and students are poor physical fitness, insufficient warm-up, and poor sports equipment. Through full warm-up exercise and adequate rest, common injuries in long-distance running can be effectively prevented.

## KEYWORDS

Health Care and Prevention, Long-Distance Running, Questionnaire Survey, Sports Injury

## INTRODUCTION

With the continuous improvement of people's living standards and health awareness, long-distance running is increasingly favored by teachers and students in colleges and universities. Long-distance running can not only enhance physical fitness and improve cardiopulmonary function but also help relieve the pressure of study and work and promote the healthy development of body and mind. However, there is a certain risk of injury in long-distance running, which may adversely affect the health and sports ability of athletes. Long-distance running is the most common joint injury. Long running times have a great impact on the knee, ankle, and hip joints, leading to joint cartilage wear, synovitis, arthritis, and other joint injuries. At the same time, long-time repeated exercise is also likely to lead to ligament and tendon damage, leading to muscle damage. Long-distance running may also cause cardiovascular problems. Long-term and high-intensity exercise increases the burden on the heart, which may lead to cardiovascular diseases such as arrhythmia, myocarditis, and myocardial infarction. Long-distance running is a beneficial physical and mental exercise for teachers and students

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in colleges and universities. Mastering the injury categories of long-distance running and taking appropriate preventive and health care measures is helpful to better enjoy the fun of long-distance running and maintain physical health and sports ability (Tonoli et al., 2010).

Some progress has been made in the research on common injuries and healthcare interventions of teachers and students in long-distance running in colleges and universities (Gallo et al., 2012). Some researchers have studied the types and incidence of injuries in long-distance running. Sports injuries mainly include muscle strain, ligament sprain, arthritis, and stress fracture. The occurrence of injuries is related to factors such as exercise intensity, training methods, and individual differences. Different preventive measures are put forward, and the risk of muscle strain can be reduced through proper warm-up and stretching activities; a reasonable training plan and running posture can also reduce the incidence of injuries.

Some researchers have studied the influence of psychological factors on injury prevention and healthcare intervention and concluded that stress and anxiety might increase the risk of sports injuries, while positive attitude and appropriate coping strategies can reduce the occurrence of injuries (Cupal, 1998). Some researchers proposed using new applied technology to prevent and intervene in the injuries of long-distance running between teachers and students in colleges and universities. By using a motion tracker and a biomechanical analysis system, we can help to monitor the posture and load of sports, provide personalized training suggestions, and improve teacher and student awareness and awareness of injury prevention of long-distance running through education and publicity activities, such as conducting health education courses, holding lectures and publishing publicity materials.

Some researchers have studied the rehabilitation and treatment of long-distance running injuries and found that the main injuries are knee joint injuries. Through a series of rehabilitation measures such as physical therapy and functional exercise, teachers and students can recover as soon as possible and reduce the risk of re-injury. At the same time, ultrasound therapy and electrotherapy can be used to improve the rehabilitation effect. Some researchers have studied the common injury parts of long-distance running and their prevention. Through literature review, it is concluded that the common injury parts of long-distance running include feet and stomping parts, calves, knees, thighs, and waist and back. Through reasonable exercise intensity and appropriate training methods, we can improve our own structural physiological weaknesses and overcome the interference of psychological obstacles, venues, weather, and other factors. Some researchers have studied the common injuries of athletes in the marathon and the measures to prevent them. The main causes of long-distance running injuries are muscle imbalance, muscle and ligament strain, and inflammation caused by long-term friction of muscles. Therefore, it is necessary to maintain a balanced development of strength, speed, and flexibility in marathons while making full preparations.

Some researchers have studied the common sports injuries in middle and long-distance running and their preventive measures. Through the methods of literature investigation, consultation and interview, questionnaire survey, and mathematical statistics, this paper presents a statistical analysis of the types, positions, and course of injuries of 50 medium- and long-distance running athletes in sports schools and puts forward preventive measures. The sports injuries of medium- and long-distance running athletes mainly involve strain, sprain, and overwork, involving injuries on the feet, knees, and calves (Leistra, 2022). The course of sports injuries can be divided into acute and chronic. Teachers should arrange teaching, training, and competitions reasonably, and impart some emergency handling skills for sports injuries.

