



Research Article

Identification of characteristics and incidence of injuries in Pencak Silat athletes in the adult competition category in East Java

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Background: Pencak silat, as a competitive sport, has a high risk of injury. However, data on its characteristics and causative factors during pre-match and matches in East Java are still limited. Objective: This study aims to identify the characteristics and incidence of injuries in adult sparring category pencak silat athletes in East Java during training and matches. Methods: Using a quantitative descriptive method with a cross-sectional survey approach. Data were collected through a survey distributed to 100 athletes (61 men and 31 women) aged 17-22 years from 11 cities/districts in East Java, including information on injury characteristics and causal factors. Result: The results showed that the most dominant injuries that occurred during pre-match were blisters on the fingers (32%), bruises on the arms (38%), sprains on the lower legs (26%), and sprains on the ankles (33%), the leading causes were technical errors, lack of warm-up, and lack of facilities and infrastructure. During matches, the most common injuries were lower limb bruises (48%), ankle sprains (29%), and head/face abrasions (12%), which were caused by punching power, technical errors, and takedowns. While serious injuries such as dislocations and fractures had a low percentage, they had a significant impact on the athletes' performance. Conclusion: Overall, the findings suggest that the lower extremities are more susceptible to injury. The types of injuries varied, ranging from minor to severe. Initial treatment for minor injuries typically involves the RICE (Rest, Ice, Compression, Elevation) method, whereas severe injuries require further medical attention to prevent serious complications.

ARTICLE HISTORY

Received February 02, 2025

Accepted July 29, 2025

Published October 01, 2025

KEYWORDS

Injury characteristics; injury incidents; lower limb injury; Pencak Silat.

Introduction

Pencak silat in East Java has become part of the culture and identity of a nation, which is rich in martial arts. According to [Muhyi & Purbojati \(2015\)](#) Pencak Silat has been an important element of Indonesian culture since ancient times and continues to evolve today. Pencak Silat is not only a traditional martial art, but an important part of competitive sports, which are governed by competition rules ([Sukendro & Ihsan, 2018](#)). The rules of pencak silat have undergone changes and advancements that require evaluation and adjustment, the rules in 2012 were modified in 2016, and further refined in 2022, indicating the need for in-depth study to maintain consistency and integrity in the sport. Pencak silat as a body contact sport includes physical strength and mental agility. This competitive aspect requires athletes to strive for victory, often at the expense of personal safety. Because of this, an in-depth understanding of injury risk identification in Pencak silat is essential to identify and develop effective prevention strategies.

The study of sports injuries in martial arts has become an important global research focus, as studies have shown that martial arts athletes are frequently injured. This is in line with research [Park et al. \(2021\)](#) showed that injury patterns in the martial arts sports of boxing and taekwondo are relatively high, with the percentage of injuries in sports reaching 59.4% and 72.7%, respectively. Research

conducted by [Lystad \(2015\)](#) shows that the martial arts branches of boxing, kickboxing, karate, and taekwondo provide significant reinforcement of the incidence of injuries in martial arts athletes. However, it is interesting to note that there are variations in injury incidence rates between these sports, which are likely influenced by differences in competition rules.

Pencak silat as an achievement sport is inseparable from the risk of injury experienced by athletes during training and competition. Previous studies have highlighted the importance of research into injuries in pencak silat to understand their characteristics and causal factors. Other research, such as that conducted by [Yudi \(2015\)](#) shows that pencak silat has a unique pattern of injuries influenced by the rules and techniques unique to the game. As a martial arts sport that involves direct physical contact, pencak silat can risk causing various types of injuries, ranging from minor to serious injuries ([Nawawi, 2018](#)). Several previous studies have investigated injuries among pencak silat athletes, particularly in relation to changes in competition regulations. A study by [Suryaningrum & Shapie \(2025\)](#) compared injury patterns before and after the 2017 PERSILAT regulation changes, showing a decrease in bruising injuries but an increase in dislocation injuries. Meanwhile, [Afis \(2026\)](#) analyzed injuries during the implementation of the new 2023 regulations. They found that sprains and contusions still dominated, especially in the lower extremities, with the main contributing factors being insufficient warm-up and physical contact. Although both studies make important contributions to understanding the impact of regulatory changes on injury risk, research that explicitly integrates athlete characteristics, injury patterns, and differences in the phases of injury occurrence between pre-match and match in the adult competition category is still very limited, especially at the provincial level, such as East Java. Therefore, this study aims to fill this gap by presenting a more detailed analysis of athlete characteristics and injury incidence based on activity stages, thereby providing a foundation for developing more contextual and applicable injury prevention strategies.

