

Analysis of Risk Control in College Sports Based on Big Data Technology

Zhao Wentao

*Sichuan Minzu College, Sichuan, Kangding, 626001, China
zhaojiang_007tom@163.com*

Abstract: *This document aims to conduct a risk control analysis of sports activities in higher education institutions based on big data technology. Firstly, it introduces data collection and analysis methods, including data sources and characteristics, data preprocessing methods, and data statistical analysis methods. Next, an analysis is made of the current situation of risk control in sports activities in higher education institutions, including the state of safety management and the analysis of accidents and their causes. Then, challenges and strategies for risk control in sports activities in higher education institutions are proposed, including establishing a comprehensive safety management system, providing professional coaches and supervisors, strengthening the maintenance of sports facilities and equipment, conducting safety knowledge education and training, and enhancing supervision and inspections. Finally, a conclusion is drawn. Through the research and analysis in this document, it can provide reference and inspiration for the risk control of sports activities in higher education institutions.*

Keywords: *Big data; College athletics; Athletic risk; Analysis*

1. Introduction

In recent years, with the rapid development and application of big data technology, its application in various fields has become increasingly extensive. College sports, as an important component of university education, plays a significant role in cultivating students' physical fitness and promoting their overall development. However, as the scale and diversity of college sports continue to expand, the associated risks have become increasingly prominent. The occurrence of sports accidents not only poses a threat to students' physical health and safety, but also imposes a significant burden and impact on schools and society. Therefore, how to effectively control the risks of college sports has become an urgent issue to be addressed. This study aims to utilize big data technology to explore the main sources and causes of risks in college sports through data collection, analysis, and examining the current status of risk control. Corresponding strategies and control methods will be proposed. Through in-depth analysis and exploration, this study seeks to provide scientific evidence and decision support for risk control in college sports, and offer effective guidance for the safety management and development of college sports.

2. Data Collection and Analysis Methods

2.1. Data sources and characteristics

Data collection serves as the foundation for conducting a comprehensive analysis of risk control in university sports. To acquire accurate and comprehensive data, this study will employ multiple channels for data collection. Firstly, statistical data from university sport departments and relevant institutions, including participation rates, match outcomes, and incidents, can be gathered. Secondly, students engaged in sports can provide their opinions and suggestions through surveys or interviews, allowing for an understanding of the risks and issues they encounter during their participation. Additionally, publicly available databases and literature can be explored to collect valuable information pertaining to risk in university sports. The diversity of data sources and the use of multiple channels will ensure a comprehensive and accurate data foundation, providing ample support for subsequent data analysis and risk control measures. Throughout the data collection process, it is crucial to consider the characteristics of the data. Data related to university sports may suffer from incompleteness,

inconsistencies, and subjectivity. Therefore, data cleansing and preprocessing are necessary to eliminate outliers, fill in missing values, and ensure data quality and reliability. Furthermore, appropriate statistical analysis methods, such as descriptive statistics, correlation analysis, and cluster analysis, should be employed to reveal relationships and patterns within the data. By conducting data collection and analysis, scientific evidence and decision support can be provided for the control of risk in university sports.

2.2. Data pre-processing methods

Data collection serves as the foundation for conducting an analysis of risk control in college sports. In order to obtain accurate and comprehensive data, this study will employ multiple channels for data collection. Firstly, statistical data from college sports departments and relevant organizations will be collected, including participation rates of sports teams, game results, and occurrences of accidents. Secondly, student opinions and suggestions regarding participation in sports can be gathered through surveys or interviews, aiming to understand the risks and issues they face in the process. Additionally, public databases and literature can be explored to gather valuable information from studies and cases related to risk in college sports. The diversity of data sources and multi-channel collection will provide a comprehensive and accurate data foundation, offering ample support for subsequent data analysis and risk control. During the data collection process, attention must be given to the characteristics of the data. Data pertaining to college sports may be incomplete, inconsistent, or subjective. Therefore, data cleaning and preprocessing steps are necessary to eliminate outliers, fill in missing values, and ensure data quality and reliability. Moreover, appropriate statistical analysis methods such as descriptive statistics, correlation analysis, and cluster analysis should be employed to reveal relationships and patterns within the data. Through data collection and analysis, a scientific basis and decision support can be provided for risk control in college sports [1].