Some researchers have studied the methods of prevention and treatment of sports injuries from medium-distance running. By analyzing the potential factors of sports injury, they concluded that the main way to prevent injury is to reasonably arrange the training intensity to prevent the local load of lower limbs from being too concentrated. At the same time, physical education colleges should strengthen students' physical exercise, and students should master standardized skills to reduce sports injuries caused by technical irregularities. Schools should establish reasonable sports venues and regularly organize inspections of the safety performance of venues and equipment, and instruct students

to master emergency treatment methods for acute soft tissue injury, improve muscle structure during training, increase the quality of muscles and ligaments, and improve the ability to avoid sports injury.

Long-distance running, as a favorite sports activity of teachers and students in colleges and universities, has caused injuries to various parts of teachers and students in the process of long-distance running due to nonstandard movement techniques and emotional instability. This paper aims at the prevention and healthcare intervention of common injuries in long-distance running between teachers and students in colleges and universities (Wang, 2023). By using questionnaire surveys, mathematical statistics, and experimental comparison, this paper investigates the sports injuries of teachers and students in the Physical Education Institute of an undergraduate college in Shanxi Province. By testing the physical exercise function indexes of teachers and students who have been running for one year, it analyzes the types, locations, occurrence stages, and the degrees and causes of injuries in long-distance running and formulates injury prevention and health care strategies to urge teachers and students to do their own physical protection during long-distance running, to prevent and health care the common injuries of teachers and students in colleges and universities.

## **RESEARCH OBJECTS AND METHODS**

### **Research Objects**

Long-distance running mainly includes 5,000 m, 10,000 m, and marathon events, which require a large number of muscle groups to participate in long-term work (Martínez-Fortuny et al., 2023). Long-distance running requires at least 10 minutes and belongs to endurance sports. In long-distance running, the aerobic oxidation system is the main energy supply for the body, and the red muscle content, the activity of aerobic metabolic enzymes, and mitochondria in muscle cells have an impact on the long-distance running ability (Brandon, 1995). The teachers and students of Physical Education College in an undergraduate college in Shanxi were taken as the research objects of this study. Long-distance running was studied, and the causes of common injuries and preventive measures were analyzed to provide scientific and effective healthcare interventions for teachers and students in colleges and universities, reduce the occurrence of sports injuries, and improve the safety and effectiveness of sports.

### **Research Method**

By questionnaire survey, obtaining samples through random sampling, 100 questionnaires were distributed, including 10 incomplete questionnaires and 90 valid questionnaires; so, the questionnaire efficiency was 90%. Teachers and students with effective questionnaires were contacted for follow-up communications. The questionnaire survey mainly collects the sports injury information of teachers and students in 2021 and makes statistics on the sports injuries of teachers and students. When teachers and students are injured, record their names, ages, genders, heights, weights, training years, injury types, locations, times and severity, and recovery period. During the recording process, the types of injuries are divided into acute and chronic injuries. The recovery period of injuries is the number of consecutive days of rest or inability to train normally, and the injuries during training are also recorded.

In order to eliminate external interference, all teachers and students were trained together except for the winter and summer vacations, and the training frequency was eight times per week, including three morning exercises and five afternoon training sessions. The training time was two hours per session, and the training included speed running, 2–3 medium-high intensity special training sessions, and aerobic training. During training, participants wore unified brand training shoes at the same training venue, diet, nutrition, and rest time. Except for reducing training volume, relaxing, running, and stopping training during the injury period, all other training hours were normal. SPSS software was used to perform a statistical analysis of the collected data, and the information of teachers and students and test indicators were counted by the average value.

## RESEARCH RESULTS

### Injury Statistics

Among the 90 teachers and students surveyed, 41 were injured and 49 were uninjured. The injured group was set as the injured group, while the uninjured group was set as the healthy group. Table 1 shows the basic information about the healthy group and the injured group of teachers and students, and Table 2 shows the statistics of the injured group. During the continuous training, the injury rate of teachers and students was 45.6%, including 20 male students (accounting for 50%), 15 female students (37.5%), 2 male teachers (40%), and 4 female students (80%). Figure 1 shows the injury rate

