

EXPLORING SAFETY HAZARDS AND COUNTERMEASURES FOR SELF-ORGANIZED CYCLING ACTIVITIES AMONG UNIVERSITY STUDENTS

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Abstract: This study explores the safety hazards and countermeasures associated with self-organized cycling activities among university students, with a focus on intercity cycling events involving students from Zhengzhou and Kaifeng. The research identifies safety concerns related to traffic, physical fitness, and equipment through a review of literature and theoretical analysis. It examines key risk factors from perspectives such as safety management, risk identification, and behavioral analysis. By integrating response strategies from universities, government authorities, and bike-sharing companies, the study proposes collaborative safety management recommendations. Findings indicate that significant safety risks exist in self-organized cycling activities, primarily due to the lack of standardized management. The study concludes that safety education by universities, improved infrastructure by the government, and optimized equipment maintenance by companies can effectively mitigate risks, ensuring the healthy development of outdoor campus activities.

Keywords: University student cycling; Self-organized cycling; Safety hazards; Risk management; Safety education

1 INTRODUCTION

In recent years, with the promotion of green travel concepts and the increased freedom of individual activities, cycling has gradually become an integral part of campus life for university students. Through cycling, students not only enhance their physical fitness and relieve stress but also expand their social circles and enjoy the excitement of exploring new experiences. Recently, intercity cycling activities between Zhengzhou and Kaifeng organized by university students have drawn significant public attention. These self-initiated activities, often carried out at night, vividly display the enthusiasm and vigor characteristic of the youth. Cycling, as a healthy lifestyle, symbolizes the students' pursuit of freedom and self-challenge.

However, while garnering attention, such self-organized long-distance cycling events have exposed notable safety hazards. First, the main routes often include public roads connecting cities. These roads are typically busy with nighttime traffic, and factors such as reduced visibility and cycling fatigue increase the risk of traffic accidents. Moreover, long-distance cycling requires substantial physical stamina and endurance. Studies have shown that stress conditions can affect physiological functions, such as variations in the performance of peripheral blood lymphocytes [1], providing theoretical support for understanding the potential health risks faced by students during prolonged cycling. Inexperienced cyclists may misjudge their physical limits, leading to overexertion or even injuries. For instance, irregular eating patterns during long-distance rides can cause gastrointestinal discomfort, a finding consistent with research emphasizing the role of physical constitution in gastrointestinal health [2].

Against the backdrop of widespread bike-sharing services, many students use shared bicycles for intercity rides. However, the quality and maintenance of these bicycles are often inadequate for long-distance requirements, increasing the likelihood of mechanical failures. Similar to the precision demanded in medical technologies like microwave ablation, the reliability of bicycle equipment forms the foundation of safe cycling [3].

This phenomenon highlights safety hazards inherent in university students' self-organized cycling activities and reflects deficiencies in related management and education. Many universities lack specific guidelines or safety protocols for cycling activities, leaving students without the necessary awareness or preparation [4]. Furthermore, local governments and bike-sharing companies fail to provide targeted support or safeguards for such activities [5].

Thus, balancing the encouragement of healthy student lifestyles with the regulation of outdoor activities has become a pressing issue in university safety management. This paper analyzes the safety hazards of self-organized cycling activities and explores potential countermeasures, aiming to provide scientific decision-making support for university administrators and practical references for promoting safe student cycling practices.

2 LITERATURE REVIEW

In recent years, cycling activities among university students have gained popularity, gradually becoming a campus cultural phenomenon. The underlying drivers include the promotion of healthy lifestyles, the growing appeal of low-carbon environmental awareness, and young people's desire for freedom and exploration. Scholar Cui Heling suggests that cycling is widely embraced by university students because it not only offers a low-cost mode of transportation but also provides physical exercise and mental relaxation [6]. Research indicates that students are primarily motivated to cycle for three reasons: first, to adopt a healthier lifestyle, as cycling effectively improves physical fitness and mental health within the relatively sedentary campus environment; second, to expand their social networks through group cycling, fostering connections and a sense of community among peers; and third, to satisfy their curiosity and

adventurous spirit by exploring unfamiliar territories. Scholar Hou Shuai also argues that outdoor activities such as cycling help students fulfill their sense of adventure and exploration, which positively impacts their personal growth and campus culture [7].

With the rise of social media, cycling has evolved from being a simple physical activity into a "check-in" culture. Social media plays a crucial role in promoting cycling activities, as students frequently share their cycling routes, scenic spots, and experiences online. This process of online sharing reinforces a sense of participation and accomplishment, attracting more students to join. Social platforms further contribute to the growth of cycling activities by enabling students to quickly form cross-campus or intercity cycling groups, injecting new social elements into the activity. However, this increased scale and changing organizational structure also present challenges for safety management.

