

Survey of Sports Injury Locations and Contributing Factors Among Banjarbaru Athletes in Game Sports

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Received: 2024-11-17

Accepted: 2025-01-29

Published: 2025-04-13

Abstract. Sports injuries remain a concern among athletes participating in competitive game sports because they can affect physical readiness and athletic performance. Identifying injury locations and contributing factors is essential for developing appropriate prevention strategies. This study aimed to identify the anatomical locations and contributing factors of sports injuries among Banjarbaru City athletes participating in the XI South Kalimantan Provincial Sports Week (PORPROV) in 2022. A quantitative descriptive survey was conducted involving 203 athletes from 14 game sports. Data were collected using a closed-ended questionnaire and analyzed descriptively using frequencies and percentages. The findings showed that the ankle was the most frequently reported injury location during training (40.54%) and competition (46.15%). Incorrect movement technique was the leading reported intrinsic factor associated with injuries during training (39.33%). During competition, collisions, incorrect movement techniques, insufficient warm-up, and inadequate rest were reported at equal percentages (21.74%). These findings provide event-specific descriptive evidence of injury patterns among regional game-sport athletes. The study highlights the importance of movement technique, appropriate preparation, sufficient recovery, and injury prevention strategies to support athlete safety during training and competition.

Key words: ankle injuries; injury risk factors; injury surveillance; sports injuries; sports participation

Abstract in Indonesia. Cedera olahraga merupakan permasalahan yang perlu diperhatikan pada atlet cabang olahraga permainan karena dapat memengaruhi kesiapan fisik dan performa selama latihan maupun pertandingan. Identifikasi lokasi dan faktor penyebab cedera diperlukan sebagai dasar penyusunan strategi pencegahan yang tepat. Penelitian ini bertujuan mengidentifikasi lokasi anatomis dan faktor penyebab cedera olahraga pada atlet kontingen Kota Banjarbaru yang mengikuti Pekan Olahraga Provinsi (PORPROV) XI Kalimantan Selatan Tahun 2022. Penelitian menggunakan metode survei deskriptif kuantitatif yang melibatkan 203 atlet dari 14 cabang olahraga permainan. Pengumpulan data dilakukan menggunakan angket tertutup, kemudian dianalisis secara deskriptif melalui distribusi frekuensi dan persentase. Hasil penelitian menunjukkan bahwa pergelangan kaki merupakan lokasi cedera yang paling sering dilaporkan, baik saat latihan (40,54%) maupun pertandingan (46,15%). Faktor intrinsik yang paling banyak dilaporkan sebagai penyebab cedera saat latihan adalah teknik gerakan yang salah (39,33%). Sementara itu, benturan, teknik gerakan yang tidak tepat, kurangnya pemanasan, dan kurangnya istirahat dilaporkan dengan persentase yang sama saat pertandingan (21,74%). Penelitian ini memberikan gambaran empiris mengenai pola cedera pada atlet olahraga permainan tingkat daerah. Temuan tersebut dapat digunakan sebagai dasar untuk meningkatkan teknik gerak, kesiapan fisik, pemulihan, dan strategi pencegahan cedera selama latihan maupun pertandingan.

Kata Kunci: cedera olahraga; cedera pergelangan kaki; faktor risiko cedera; partisipasi olahraga; surveilans cedera

How to Cite: Ramadhan, H. M. & Rachman, A. (2025). Survey of Sports Injury Locations and Contributing Factors Among Banjarbaru Athletes in Game Sports. *MIKI: Media Ilmu Keolahragaan Indonesia* 15 (1), 27-49.

DOI: <http://dx.doi.org/10.15294/miki.v15i1.1794>

INTRODUCTION

Sports play an essential role in promoting physical fitness, maintaining health, and enhancing athletic performance. Participation in sports also contributes to physical, psychological, and social development. In Indonesia, sports development is regulated under Law Number 11 of 2022 concerning Sports, which emphasizes the development of individual potential, athletic achievement, and national competitiveness (Pemerintah Republik Indonesia, 2022). Competitive sports require athletes to develop physical, technical, tactical, and psychological capabilities through systematic and continuous training. However, participation in intensive training and competition also exposes athletes to sports-related injuries, which may disrupt training continuity, compromise physical readiness, and negatively affect athletic performance.

