

Exploring the Psychological Impact of Sports Injuries and Academic Pressure on High School Athletes in China: A Case Study

Honghan Li*

Shandong Experimental High School, 73 Jing Qi Road, Jinan, Shandong, China

**Corresponding Author.*

Abstract: This manuscript presents a case study on the mental health of high school athletes, focusing specifically on the psychological impact of sports-related injuries and academic pressures. The primary objective is to ascertain the extent of correlation between these two factors and the mental well-being of this demographic. Employing a rigorous methodology that combines both quantitative and qualitative approaches, the study meticulously gathers data via a series of surveys, structured interviews, and psychometric assessments. The comprehensive data analysis undertaken in this research is designed to elucidate how these factors jointly influence the psychological states of high school athletes. This exploration is pivotal in enhancing our understanding of the unique mental health challenges faced by this group. Furthermore, the insights garnered are intended to inform the development of targeted mental health interventions and support strategies for high school athletes. Moreover, this study aims to draw increased scholarly attention to the distinct needs of high school athletes, a group often overlooked in mental health evaluation in China. The findings are expected to significantly advance our understanding of adolescent mental health, particularly within the context of sports and education. The implications of this research are far-reaching, promising to contribute substantially to both academic discourse and practical applications in the realms of physical education and mental health.

Keywords: High School Athletes, Psychology of Sports; Injuries; Academic Pressures; Mental Health Interventions.

1. Introduction

In the realm of sports science, a growing body of literature underscores the myriad psychological stressors confronting high school athletes. Keys among these are sports injuries and academic pressures, both of which are intrinsically linked to the mental health outcomes within this population. The present article aims to delineate the impact of these stressors on the psychological well-being of high school athletes, a group at a pivotal developmental juncture.

Sports injuries, a ubiquitous concern across athletic disciplines, have been consistently linked to adverse psychological effects. Empirical studies, such as those conducted by Xu et al. [1], have illuminated how sports injuries can catalyze feelings of tension and fear among athletes, potentially precipitating a decline in mental health. Haugen et al. [2] further expounded on this by demonstrating a correlation between sports injuries and the onset of psychological issues, including PTSD-like symptoms. Guo et al. [3] reinforced these findings, highlighting a notable correlation between exigent circumstances in sports and psychological fatigue, which may, in turn, exacerbate the likelihood of injuries or competitive failures. Gorczynski et al. [4] provided a comparative analysis, revealing that athletes experience a more pronounced psychological impact from injuries and illnesses than their non-athlete counterparts. Brand et al. [5] explored the relationship between the intensity of athletic competition and its consequent psychological impacts. Gouttebauge et al. [6] discovered that a positive correlation is found between the count of severe musculoskeletal injuries sustained in a football career and increased levels of distress, anxiety, and sleep disturbances. Additionally, the frequency of surgeries undergone by players shows a link to negative alcohol-related behaviors and smoking habits.

The adolescence period is also characterized by significant academic pressures, which compound the challenges faced by young athletes. Academic stress, uncertainties surrounding academic achievement, the pressure of college admission, and the pervasive nature of social comparison are all factors that exacerbate the psychological burden on these individuals. As revealed by Li et al. [7], academic pressure has emerged as a critical determinant of mental health issues such as anxiety and depression in youth. This pressure is particularly pronounced among high school athletes, who often view sports as a conduit to future career opportunities, thereby influencing their identity formation and developmental trajectory. Liu et al. [8] suggested that the unique personal characteristics of athletes, coupled with their elevated expectations, render them susceptible to considerable psychological stress in response to routine setbacks. Castaldelli-Maia et al. [9] suggested that the influence of the environment and subtle pressures exerted by coaches and peers can significantly impact athletes, particularly those at the elite level.

This study delves into the significant impact of sports injuries and academic pressure on the mental health of high school athletes. It is an inquiry that goes beyond the surface to understand the longitudinal psychological effects of these stressors. Such in-depth exploration is essential for the development of effective psychological interventions and support strategies, aimed at bolstering mental resilience and adaptability in high school athletes. This contribution is vital for enhancing our understanding of mental health and performance optimization within the realm of athletics. In our case study, we focus specifically on high school athletes in China, who rely heavily on their athletic achievements for university admissions, while concurrently navigating the challenges posed by sports injuries and competition pressure. By examining these athletes' experiences and responses to these stressors, this study aims to provide a substantial foundation for future psychological support and intervention strategies. This comprehensive approach is intended to address the unique psychological needs and challenges faced by these young athletes, paving the way for their improved mental well-being and success both in and out of the sports arena.