2.3. Data statistical analysis methods

Statistical analysis is conducted on the basis of data preprocessing in order to reveal the relationships, patterns, and trends among the data. Various statistical analysis methods can be employed in the research of risk control in university sports. Firstly, commonly used descriptive statistics can assist researchers in summarizing and describing the data as a whole. For instance, calculating measures such as mean, variance, and standard deviation allows for an understanding of the data distribution and central tendencies. Secondly, correlation analysis is used to explore the degree of association between variables. By calculating correlation coefficients, it becomes possible to determine the strength and direction of the relationships among different variables. This helps researchers identify the factors that are related to the risks in university sports, thereby providing a basis for developing corresponding risk control measures. Additionally, cluster analysis, a commonly used unsupervised learning method, can divide data samples into mutually exclusive groups and identify underlying distribution structures. Through cluster analysis, risks in university sports can be classified, providing insight into the characteristics of different risk categories and supporting targeted risk management. Other methods such as regression analysis and time series analysis can also be employed for statistical analysis based on the specific research objectives and data characteristics. In conclusion, utilizing appropriate statistical analysis methods enables the extraction of valuable information from data, revealing patterns and trends in risks associated with university sports, and providing scientific evidence and decision support for risk control. During the implementation of statistical analysis, it is important to flexibly select suitable methods based on research questions and data characteristics to ensure the accuracy and interpretability of the analysis results.

3. Analysis of the Current Situation of Risk Control of Sports in Colleges and Universities

3.1. Current Situation of Sports Safety Management in Colleges and Universities

Currently, safety management of sports in universities has received some attention and improvement to a certain extent. However, there are still some underlying issues. Firstly, the awareness and importance of safety management for sports in universities have gradually increased. Schools and relevant organizations have established corresponding management structures and systems to regulate and manage sports activities. Secondly, universities have developed a series of safety regulations and management measures for different sports projects and sports teams, including coach and athlete

qualification requirements, maintenance and safety assurance of sports facilities, organization and scheduling of matches and training, etc. Nonetheless, there are still some issues in the safety management of sports in universities. Firstly, the systematic and scientific level of risk assessment and risk management need to be improved. In terms of risk assessment, there is a lack of detailed risk analysis and assessment, as well as effective predictability and control of possible risks. Secondly, emergency plans and accident handling mechanisms need to be further improved [2]. The handling of unexpected events and accidents lacks a sound and effective process and emergency plan, leading to limited ability to deal with accidents. In addition, there are certain problems in supervision and law enforcement in the safety management of sports in universities. The absence of effective supervision mechanisms and law enforcement leads to less timely and powerful detection and handling of violations and hidden safety risks, thereby giving rise to some potential safety risks, which cannot be effectively controlled. In the future, safety management for sports in universities needs to be further strengthened, emphasizing the following points: enhancing the scientific and systematic safety management, strengthening risk assessment and control; improving emergency plans and accident handling mechanisms to enhance the ability to respond to unexpected events; strengthening the supervision and law enforcement to ensure the effective implementation of safety regulations and systems. Through continuous efforts, the safety level of sports in universities can be improved, safeguarding the physical health and safety of students and faculty.