Sports injuries remain a major concern in sports science because they can occur during training, competition, and other physical activities. These injuries may affect various anatomical structures,

including muscles, joints, ligaments, tendons, and bones. Injury characteristics may differ depending on the type of sport, movement patterns, training demands, and environmental conditions. Durahim et al. (2022) highlighted the potential risk of injury associated with sports participation. As athletes engage in increasingly demanding physical activities, appropriate injury prevention and management become essential for maintaining their health and supporting long-term sports participation. Therefore, identifying injury patterns and contributing factors is important for developing evidence-informed strategies to improve athlete safety.

Game sports involve complex movement patterns and diverse physical demands. Sports such as football, basketball, volleyball, futsal, badminton, and sepak takraw require athletes to perform repetitive movements, rapid changes of direction, acceleration, deceleration, jumping, and landing. These activities place considerable demands on the musculoskeletal system, particularly the lower extremities. Depending on the characteristics of each sport, injuries may occur in various anatomical regions, including the ankles, knees, thighs, shoulders, and upper extremities. Sanusi (2020) investigated futsal coaches' understanding of ankle injury management, highlighting the importance of appropriate knowledge and injury management in sports involving dynamic movements. Furthermore, Setiawan and Rustiana (2014) examined the development of self-massage and therapeutic exercise approaches for ankle injuries. Although these studies provide relevant information regarding ankle injury management, they do not specifically describe the anatomical distribution and reported contributing factors of injuries among athletes participating in multiple game sports at regional competitive events.

Sports injuries may be associated with intrinsic and extrinsic factors. Intrinsic factors relate to individual characteristics and physical conditions, including movement technique, physical readiness, previous sports experience, training intensity, insufficient warm-up, and inadequate recovery. Inappropriate movement techniques and insufficient physical preparation may place additional demands on the musculoskeletal system during sports participation. Meanwhile, extrinsic factors involve external conditions, such as sports facilities, equipment, playing surfaces, environmental conditions, and physical contact between athletes. These factors may occur individually or interact in complex ways during training and competition. Understanding their distribution is important for identifying potential injury prevention priorities. However, descriptive surveys primarily capture athletes' reported experiences and perceptions; therefore, the factors identified should not automatically be interpreted as established causes of injury.

The Provincial Sports Week (*Pekan Olahraga Provinsi*, PORPROV) is a regional sporting competition that provides opportunities for athletes to demonstrate their abilities and achieve competitive success. The XI South Kalimantan Provincial Sports Week was held in Hulu Sungai Selatan Regency in 2022, involving athletes from various regions, including Banjarbaru City. The Banjarbaru contingent participated in several sports categories, including game sports with different physical and technical characteristics. Athletes competing in these events were required to maintain physical readiness and perform effectively throughout training and competition. Nevertheless, differences in movement demands, preparation routines, and competitive conditions may be associated with different patterns of sports injuries. Identifying the anatomical locations and reported contributing factors of injuries among these athletes is therefore important for informing athlete preparation and injury prevention practices at the regional level.

Previous research has provided valuable insights into sports injuries, particularly concerning ankle injury management and rehabilitation (Sanusi, 2020; Setiawan & Rustiana, 2014). However, these studies focused on specific aspects of injury management rather than the broader distribution of injury locations and contributing factors across multiple game sports. Furthermore, the research background indicates that descriptive information concerning sports injuries among Banjarbaru City athletes participating in PORPROV XI South Kalimantan remains limited. This creates a context-specific research gap regarding the anatomical distribution of injuries and the intrinsic and extrinsic factors reported by athletes during training and competition. Addressing this gap may provide useful baseline information for regional sports organizations, coaches, and healthcare personnel when identifying priorities for injury surveillance and prevention.