2. Method

2.1 Participant Selection

In this study, we used face-to-face or online interviews to collect sample data. By engaging in direct conversation with the participants, rather than through textual communication, we aimed to ensure greater accuracy of the data and the ability to extend discussions based on varying circumstances [10]. For the interviews, we selected nine high school athletes who primarily relied on their sports performance for college admission. These participants specialized in various sports, mainly track and field and soccer, and had experienced different types and degrees of injuries at various stages. This selection was intended to encompass a diverse range of backgrounds and types of sports among the high school athletes. During the interview process, we employed both quantitative and qualitative questions to inquire about the participants' experiences, thereby gathering varied data. This was then combined with statistical methods for a comprehensive analysis, allowing us to gain a more holistic understanding of the individual experiences of adolescent athletes.

2.2 Interview Design

We employed a semi-structured interview approach, developing seven essential questions that primarily covered aspects such as sports injuries, competition stress, academic pressure, and family-related psychological states [11]. Additionally, for each core question, we designed specific follow-up queries to accommodate different scenarios that might arise during the interviews, allowing us to tailor our questions to the specific context. Through this series of questions, we aimed to gain an in-depth understanding of the psychological states of the athletes and the pressures they face due to injuries within the context of competitive sports and the college admission system of China.

2.3 Statistical Analysis

For quantitative analysis, we employed various statistical techniques to analyze the responses of the participants holistically [12]. Descriptive statistical analysis was used to present overall trends in the psychological impact of sports injuries and competition stress. Additionally, where the quantitative data meet the required criteria, statistical methods such as linear

regression and hypothesis testing were used to explore the relationships between different factors, including the correlation between sports injuries and psychological stress, as well as the relationship between academic performance and psychological state.

2.3.1 Hypothesis Testing

Hypothesis testing [13], also known as statistical hypothesis testing, is a method of statistical inference used to determine whether differences between samples, or between samples and populations, are due to sampling error or fundamental differences. Significance testing is the most common form of hypothesis testing and a fundamental statistical inference method. The fundamental principle of hypothesis testing involves formulating a specific hypothesis about the characteristics of a population. This hypothesis is then examined through statistical analysis applied to a sample drawn from the population. Based on this analysis, a determination is made as to whether the initial hypothesis should be rejected or accepted. This process employs various statistical techniques, with the most common methods being Z-tests, t-tests, chi-square tests, and F-tests. These methods provide a structured approach to infer about the population from the sample data.

2.3.2 Linear Regression

The linear regression model is a widely used statistical model, mainly for determining whether there is a quantitative relationship between two or more variables, represented through a linear combination [14]. For the simple linear regression used in this study, the basic model can be expressed as $y = \beta_0 + \beta_1x + \epsilon$, where y is a non-random variable, X is a random variable, β_0 and β_1 are two unknown constants representing the intercept and slope in the linear model, and ϵ is the error term.

2.3.3 Chi-Square Test

The chi-square test measures the degree of deviation between actual observed values and theoretical expected values in a sample [15]. The size of the chi-square value determines the degree of deviation. The larger the chi-square value, the greater the deviation; conversely, the smaller the deviation. When the observed and expected values are exactly the same, the chi-square value is zero, indicating that the theoretical values are perfectly consistent.

2.4 Qualitative Analysis

In terms of qualitative analysis, our primary

method of data collection was through interviews. We conducted inductive and thematic analyses based on the content of the interviews, aiming to uncover commonalities and individual differences among participants regarding sports injuries and competition stress, their specific behavioral manifestations, and the direct relationship with academic pressure. This approach will enrich our understanding of the mechanisms and factors influencing psychological impacts.

2.5 Ethical Considerations

Throughout the interview process, we strictly followed the APA's guidelines for debriefing as outlined in their "Ethical Principles of Psychologists and Code of Conduct," published in 2017 by the American Psychological Association, Washington, DC. We ensured that the privacy of the participants was fully protected, and all information was kept confidential and used solely for research purposes. Principles of confidentiality in recording were strictly adhered to, and recordings were used only for research; participants had the option not to answer difficult questions and were allowed to withdraw from the interview if they felt uncomfortable. Recording commenced only after confirming the interviewee's consent and understanding, thus beginning the interview process.

Through the aforementioned methods, we aim to comprehensively and deeply understand the psychological states of high school athletes in China who rely on sports for university admission when facing sports injuries and competition pressure. This will provide a substantial basis for future psychological interventions and support.