Despite the benefits of cycling, such as health improvements and enhanced social interaction, the associated safety risks cannot be overlooked. Existing studies highlight three primary areas of concern: traffic safety, physical challenges, and the suitability of cycling equipment [8].

Regarding traffic safety, the primary cycling routes often involve public roads connecting cities. These roads can be complex and pose challenges, particularly at night when visibility is reduced. Studies suggest that nighttime cycling is riskier than daytime cycling, not only due to poor visibility but also because of factors such as fatigue and unfamiliarity with road conditions [9].

Long-distance cycling also imposes substantial physical demands. While university students typically have a good physical foundation, many lack experience in cycling, making it difficult for them to accurately assess their endurance levels. This often results in overexertion or emergencies. Scholars have noted that outdoor accidents caused by fatigue and inadequate emergency response are common during long-distance cycling, and such incidents are particularly difficult to manage in outdoor settings [10].

As for cycling equipment, research points to several critical issues. With the widespread use of bike-sharing services, many students opt for shared bikes for intercity travel. However, these bikes are generally designed and maintained for short-distance use, making them unsuitable for long-distance rides. Prolonged use often leads to issues such as brake failures and tire wear, further increasing safety risks. The absence of professional cycling equipment means that students are ill-equipped to handle such failures, leaving them vulnerable. Additionally, some studies highlight inconsistencies in maintenance frequency and service standards among bike-sharing companies. To reduce costs, some companies cut back on maintenance, resulting in substandard bicycles. Since students often lack a clear understanding of the equipment's condition, this exacerbates the risks [11].

Various recommendations have been proposed to address these safety risks. For instance, in cycling safety education, scholars advocate for systematic training programs in universities. These programs could include topics such as basic traffic rules, nighttime cycling safety tips, self-assessment of physical endurance, and emergency responses to equipment failures [12]. Such training would enhance students' safety awareness, enabling them to better identify risks and make informed decisions during cycling activities. Universities could also implement additional safety measures for outdoor activities, such as installing prominent signs on campus cycling routes or distributing safety manuals to improve students' risk prevention capabilities.

Local governments also play a vital role in improving the cycling environment for students. Studies suggest that governments can optimize cycling conditions by establishing dedicated bike lanes and improving nighttime lighting along cycling routes to mitigate safety hazards such as traffic congestion and poor visibility [13]. Additionally, transportation authorities can promote awareness of safe cycling practices, helping students better understand traffic rules when participating in intercity cycling activities.

Bike-sharing companies are also regarded as key contributors to improving student cycling safety. Research suggests that these companies should increase the frequency of equipment inspections and maintenance, especially in high-demand areas such as university campuses and commonly used cycling routes, to ensure the reliability of their bicycles [14]. Companies could also introduce specialized bikes designed for long-distance cycling and equip their bikes with basic safety features, such as reflective stickers and helmets. Furthermore, bike-sharing companies could collaborate with universities to offer cycling training courses or insurance services, further enhancing students' sense of security during cycling activities.

In summary, the literature indicates that the safety risks of self-organized cycling activities among university students are multifaceted, involving individual factors, external environments, and equipment quality. Against this backdrop, a collaborative safety management mechanism becomes essential. Joint efforts by universities, governments, and companies can significantly reduce the risks associated with self-organized cycling activities.

3 THEORETICAL ANALYSIS

To address the safety hazards present in self-organized cycling activities among university students, theoretical analysis can be conducted from three perspectives: safety management, risk identification, and cycling behavior. These perspectives offer insights into the potential risk factors and corresponding countermeasures.

3.1 From the Perspective of Safety Management

The safety issues associated with cycling activities are closely tied to the structural organization of the events and participants' safety awareness. Unlike organized campus activities, self-organized cycling events lack standardized

management and guidance. According to safety management theory, group activities without clear rules or a structured management framework often lead to incomplete risk awareness among participants, resulting in uncontrollable hazards during the event. For instance, during long-distance nighttime rides, university students may face a higher risk of traffic accidents if there is no organized guidance on route planning, equipment checks, or safety awareness. Therefore, for self-organized cycling activities, interventions such as pre-event education, risk warnings, and organizational safety measures are particularly critical.

3.2 From the Perspective of Risk Identification

The primary risks in self-organized cycling activities include traffic hazards, physical health risks, and equipment-related risks [15]. Risk identification theory emphasizes that identifying and analyzing potential risk factors are prerequisites for effectively mitigating accidents.