However, research that specifically highlights the incidence of injury in adult sparring category pencak silat athletes for the new rules, especially in East Java is still very limited, so a more in-depth approach is needed to minimize the risk of injury through improving athletes' motor abilities.

This research has novelty in its more specific focus on athlete characteristics, and injury patterns that occur in adult sparring category pencak silat athletes in East Java during pre-match and matches. Understanding injury causation factors based on both the pre-match and in-match stages is a topic that has rarely been explored in the context of traditional martial arts sports in Indonesia. In addition, this study also sought to identify the factors that cause injuries based on the new pencak silat rules techniques.

Based on the above problems, the author wants to conduct an in-depth analysis of the characteristics and incidence of injuries in adult Pencak Silat athletes in East Java. Through the findings of this research, it is hoped that it can enrich the scientific literature in the field of sports science, especially those related to pencak silat as an achievement sport. Thus, it is hoped that the results of the study can serve as a reference for the development of more effective injury prevention strategies, to improve the safety and well-being of Pencak Silat athletes in East Java and more broadly, throughout Indonesia.

Method

Research Design

The research method uses non-experimental quantitative descriptive research, aiming to objectively identify the characteristics of a population or phenomenon. According to [Rachman et al. \(2024\)](#), the researcher used a survey method with a cross-sectional approach, the research was conducted in 11 cities and districts in East Java by collecting data through questionnaires distributed to Pencak silat athletes in the competition category. The data collected includes the characteristics and incidence of injuries that occurred in the last 6 months.

Participants

The population of this study consisted of adult-category Pencak Silat athletes in East Java. A total of 100 athletes were recruited using a purposive sampling technique from 11 cities and regencies across the province. The inclusion criteria were athletes aged 17–22 years who were actively training with a minimum frequency of four sessions per week, had achieved at least regional-level competitive accomplishments, and were domiciled in cities or regencies within East Java. Athletes who were unwilling to participate in the study were excluded from the analysis.

Research Instruments

The instrument in this study is a non-test instrument in the form of a questionnaire/questionnaire. According to [Sugiyono \(2019\)](#), questionnaires are an effective data collection method if the researcher already knows the variables to be measured. In this study, the researcher used a questionnaire that had been modified from the previous study and had been tested for validity with the validity of the content through experts.

Data Analysis

The data processing technique uses Percentages with the help of Microsoft Excel, then interprets the results and prepares reports by interpreting the findings of the research results thoroughly and compiling a research report that includes the results of analysis and conclusions.

Results and Discussion

Results

Referring to [Table 1](#), overall respondents consisted of men and women, with respective percentages showing gender diversity among participants. The 61% male percentage indicates that the majority of respondents are dominated by male athletes. This may reflect the influence of tradition as well as the values and social norms applied in society related to gender role participation in the world of sports. Meanwhile, the women involved reached 39% which shows a positive development in gender equality in sport.

Table 1. Characteristics of Respondents based on the Gender Proportion of Pencak Silat Athletes in East Java Province

No	Gender	Total Respondents	Percentage
1	Male	61	61%
2	Female	39	39%
Total		100	100%

Table 2. Age Classification of Respondents Based on the Age Range of Sparring Category Pencak Silat Athletes in East Java Province

No	Age category	Total respondents	Percentage
1	17 year	17	17%
2	18 year	21	21%
3	19 year	22	22%
4	20 year	14	14%
5	21 year	19	19%
6	22 year	7	7%
Total Respondents		100	100%

Referring [Table 2](#), it can be seen that adult sparring pencak silat athletes in East Java are in the age range of 17-22 years. This shows that the martial art of pencak silat in East Java has significant appeal, the chronological range at this age also signifies an important stage in optimizing athlete performance for further competition to achieve peak performance.