3. Results

3.1 Quantitative Analysis

In this study, we collected three types of quantitative data from the participants: the time (in days) from injury to the next closest competition, the psychological state rating during the injury process (with 10 being the best and 0 the worst), and the importance of that competition to their sports career (with 1 being not important at all and 3 being crucial). Subsequently, we divided the data into two groups: one comparing the time from injury to the next closest competition to the next

competition with the psychological state rating, and the other comparing the importance of the competition with the psychological state rating. For each group, we conducted hypothesis testing (assuming a positive correlation within the group data) and used basic linear regression for analysis. We then applied the chi-square test to calculate the deviation between the mathematical expectation and the observed data, comparing the obtained p-value with the critical value to determine if the null hypothesis (H0) holds. In the second group, to negate the impact of the time to the next competition on the psychological state rating, we used the difference between the time to the next competition and its importance of the competition, replacing the original importance data.

In the first group, analyzing the time to the next competition against psychological state ratings, the linear regression yielded an equation approximated as $0.8415 + 0.0735x$ (Table 1).

Table 1. The Relationship Between Time to the Next Competition and Psychological State of Athletes.

Participant	Score	Days to the next competition	Theoretical expected values	Chi-square
M1	0	1	0.8415	0.8415
M2	8	60	5.2515	1.4384
M3	3	60	5.2515	0.9653
M4	4	30	3.0465	0.2984
M5	0	10	1.5765	1.5765
M6	7	60	5.2515	0.5822
M7	6	60	5.2515	0.1067
M8	4	40	3.7815	0.0126
M9	8	120	9.6615	0.2857

The chi-square test culminated in a p-value of 6.1073, which is notably below the threshold critical value of 15.51 at a 0.05 significance level. This result validates the null hypothesis, substantiating a direct correlation between the duration since injury and the athletes' psychological self-assessment.

For the second group, which focused on the importance of the next competition on psychological ratings, the linear regression model derived was approximately $1.2907 + 0.1214x$ (Table 2). The chi-square analysis produced a p-value of around 5.1045, again falling below the critical value of 15.51 at the 0.05 level. Consequently, this confirms the

validity of the null hypothesis for this group as well.

Table 2. The Relationship Between the Importance of the Next Competition and Psychological State of Athletes.

Participants	Score	Days to the next competition	Significance of the next competition	Ratio	Theoretical expected values	Chi-square
M1	0	1	2	0.5	1.3514	1.3514
M2	8	60	0	60	8.5747	0.0385
M3	3	30	3	10	2.5407	0.083
M4	4	30	2	15	3.1117	0.2536
M5	0	10	2	5	1.8902	1.8902
M6	7	60	1	60	8.5747	0.2892
M7	6	60	2	30	4.9327	0.2309
M8	4	40	3	13.333	2.9093	0.4089
M9	8	120	3	40	6.1467	0.5588

These analytical endeavors provide a nuanced understanding of how both the timing of injuries relative to the next competitive events and the athletes' perception of these events' importance are intricately linked to their psychological well-being. The results from this quantitative analysis offer pivotal insights into the complex dynamics influencing the mental health of high school athletes, particularly in the context of sports-related injuries and competitive pressures.

3.2 Qualitative Analysis

In the process of analyzing the interview data, we found that over 60% of the participants mentioned experiencing symptoms of insomnia when asked about the pressures of upcoming competitions and academic advancement following an injury. This condition significantly affected their daily study habits and life attitudes. Moreover, the more severe the injury and the closer the critical competition, the more apparent were symptoms like insomnia and demotivation, demonstrating that academic pressure plays a decisive role in the psychological state of high school athletes. Almost all participants

mentioned experiencing Post-traumatic stress disorder (PTSD)-like symptoms, leading to a lack of full effort in training, self-doubt, and even withdrawing from training. This, in turn, led to a decline in athletic performance and further self-doubt, greatly impacting their self-planning and sports careers, and in some cases, even leading to an early end to their athletic pursuits.

Additionally, the study found that the emotional support from parents, coaches, and teammates significantly influenced injured athletes, aiding in their timely psychological recovery and faster return to competition. Conversely, negative examples were also evident. For instance, participant M5 mentioned in the interview that his parents did not support his sports training and encouraged him to give up his dreams after he was injured. His coach also lost confidence in him, leading to less attention, which resulted in severe self-doubt and a two-month period of demotivation (compared to approximately two weeks for others who received positive psychological support). This ultimately led him to abandon his sports career, highlighting how external attitudes and support are instrumental in the psychological rebuilding of athletes

4. Discussion

In this study, we have delved deeply into the impact of academic pressure and sports injuries on the psychology of high school athletes. By examining factors such as the timing of injuries relative to competitions, the importance of the competition, and the roles of parents, coaches, and teammates, we have further revealed the extent to which these factors affect the mental health of adolescent athletes.