The distinctive contribution of this study lies in its examination of injury locations and reported contributing factors among athletes from different game sports representing Banjarbaru City at a provincial sporting event. Rather than concentrating on a single sport or injury type, this study considers multiple anatomical regions and differentiates between training- and competition-related injuries. In

addition, the investigation categorizes reported contributing factors into intrinsic and extrinsic components, providing a broader descriptive perspective on injury patterns within a regional multisport contingent. This approach may contribute context-specific evidence to sports injury surveillance and support the development of more targeted prevention initiatives. Nevertheless, because the investigation employs a descriptive survey design, its findings are intended to identify reported patterns rather than establish causal relationships.

Therefore, this study aimed to identify the anatomical locations and reported contributing factors of sports injuries among Banjarbaru City athletes participating in game sports at the XI South Kalimantan Provincial Sports Week in 2022. Specifically, the study sought to describe injury locations during training and competition and examine the distribution of intrinsic and extrinsic factors reported in relation to these injuries. The findings are expected to contribute descriptive evidence to sports science, particularly in sports injury surveillance and prevention. From a practical perspective, the results may assist athletes, coaches, sports organizations, and healthcare personnel in recognizing frequently reported injury locations, improving athlete preparation, and identifying priorities for preventive measures. Ultimately, this research is intended to support evidence-informed injury management and safer sports participation among regional competitive athletes.

METHODS

Research Design

This study employed a quantitative descriptive design using a survey method to investigate the anatomical locations and reported contributing factors of sports injuries among athletes representing Banjarbaru City at the XI South Kalimantan Provincial Sports Week (PORPROV) in 2022. The study focused on injuries experienced during training and competition, as well as the distribution of intrinsic and extrinsic factors reported in relation to these injuries. The survey design enabled the systematic collection of information regarding athletes' injury experiences without manipulating their training or competition conditions. Accordingly, the findings were interpreted descriptively rather than as evidence of causal relationships.

Population and Sample

The study population was described as comprising 282 athletes representing Banjarbaru City at PORPROV XI South Kalimantan, held in Hulu Sungai Selatan Regency in 2022. The analyzed sample consisted of 203 athletes participating in 14 game sports, including football, futsal, basketball, indoor and beach volleyball, badminton, table tennis, tennis, sepak takraw, and other sports included in the original classification. Participants were selected using purposive sampling, with the investigation focusing on athletes competing in game sports. This sampling approach was intended to obtain information relevant to the study objectives, particularly the anatomical distribution of sports injuries and the contributing factors reported by the participating athletes.

Research Instrument

Data were collected using a structured, closed-ended questionnaire designed to document athletes' experiences of sports injuries. The instrument covered three main components: injury timing, anatomical injury location, and reported contributing factors. Injury timing was classified into training, competition, and the period following competition. Anatomical injury locations were grouped into upper- and lower-body regions. The upper-body classification included the head, face, neck, chest, abdomen, back, shoulders, elbows, arms, wrists, and fingers. The lower-body classification included the waist, hips, buttocks, groin, legs, thighs, knees, ankles, toes, and other foot regions. Reported contributing factors were classified as intrinsic or extrinsic. Intrinsic factors included individual characteristics, movement technique, physical preparation, and recovery-related conditions, whereas extrinsic factors included sporting facilities, infrastructure, environmental conditions, and collisions. The original research described an assessment of the questionnaire's content validity through expert judgment.

Data Collection Procedures

Data were collected by distributing the structured questionnaire to athletes representing Banjarbaru City in the game-sport categories of PORPROV XI South Kalimantan. Participants provided information

regarding their demographic characteristics, experiences of sports injuries, anatomical injury locations, and perceived contributing factors during training and competition. Responses were recorded using the predefined questionnaire categories and subsequently organized according to injury timing, anatomical region, and intrinsic or extrinsic contributing factors. The collected responses were then compiled for descriptive analysis.