Referring to Table 3, the contribution of respondents shows the distribution of respondents based on region, geographical location, and the development of pencak silat sports achievements in East Java. After looking at the data, it can be seen that Banyuwangi Regency, Gresik Regency, Jember Regency, Malang Regency, Blitar City, Malang City, and Surabaya City each contributed 10 athletes (10%) of the total respondents. Bangkalan Regency and Sidoarjo Regency have 8 athletes (8%), while Probolinggo Regency and Madiun City have 7 athletes (7%). This indicates that these regions have a strong base for pencak silat sport development. This even distribution is a positive indicator that the development of pencak silat in East Java is going well. Overall, the relatively balanced distribution of respondents reflects the diversity and availability of competitive pencak silat athletes in various regions. This is a strategic opportunity to maximize athlete development in various regions to support pencak silat sporting achievements at the regional, national, and international levels.

Table 3. Distribution of Respondents Based on Region, Geographical Location, and Development of Pencak Silat Sports Achievements in East Java Province

No	City/Regency Domicile	Total respondent	Percentage
1	Bangkalan Regency	8	8%
2	Banyuwangi Regency	10	10 %
3	Gresik Regency	10	10 %
4	Jember Regency	10	10 %
5	Malang Regency	10	10 %
6	Probolinggo Regency	7	7 %
7	Sidoarjo Regency	8	8%
8	Blitar City	10	10 %
9	Malang City	10	10 %
10	Madiun City	7	7%
11	Surabaya City	10	10 %