3.2. Analysis and Causes of Sports Accidents in Colleges and Universities

Accidents in high school sports occur frequently, resulting in both physical injuries and financial losses. These incidents not only impact students' physical well-being and academic lives but also tarnish the reputation and image of the school. An analysis reveals several main factors contributing to these sports-related accidents. Firstly, one of the primary culprits behind these incidents is the inadequate arrangement of sports training and competitions. Some schools or coaches, in their pursuit of athletic achievements, neglect the physical conditions and physiological characteristics of the athletes, leading to excessive training or improper scheduling, thereby increasing the risk of sports injuries. Secondly, the lack and insufficiency of safety facilities serve as another significant cause of these accidents in high school sports. Some schools or venues lack sufficient safety equipment, such as protective pads, arm guards, helmets, etc., and inadequate safety measures in hazardous areas, thus making it easier for athletes to sustain unintended injuries. Additionally, the athletes themselves contribute to these accidents. Some athletes engage in unreasonable dietary practices, insufficient rest, and wear inappropriate equipment during sports activities, all of which heighten the risk of sports-related injuries. In summary, the formation of accidents in high school sports involves complex and diverse factors. Schools should take measures to strengthen the supervision and management of athletic safety. In addition to improving safety facilities and scheduling of sports activities, attention should be paid to providing safety education to the athletes, establishing clear regulations and requirements, and avoiding neglecting athletes' life value and physical well-being due to an excessive emphasis on competition results [3].

4. Challenges and Countermeasures for Risk Control of Sports in Colleges and Universities

4.1. Establishing a perfect safety management system

Establishing a comprehensive safety management system is a crucial measure for risk control in sports activities at universities. In the face of challenges related to risk control, schools can adopt the following strategies to establish an effective safety management system. Firstly, a specialized safety management institution or department should be established at the school, responsible for the management of sports safety. This institution or department should be composed of professionals with extensive experience and knowledge in safety management, capable of formulating and implementing scientifically sound safety management systems. Secondly, the school should develop a series of safety management regulations and rules, clearly outlining the requirements and measures for sports safety management. This includes qualification requirements for coaches and athletes, safety standards for facilities and equipment, as well as arrangements and supervision for competitions and training. The establishment of these regulations should fully consider the school's actual situation and characteristics, ensuring the feasibility and effectiveness of the system. Additionally, the school should enhance safety awareness and training to increase the awareness and importance of sports safety among teachers and students. The school can organize safety training courses and activities to enhance the safety

consciousness and skills of teachers and students, thereby improving their awareness of sports risks and their ability to protect themselves. Furthermore, safety supervision and inspection are also crucial aspects of establishing a comprehensive safety management system. The school should conduct regular safety supervision and inspections to identify and resolve any safety hazards and issues, ensuring the effective implementation of the safety management system. Overall, the challenges of risk control in university sports activities are complex and diverse, and the establishment of a comprehensive safety management system is one of the important measures. By establishing specialized safety management institutions, formulating scientifically sound safety management systems, enhancing safety awareness and training, and conducting safety supervision and inspections, schools can better control sports risks, ensuring the physical health and safety of teachers and students.

4.2. Providing professional coaches and supervisors

Providing professional coaches and supervising personnel is one of the crucial measures to ensure safety in university sports. Professional coaches and supervisors possess knowledgeable expertise and experience, effectively guiding students in sports and promptly identifying and addressing potential safety risks. Firstly, schools should hire coaches with relevant professional backgrounds and qualifications, ensuring their solid professional knowledge and skills to scientifically and rationally develop training plans and guide students in sports training. Coaches should be familiar with students' physical conditions and characteristics, developing personalized training plans according to each student's actual situation, avoiding overtraining and sports injuries. Secondly, schools should establish a sound training and evaluation mechanism for coaches, regularly organizing training and assessments to improve their professional quality and safety awareness. Training content may include first aid knowledge and skills, sports injury prevention and treatment, risk assessment and control, etc., enhancing coaches' safety management capabilities. Additionally, schools should arrange special supervision personnel responsible for supervising and managing sports venues and activities. Supervisors should possess professional safety knowledge and background, promptly identifying and solving safety issues in venue facilities, maintaining students' safety. They can also supervise sports training and competitions, ensuring the implementation of regulations and safety requirements, promptly correcting improper behaviors and existing safety hazards. In conclusion, providing professional coaches and supervising personnel is a crucial measure to ensure safety in university sports [4]. By hiring coaches with professional backgrounds and qualifications, establishing sound training and evaluation mechanisms, and arranging special supervision personnel for safety management, schools can improve safety levels in sports, safeguarding students' physical health and safety.