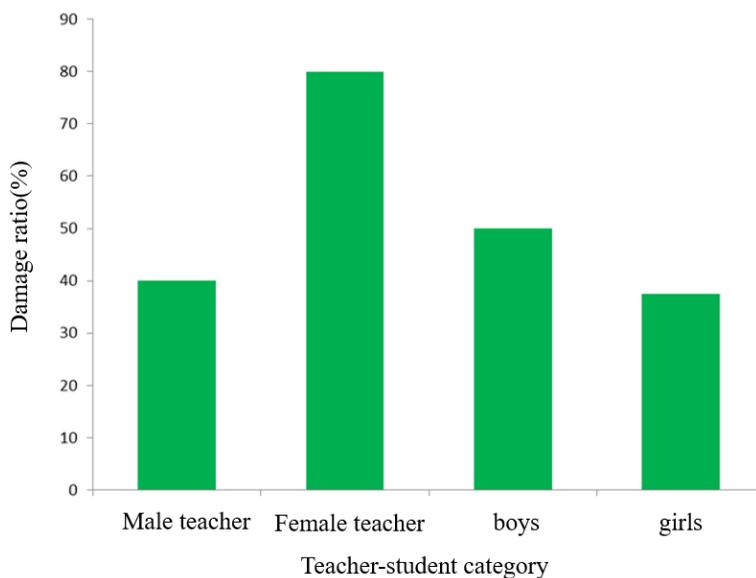
Table 1. Basic situation of health group and injury group of teachers and students

Personnel category	Number of people	Age (years)	Height (cm)	Weight (Kg)	Training (years)	Leg length (cm)
Health group	49	14.6	164	51	1.35	88.9
Injury group	41	14.4	159	47	1.31	88.1

Table 2. Statistics of injury group

Teacher-student category	Number of people injured	Percentage
Male teacher	2	40
Female teacher	4	80
Boys	20	50
Girls	15	37.5

Figure 1. Injury rate of different types of teachers and students



of different types of teachers and students. Female teachers had the highest injury rate, 80%, followed by male students and female students, and male teachers had the lowest injury rate. This was mainly due to male teachers' adherence to exercise, mastery of running skills, and good physical fitness.

According to the statistics of injuries in long-distance running between teachers and students, Table 3 and Figure 2 present the statistics of the number of injured parts in long-distance running between teachers and students. A total of 23 teachers and students had only one injury, 13 had two injuries, and 5 had three injuries. This shows after recovering from a sports injury, awareness of self-protection is strengthened to avoid future injuries.

The main part of long-distance running sports injury is lower-limb injury, especially knee joint injury, commonly seen as skeletal thigh joint pain in the front of the knee. According to the statistical data, it can be concluded that the common sports injuries in long-distance running mainly occur in knees, calves, hips, heel keys, and thigh muscles. Table 4 and Figure 3 show the statistics of sports injury positions of teachers and students. For long-distance running, the number of knee injuries was the largest, followed by calf, hip, heel, and thigh injuries. This is mainly because the knee joint is mainly engaged in flexion and extension, and the stress situation constantly changes during running. When the stress of the knee joint exceeds the bearing range of the joint, it will be injured, and long-term training will also lead to chronic injury of the knee joint (Kujala, 2003). The survey found that there are more injuries to the right limb of teachers and students than to the left, mainly because the right leg of most teachers and students is a load-bearing leg, and they are accustomed to using it

**Table 3. Statistics on the number of injured parts in long-distance running between teachers and students**

Number of injuries	Number of injured people	Percentage
1	23	56.10
2	13	31.71
3	5	12.20