Studies have identified three major contributors to accidents in university students' cycling activities: traffic risks, physical health risks, and equipment risks. Traffic risks are heightened by factors such as nighttime cycling, long-distance routes, and unfamiliar terrains, where inadequate lighting and challenging road conditions can impair cyclists' vision and reaction times, significantly increasing the likelihood of accidents. Physical health risks stem from the substantial stamina required for long-distance cycling, which many students, despite their basic physical fitness, may not accurately assess due to a lack of experience, leading to overexertion and potential injuries. Additionally, equipment risks arise from the quality and reliability of cycling gear; inadequate inspection or maintenance of shared bicycles, particularly their brakes and tires, can result in equipment failures during rides, posing severe safety hazards.

3.3 From the Perspective of Behavioral Analysis

The cycling behaviors of university students exhibit distinct group characteristics and tendencies toward imitation. Behavioral theory suggests that individual actions are influenced by group pressure and social media. The rise of cycling activities among university students is largely driven by the "check-in culture" popularized on social media. This trend has created a "herd effect," encouraging more students to participate in activities despite their lack of cycling experience [16]. The widespread sharing of "iconic routes" and "cycling challenges" on social media has fueled the growth of large-scale cycling events, inadvertently amplifying safety risks.

Furthermore, university students, known for their openness to new experiences, often lack a strong sense of risk awareness. This leads to insufficient consideration of potential safety hazards when engaging in cycling activities. The combined influence of group behavior and individual risk negligence makes safety management in these activities particularly challenging.

The above theoretical perspectives reveal that the safety hazards in university students' self-organized cycling activities are the result of multiple interacting factors. Enhancing the safety of these activities requires collaborative efforts from universities, governments, and bike-sharing companies.

Universities, governments, and bike-sharing companies each play vital roles in ensuring the safety of cycling activities among university students. As primary organizers, universities should incorporate safety education into students' daily curricula to enhance their risk management and self-protection capabilities [17], such as by developing safety awareness programs within regular courses [18]. Governments should focus on improving cycling-related infrastructure and implementing targeted safety policies to provide a safer environment for student cyclists. Meanwhile, bike-sharing companies can contribute by optimizing equipment and increasing maintenance frequency to better accommodate the needs of intercity student cyclists.

4 CONCLUSION

An in-depth exploration and theoretical analysis of university students' self-organized cycling activities reveal that while such activities hold significant benefits in terms of health, social interaction, and exploration, their inherent safety hazards cannot be ignored. The enthusiasm and interest of university students in cycling activities, fueled by social media, have led to a rapid increase in participation. However, the spontaneous nature of these activities, coupled with a lack of systematic safety management, has resulted in overlapping risks related to traffic, physical fitness, and equipment. The safety challenges of self-organized cycling extend beyond individual control and lack effective mechanisms for risk warning and management.

4.1 Universities Should Take Responsibility for Safety Education

Universities should conduct regular safety education programs, organize training sessions, and promote awareness campaigns to help students acquire essential cycling skills, knowledge of traffic regulations, and emergency response techniques for equipment failures. Additionally, universities can establish guidelines for outdoor activities, providing advice and consultation services for self-organized cycling events, including recommendations on routes, equipment, and timing.

4.2 Local Governments and Traffic Authorities Should Enhance Infrastructure

Local governments can mitigate safety risks by constructing dedicated bike lanes near university campuses and improving lighting and signage along cycling routes, particularly those used at night. Furthermore, government agencies can collaborate with universities to install safety warnings and reflective markers in high-traffic areas to enhance safety during nighttime cycling. Policymakers could also introduce regulations specifically tailored to long-distance cycling activities, outlining safety requirements to guide and support such initiatives.

4.3 Bike-Sharing Companies Must Optimize Equipment and Services

As key stakeholders in supporting cycling activities, bike-sharing companies should prioritize equipment maintenance and inspection, especially in high-demand areas near universities. Increasing maintenance frequency ensures the safety and reliability of shared bicycles. Companies could also introduce specialized bikes designed for long-distance cycling and equip them with safety features such as helmets and reflective stickers to meet students' intercity cycling needs. Additionally, companies might consider offering cycling insurance to reduce the financial risks students face during these activities.

Addressing the safety issues of self-organized cycling among university students requires collaborative efforts. Universities should focus on fostering safety awareness among students, while governments and companies must provide the necessary infrastructure and equipment support. These measures can gradually reduce safety hazards and create a secure environment for students to engage in outdoor exploration and adopt healthy lifestyles. Future research could further evaluate the effectiveness of specific interventions and identify the most impactful strategies to improve the safety of university cycling activities.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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