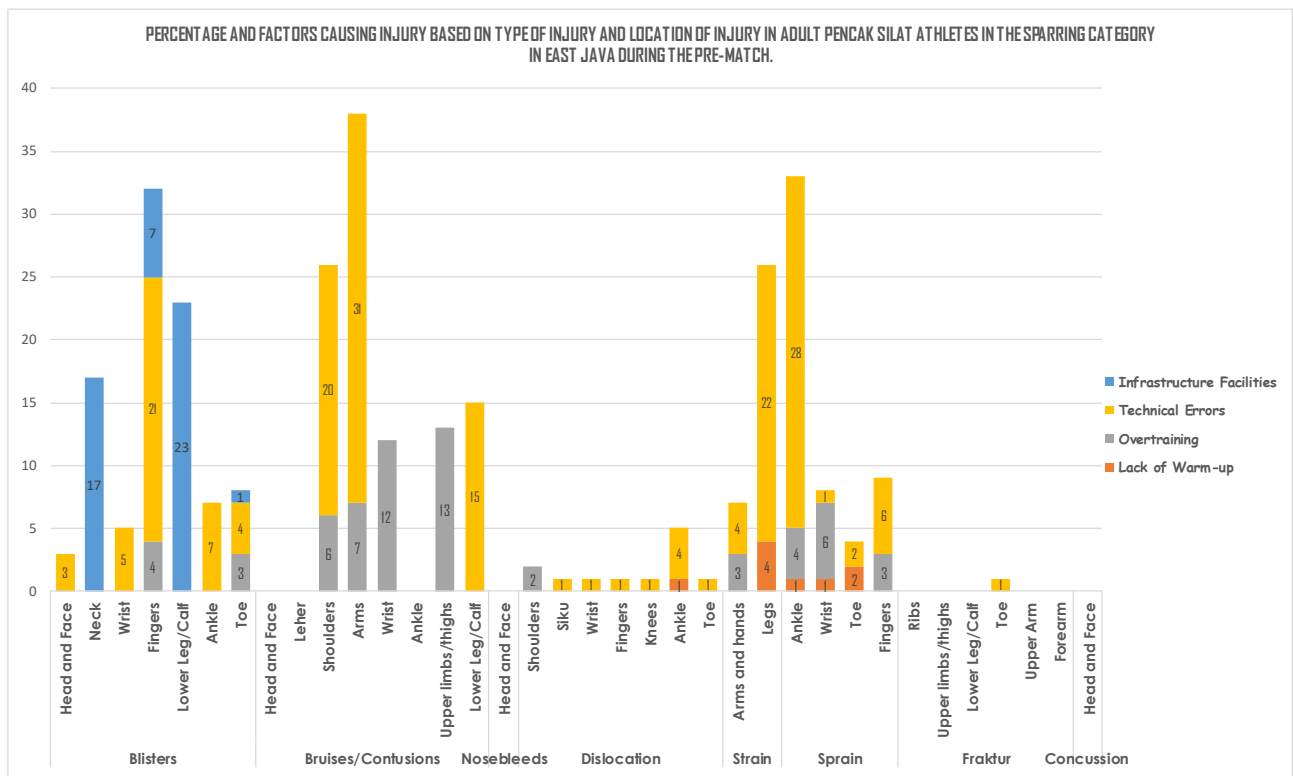


Figure 1. Data Diagram Percentages and Causes of Pre-Match Injuries

Referring to [Figure 1](#), the most dominant injury type among adult sparring pencak silat athletes in East Java during pre-match is abrasions, with the highest incidence on the fingers (32%), followed by technical errors (21%), infrastructure-related injuries (7%), and excessive training (4%). The lowest area was the head and face (3%) due to technical errors. These injuries generally tend to occur more often due to direct physical contact (technical errors). The mechanism of this injury is due to an incorrect hand position when performing a punch or parry, which can increase the risk of friction and impact on the skin area of the fingers. Moreover, it is influenced by the lack of infrastructure and the quality of hand protection.

Bruising injuries (contusions) are also quite prevalent, especially in the arm area (38%), caused by technical errors (31%) and excessive training (7%). The wrist area has the lowest incidence (12%), also attributed to excessive training. The mechanism of injury due to technical errors is usually caused by a less-than-optimal defense position or an improper way of parrying an opponent's attack. This causes the area to experience a collision with sufficient intensity, resulting in damage to small blood vessels (capillaries), which triggers bruising. This is because during training sessions, there is a sparring program, where athletes engage in intensive physical contact, using techniques such as punching, kicking, blocking, and even slamming against opponents, which increases the risk of bruising injuries.

Strain injuries to the lower limbs (26%) are caused by technical errors (22%), a lack of warm-up (4%), and other factors (60%). The mechanism of occurrence of these injuries is due to punches or kicks that are too hard and fast, causing the muscles or tendons to stretch beyond their limits, primarily when the movement is performed with the wrong technique. This is corroborated by research (Zhichang & Weimin, 2024) that martial arts sports, especially pencak silat, can cause muscle and tendon tension because pencak silat requires strong muscle contractions (extension), which can lead to muscle tension. Sprain injuries to the ankle (33%), often caused by poor technique coordination, unstable body rotation, or shifting positions while performing techniques, can also put excessive pressure on the joint area, leading to ligament sprains and tears.

Serious injuries such as dislocations in the ankle area (5%) and the shoulder (2%), as well as fractures in the toe area (1%), have a lower percentage. However, they have a significant impact on the athlete as they can impair performance and require a longer recovery time. These injuries result from technical errors, such as an incorrect footing position during a kick or an unbalanced stance, an incorrect parry movement, or the use of excessive force in attacking, which can trigger a shoulder joint displacement.

Discussion

Based on the explanation above, injuries to adult sparring pencak silat athletes in East Java during the match occurred more in the lower body than the upper body. This finding aligns with existing several researchs ([Del Vecchio et al., 2018](#); [Kusuma & Novita, 2023](#)). They are revealed that in other martial arts sports, the lower extremities are more dominant in injury than the upper body. Although this study reported some upper-body injuries, lower extremity injuries were more prevalent in frequency. This suggests that martial arts injuries are more common in the lower extremities which may be more susceptible to trauma from takedowns, falls, and technical errors in competition.

Proper injury management is crucial for athletes, as it provides various benefits in accelerating recovery and improving performance. Appropriate management approaches, such as accurate diagnosis and prompt rehabilitation, can significantly reduce the risk of re-injury and accelerate an athlete's return to sporting activity ([Hanief et al., 2024](#)). First aid for sports injuries requires special attention because many cases can worsen or continue if not treated appropriately, which can negatively impact an athlete's performance ([Nurhayati & Cahyani, 2023](#)). The first aid method applied must be tailored to the type and severity of the injury, encompassing the initial first aid steps and the rehabilitation process necessary for a full recovery.