**Figure 2. Statistics on the number of injured parts in long-distance running between teachers and students**

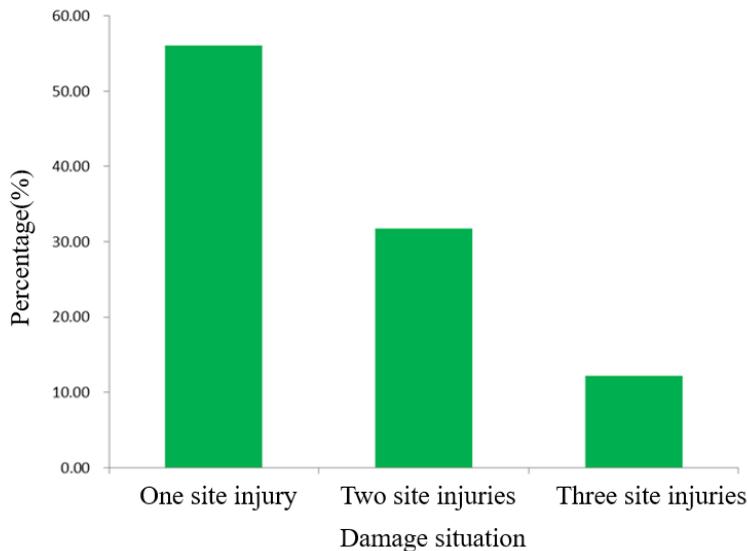
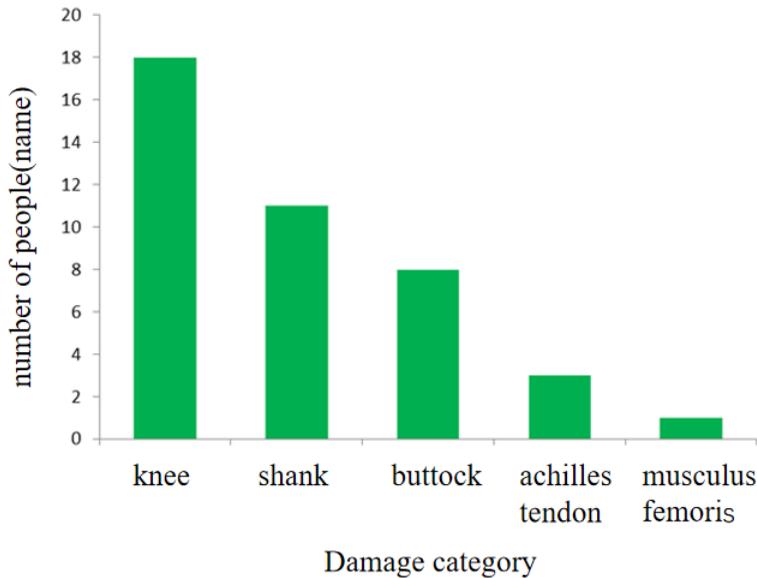


Table 4. Statistics of sports injury sites of teachers and students

Damage category	Knee	Shank	Buttock	Achilles tendon	Musculus femoris	Total
Number of people	18	11	8	3	1	41
Percentage	43.90	26.83	19.51	7.32	2.44	100

Figure 3. Statistics of sports injury sites of teachers and students



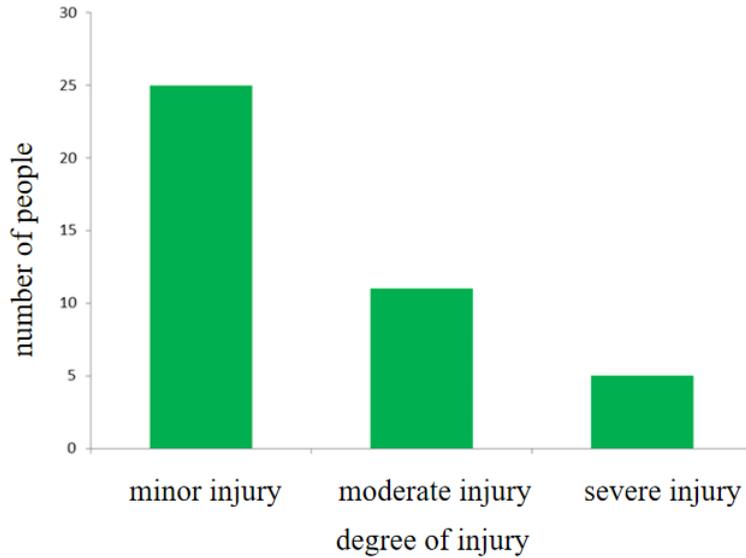
as a starting leg during exercise, bearing a heavier load than the left, which is more likely to cause damage in the long run.

Sports injuries can be divided into mild, moderate, and severe injuries, mainly based on how long it takes to be unable to participate in sports after the injury (Clarsen, 2013). Table 5 and Figure 4 show statistics on the degree of sports injuries of teachers and students. The number of teachers and students who suffered minor injuries (resuming training within 7 days after injury) was 25, accounting for about 60.98%. The number of teachers and students with moderate injuries (resuming training 8–22 days after injury) was 5, accounting for about 26.83%. The number of teachers and students who suffered severe injuries (resuming training more than 23 days after injury) was 11, accounting for about 12.2%. At the same time, it was also found that injuries to teachers and students were mainly concentrated in November–December (17 people) and June–July (18 people), with injuries occurring more sporadically in other months.