4.3. Strengthening the maintenance of sports venues and equipment

Enhancing the maintenance of sports facilities and equipment constitutes a crucial aspect of risk management in higher education sports. The condition of these facilities and equipment directly impacts the safety and effectiveness of student sports activities, thus requiring measures to ensure their normal usage and upkeep. Firstly, the institution should conduct regular inspections and maintenance of sports venues and equipment, promptly repairing and replacing any problematic facilities and apparatus. Reasonable schedules for inspections and maintenance should be established, with clear guidelines on content and standards, allowing for the timely detection and elimination of any potential hazards. Moreover, the management of equipment should be reinforced, guaranteeing both the supply and safe use of these resources. Secondly, the school should intensify cleaning and disinfection efforts for the venues and equipment, ensuring cleanliness and hygiene to prevent cross-contamination. Regular cleaning and disinfection, along with the timely replacement of worn-out and aged equipment, are vital for ensuring the safety of equipment usage. Additionally, it is essential for the school to establish a robust mechanism for injury management, devising emergency protocols and contingency plans to facilitate prompt treatment and assistance in the event of injury. Simultaneously, the school should prioritize the education of students regarding sports safety, acquainting them with the proper usage methods and safety requirements of sports facilities and equipment while equipping them with preventive measures and injury management techniques. In conclusion, strengthening the maintenance of sports facilities and equipment is a critical link in risk management for physical activities in higher education institutions. Consequently, the school should establish a scientifically sound mechanism for inspections, cleaning, and maintenance, enhance equipment management, establish a comprehensive injury management system, and elevate students' awareness of safety and self-protection. These measures will ultimately ensure the safety of physical activities in higher education sports.

4.4. Conducting safety education and training

In order to ensure the safety of collegiate sports, conducting education and training on safety knowledge is of paramount importance. Firstly, students need to acquire a comprehensive understanding of relevant safety knowledge before engaging in athletic activities. This includes the proper utilization of safety equipment, implementation of first-aid measures, and prevention of common sports injuries. Secondly, schools should provide training for coaches and administrators to enhance their safety awareness and ability to respond to emergencies. Coaches and administrators should be familiar with sports safety protocols and emergency plans, and be capable of promptly taking appropriate measures. Lastly, schools should organize regular safety knowledge training sessions and drills to familiarize faculty, students, and staff with safety measures, thus enhancing their emergency response capabilities. By promoting safety knowledge and conducting training, awareness about safety matters can be spread, and the cognitive and responsive abilities of students and administrators towards safety issues can be effectively enhanced. Consequently, the risks and potential safety hazards associated with collegiate sports can be significantly reduced, providing a more reliable guarantee for sporting activities on campus [5].

5. Conclusion

Based on the analysis of sports risk control in higher education institutions using big data technology, it fully utilizes the technological advantages of the digital era. By collecting, analyzing, and mining data, it can comprehensively and accurately understand the risks and issues in sports in higher education institutions. Prompt measures and solutions can then be taken to control and manage risks. Big data technology can not only track students' physical indicators and sports data but also collect data on facilities, coaches, and equipment, allowing for a more comprehensive assessment of sports safety and risks. This not only helps schools develop precise safety management systems and preventive measures but also improves regulatory efficiency and safety levels, ensuring the well-being and safety of students. In conclusion, the application of big data technology provides new ideas and approaches for risk control and management in sports in higher education institutions, supporting the guarantee of sports safety. We believe that with the continuous advancement and application of big data technology, the healthy development and safety management of sports in higher education institutions will become more scientific, rational, and efficient.

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