Firstly, we discovered that academic pressure significantly affects the psychology of these high school athletes, as evidenced by the impact of the importance of competitions on athletes' mental states. As college admission approaches, athletes may face pressures from academics, examinations, and future planning, which could negatively impact their training and competition performance. This finding indicates that in training high school athletes, attention should be paid to the academic pressures they face to maintain their psychological health, where coaches can play a guiding and suggestive role. Secondly, the time between injury and the next competition was found to affect the psychological state of high school athletes. As

competitions approach, athletes may experience increased competitive pressure, leading to heightened anxiety and tension. Therefore, a scientific and reasonable competition schedule is crucial for maintaining the psychological balance of athletes and can help improve their performance in competitions. Additionally, the study showed that the attitudes and support of parents, coaches, and teammates play a significant regulatory role in the psychology of high school athletes. Support from family and teams can provide emotional backing, reducing the burden faced by athletes during challenging times. The care and guidance from coaches help build confidence and self-esteem in athletes, while teamwork can alleviate the sense of isolation an athlete may feel when facing challenges alone.

While our study has shed light on the effects of academic pressure and sports injuries on the mental states of high school athletes, it's important to acknowledge its limitations. The use of a small and possibly non-representative sample size, the subjective nature of qualitative data gathered from interviews, and the cross-sectional approach of the study, which does not track changes over time, all impact the breadth and depth of our findings. Recognizing these limitations is vital as it points towards areas for improvement and refinement in future research, ensuring a more comprehensive understanding of how these stressors impact high school athletes.

5. Conclusion

In summary, factors such as academic pressure, competition dates, and the support of parents, coaches, and teammates all have a significant impact on the psychology of high school athletes. To better promote the mental health of these athletes, it is recommended that these factors be comprehensively considered in their training, and a scientific training plan with all-round support be developed. This will help them better cope with various pressures and maintain a healthy psychological state, which is not only beneficial for their sports performance but also for their overall development and well-being.

References

- [1] Xu Y, Zhou L. (2008) Psychological quality and injuries of athletes. *Zhejiang Sport Science*, 30(5): 121-123.
- [2] Haugen, E. (2022) Athlete mental health &

- psychological impact of sport injury. *Operative Techniques in Sports Medicine*, 30(1), 150898.
- [3] Guo Y. (2015) Relationship between sport motivation and sport mental fatigue of athletes: Mediation function of time management. *Journal of Shenyang Sport University*, 34(5): 43-47.
- [4] Gorczynski P, Coyle M, Gibson K. (2017) Depressive symptoms in high-performance athletes and non-athletes: A comparative meta-analysis. *Br J Sports Med*, 51:1348-1354.
- [5] Brand R, Wolff W, Hoyer J. (2013) Psychological symptoms and chronic mood in representative samples of elite student-athletes, deselected student-athletes and comparison students. *School Ment Health*, 5:166-174.
- [6] Gouttebarga V, Aoki H, Ekstrand J, Verhagen EA, Kerkhoffs GM. (2016) Are severe musculoskeletal injuries associated with symptoms of common mental disorders among male European professional footballers? *Knee Surg Sports Traumatol Arthrosc*, 24(12): 3934-3942.
- [7] Li D. (2023) University students' mental health survey results released! Academic advancement identified as the greatest risk factor. *China Youth Daily*, https://zqb.cyol.com/html/2023-03/27/nw.D110000zgqnb_20230327_2-04.htm.
- [8] Liu D. (1994) Psychological regulation of students' anxiety states in physical education additional tests for academic advancement. *Journal of Nanjing Sports Institute*, 03.
- [9] Castaldelli-Maia JM, Gallinaro Jgme, Falcão RS, Gouttebarga V, Hitchcock ME, et al. (2019) Mental health symptoms and disorders in elite athletes: a systematic review on cultural influencers and barriers to athletes seeking treatment. *Br J Sports Med*, 53(11):707-721.
- [10] Martínez-Mesa J, González-Chica D A, Duquia R P, Bonamigo R R, Bastos J L. (2016) Sampling: how to select participants in my research study? *An Bras Dermatol*, 91(3):326-30.
- [11] Taherdoost, H. (2022). How to conduct an effective interview; a guide to interview design in research study. *International Journal of Academic Research in Management*, 11(1), 39-51.
- [12] James G, Witten D, Hastie T, Tibshirani R. (2013) *An introduction to statistical learning: with applications in R*, Springer Texts in Statistics, New York, Springer, 1st ed.
- [13] Walker J. (2019) Hypothesis tests. *Bja Educ*, 19(7):227-231.
- [14] Altman, N., Krzywinski, M. (2015) Simple linear regression. *Nat Methods* 12, 999–1000.
- [15] Pearson, K. (1900). X. On the criterion that a given system of deviations from the probable in the case of a correlated system of variables is such that it can be reasonably supposed to have arisen from random sampling. *The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science*, 50(302), 157–175.