Table 5. Statistics on sports injury degree of teachers and students

Degree of injury (and days before resuming training)	Number of people	Percentage
Minor (7 days)	25	60.98
Moderate (8–22 days)	11	26.83
Severe (23 days)	5	12.20

Figure 4. Statistics on sports injury degree of teachers and students



There are many reasons for sports injuries. Through the statistics of long-distance running injuries of teachers and students, it is found that the main reasons for injuries are physical fitness, fatigue or overload, insufficient warm-up activities, poor external environment, and poor sports equipment. Table 6 and Figure 5 show statistics on the causes of sports injuries. The sports injuries of teachers and students in long-distance running were mainly related to physical fitness; most teachers and students were injured because of poor physical fitness, accounting for 46.34%, followed by fatigue or overload, accounting for 24.39%, followed by insufficient preparation activities, poor external environment, and their own sports equipment (He, 2021). This was mainly because the physical quality of teachers and students was poor, their sports strength and endurance were insufficient, and their muscle response, joint flexibility, and stability were poor.

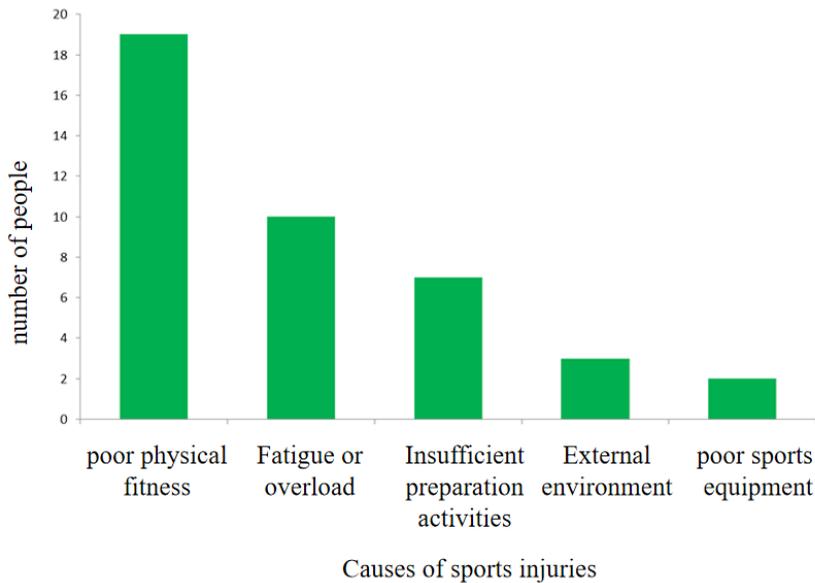
### Injury Prevention and Health Care in Long-Distance Running

The injuries of college teachers and students in long-distance running mainly include muscle strain, sprain, joint injury, fracture, lumbar muscle strain, and fatigue injury. These injuries are common in long-distance running between teachers and students in colleges and universities, which have a certain impact on physical and mental health. The main reasons for sports injury in long-distance running are poor physical quality, fatigue or overload, inadequate preparatory activities, poor external environment, and sports equipment.

Table 6. Statistics on the causes of sports injuries among teachers and students

Causes of sports injuries	Number of people	Percentage
Poor physical fitness	19	46.34
Fatigue or overload	10	24.39
Insufficient preparation activities	7	17.07
External environment	3	7.32
Poor sports equipment	2	4.88

Figure 5. Statistics on the causes of sports injuries among teachers and students



In order to ensure the health and safety of teachers and students in long-distance running, it is very important to prevent injuries. First of all, teachers and students should do enough warm-up exercises to increase muscle flexibility and blood circulation and reduce the risk of injury (Smith, 1994). Secondly, choose the right shoes to provide enough support and buffer to reduce the pressure on joints and muscles. At the same time, teachers and students should pay attention to correct posture and skills, reduce unnecessary pressure on joints and muscles, and avoid injuries. Excessive exercise may lead to fatigue and muscle strain. Pay attention to maintaining adequate rest and recovery to help teachers and students recover their physical strength and prevent injuries after exercise. Finally, teachers and students should pay close attention to their own situation. Once any discomfort or pain occurs, stop exercising in time and consult the doctor's advice. Therefore, by taking appropriate preventive measures, the common injuries of teachers and students in long-distance running in colleges and universities can be effectively prevented to ensure the health and safety of teachers and students.