Minor injuries, such as bruises, can be treated by placing an ice pack wrapped in cloth or an ice bag on the bruised area to reduce swelling. On the third day, apply a warm compress to speed up the absorption of the blood clot. Strain and Sprain injuries can be treated using the REST method (Rest, Ice, Compression, and Elevation). First, (Rest) stop the activity and rest the injured body part to prevent the injury from getting worse. Then, apply ice with an ice bag for 15-20 minutes to relieve swelling. (Compression) Wrap the injured area with an elastic bandage to prevent swelling from increasing. (Elevation) Position the injured body part higher than the heart to allow blood flow to return to normal and reduce swelling quickly (Mustafa, 2022).

Sports injuries also cause psychological disorders (Haugen, 2022; Rahayuni, 2021). Sleep disorders, stress, anxiety, fear of competing again, and even depression are long-term effects of repeated injuries (Johnston & Carroll, 2000; Mitchell et al., 2014; Smith et al., 1990). Therefore, these findings also highlight the importance of mental health treatment for athletes who have suffered injuries in order to minimize these disorders. Several studies report that coping is one effective strategy (Cosma et al., 2020; Leprince et al., 2018; Neutzel, 2023).

First aid management for sports injuries should be tailored to the type and severity of the injury. In cases of fractures, initial treatment should focus on restricting movement using a splint on the affected area, followed by immediate referral to a hospital for further medical management and evaluation. For concussion injuries, initial first aid includes placing the athlete in a supine position without a pillow, while slightly tilting the head, followed by assessment of pupillary reflexes. Unequal pupil size may indicate severe neurological abnormalities and requires urgent medical attention. After initial stabilization, the athlete should be promptly transported to a medical facility for further examination and treatment (Bezpalkova & Davybidia, 2024; Mustafa, 2022). Dislocation injuries also require immobilization and the application of ice, following the RICE principle, with immediate referral for medical reduction and rehabilitation. In line with this, previous research has emphasized the importance of structured first aid knowledge in injury management. Ar Rahman (2025) reported that although the majority of student-athletes demonstrated moderate to high knowledge of the PRICE method (Protection, Rest, Ice, Compression, Elevation), a substantial proportion still exhibited low understanding, particularly in the compression component. This finding highlights that inadequate comprehension of basic first aid principles may compromise the effectiveness of early injury management and increase the risk of prolonged recovery, underscoring the need for continuous education and training on RICE/PRICE protocols among athletes and coaches.

Limitations and Future Research

This study has several limitations that need to be considered when interpreting the results. First, the descriptive research design, with a cross-sectional approach, can only describe the characteristics and incidence of injuries at a single point in time; therefore, it cannot explain causal relationships or changes in injury risk longitudinally. Second, injury data were obtained through self-report questionnaires, which may have introduced recall bias and subjectivity in respondents' classification of injury types and severity. Third, although it involved athletes from various districts/cities in East Java, the results of this study cannot necessarily be generalized to pencak silat athletes in other provinces or in different age categories and competition numbers. Furthermore, this study did not integrate objective medical examinations or clinical data, so injury classification still depended on the athletes' perceptions. Therefore, future studies are recommended to use a longitudinal design, involve a broader sample, and combine survey data with medical evaluations to obtain a more comprehensive picture of injury risk.

Conclusions

The results of the study indicate that adult pencak silat athletes in East Java exhibit diverse characteristics based on gender, age, and region of residence. The majority of athletes are male and aged 17–22 years, with a relatively even distribution of training across various regions. The most

dominant injuries in both the pre-match and match phases mainly occurred in the lower extremities, with common types of injuries including abrasions, bruises, strains, and sprains, while severe injuries such as dislocations, fractures, and concussions, although low in percentage, had a significant impact on performance because they required a longer recovery time. The causes of injury were primarily attributed to technical errors, followed by attack strength, overtraining, inadequate warm-up, and infrastructure-related factors. These findings confirm that pencak silat, as a martial art, has a high risk of injury to the lower limbs, necessitating preventive measures through improved technical quality, training load management, facility readiness, and the application of appropriate injury treatment according to severity.

Authors' contributions

DFPB contributed to the study conceptualization, study design, data collection, data analysis, and drafting of the manuscript. KR contributed to data analysis, interpretation of results, critical revision of the manuscript for important intellectual content, and overall methodological supervision. Both authors reviewed and approved the final version of the manuscript.

Acknowledgment

The researchers would like to thank all participants who have volunteered to participate in this research.

Competing interests

The authors declare no competing interests.

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