When teachers and students are injured, corresponding health intervention measures should be taken. For the common muscle strain and sprain in long-distance running, strengthen the muscle strength training of teachers and students, improve the flexibility and endurance of muscles, and reduce the occurrence of injuries. For long-term sports training, attention should be paid to arranging rest and recovery time reasonably to avoid overtraining leading to physical fatigue and injury. Reasonable diet and nutrient intake are also important for ensuring the health of long-distance running teachers and students (Wang & Chen, 2022). Teachers and students should take enough nutrients such as protein, carbohydrates, and vitamins to meet the body's demand for energy and nutrition. Finally, regular physical examination and evaluation, as well as timely detection and treatment of potential health problems, are important to ensure the health of college teachers and students in long-distance running. Through the above health intervention measures, we can effectively prevent and reduce the common injuries in long-distance running, improve the training effect and competitive ability of teachers and students, and ensure their health and safety at the same time.

The prevention and health intervention measures of long-distance running between teachers and students in colleges and universities are very important for the health and safety of participants (Buxton & Hagan, 2012). Proper warm-up and stretching, choosing proper shoes and equipment, a reasonable training plan, balanced nutrition, adequate rest and sleep, and coping with stress and emotional management are all keys to staying healthy. By taking these measures, college teachers and students can fully enjoy the benefits of long-distance running and reduce the potential risk of injury.

## CONCLUSION

In long-distance running, due to the nonstandard movement skills, teachers and students are injured in various parts during long-distance running, especially for inexperienced or incorrect training participants. This study aimed to advance the prevention and healthcare intervention of common injuries in long-distance running between teachers and students in colleges and universities. By using questionnaire surveys, mathematical statistics, and experimental comparison, this paper investigates the sports injuries of teachers and students in the Physical Education Institute of an undergraduate college in Shanxi Province. By testing the physical exercise function indexes of teachers and students who have been running for one year, this paper statistically analyzes the types, locations, occurrence stages, degrees, and reasons for the injuries in long-distance running and formulates injury prevention and health care strategies according to the occurrence of sports injuries, so as to promote teachers and students to do their own physical protection during long-distance running. The main research results are as follows.

In this paper, the teachers and students at the Physical Education Institute of an undergraduate college in Shanxi Province were taken as the research objects, and the questionnaire survey method was used to collect information about teacher and student sports injuries in 2021, and the statistics of sports injuries of teachers and students were analyzed. SPSS software was used to make statistics and analysis of the collected data, and the information and test indicators of teachers and students were counted by using the average value. In the process of continuous training, the injury rate of teachers and students reached 45.5%, with male students having the highest sports injury rate, followed by male students and female students, and male teachers having the lowest injury rate.

According to the statistics of injuries in long-distance running between teachers and students, the number of teachers and students with injuries in only one area was the largest. Knee injuries were the most common, followed by calves and buttocks. The number of people with mild injuries (returning to training within 7 days after injury) reached 60.98%, and injuries were mainly concentrated in November–December and June–July. Most teachers and students were injured because of poor physical fitness, including fatigue or overload, insufficient warm-up activities, and a poor external environment and their own sports equipment. Teachers and students can effectively prevent the common injuries of long-distance running in colleges and universities by fully warming up, paying attention to correct posture and skills, paying attention to maintaining adequate rest and recovery, and paying close attention to their own situation. By strengthening the muscle strength training of teachers and students, the flexibility and endurance of muscles can be improved, so as to reduce the occurrence of injuries, reasonable diet and nutrient intake, regular physical examination and evaluation, effectively prevent and reduce common injuries in long-distance running, and improve the training effect and competitive ability of teachers and students. By taking these measures, university teachers and students can fully enjoy the benefits of long-distance running and reduce the potential risk of injury.

## **DATA AVAILABILITY**

The figures and tables used to support the findings of this study are included in the article.

## **CONFLICTS OF INTEREST**

The authors declare that they have no conflicts of interest.

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