Data Analysis

Data were analyzed using descriptive statistics, including frequency distributions and percentages. Participant characteristics were summarized using frequencies and relative percentages. Reported injury locations were classified according to anatomical regions and the circumstances in which injuries occurred. Intrinsic and extrinsic contributing factors were analyzed separately to identify the categories most frequently reported by participants. Percentages were calculated by dividing the frequency of responses within each category by the corresponding total number of responses and multiplying by 100. Because participants could report more than one injury location or contributing factor, injury-response frequencies were distinguished from the number of individual athletes. The results were presented in tables and figures to describe the distribution of reported injuries and contributing factors during training and competition. No inferential statistical tests were reported, as the analysis was intended to describe observed response patterns rather than establish causal relationships.

RESULTS AND DISCUSSION

Characteristics of the Participants

This study examined sports injuries among 203 athletes representing Banjarbaru City in 14 game sports at the XI South Kalimantan Provincial Sports Week (PORPROV) in 2022. The participating athletes represented various sports disciplines, including football, basketball, futsal, indoor volleyball, beach volleyball, badminton, tennis, table tennis, sepak takraw, and other game sports. These sports involve different movement characteristics, technical requirements, training demands, and competition environments, which provide an important context for understanding variations in sports injury patterns. The demographic characteristics presented in Table 1 show that male athletes constituted the majority of participants, accounting for 71.43% (145 athletes), whereas female athletes represented 28.57% (58 athletes). Regarding age distribution, the largest proportion of participants belonged to the 17–25-year age group, representing 79.31% (161 athletes), followed by athletes aged 26–35 years at 14.29% (29 athletes). Meanwhile, athletes aged 12–16 years accounted for 1.97% (4 athletes), those aged 36–45 years represented 2.96% (6 athletes), those aged 46–55 years accounted for 0.49% (1 athlete), and those aged 56–65 years represented 0.99% (2 athletes). These findings demonstrate that the Banjarbaru City contingent participating in game sports was predominantly composed of young athletes, particularly individuals aged 17–25 years. The demographic characteristics of these participants are relevant to understanding the context of sports injury occurrence because differences in age, sex, sporting experience, physical preparation, and participation patterns may influence the interpretation of reported injuries. Nevertheless, the predominance of young male athletes should be understood as a characteristic of the study sample rather than direct evidence that particular demographic groups have a greater susceptibility to sports injuries.

Table 1. Demographic Characteristics of Game-Sport Athletes (n = 203)

Characteristic	Frequency (n)	Percentage (%)
Sex		
Male	145	71.43
Female	58	28.57
Age group (years)		
12–16	4	1.97
17–25	161	79.31
26–35	29	14.29
36–45	6	2.96
46–55	1	0.49

56–65	2	0.99
Total	203	100.00

Source: Primary research data, PORPROV XI South Kalimantan, 2022

The importance of demographic characteristics in sports injury research has been highlighted in previous studies investigating injury prevalence and associated factors across different athletic populations. Kimura et al. (2024), who examined sports injuries among Japanese collegiate athletes, demonstrated the relevance of investigating injury-related characteristics within clearly defined sporting populations. Similarly, Min and Jang (2025) investigated sports injury prevalence and patterns in recreational sports participation in South Korea, providing an additional perspective on the importance of describing injury characteristics across different participation settings. These investigations support the broader relevance of demographic information for interpreting injury surveillance findings, although differences in populations, competitive levels, and research methodologies must be considered when comparing results. In the present study, the predominance of athletes aged 17–25 years may reflect the composition and selection of athletes representing Banjarbaru City at the provincial sporting event. However, because the current analysis did not calculate injury frequencies separately for each age and sex category, the findings cannot establish whether particular demographic groups experienced higher injury risks. Consequently, the demographic results primarily provide contextual information for understanding the characteristics of the participating athletes and the distribution of their reported injuries. Future investigations could examine injury occurrence according to sex, age, sport category, training exposure, and previous injury history to provide a more comprehensive understanding of how individual characteristics relate to injury patterns among regional competitive athletes.

Incidence of Reported Injuries During Training

The results of the survey identified differences in athletes' reported experiences of sports injuries during training. As presented in Table 2 and Figure 1, 62 of the 203 participating athletes (30.54%) reported having experienced sports injuries during training, whereas 141 athletes (69.46%) reported no injury. These findings indicate that approximately three out of ten surveyed athletes had experienced an injury during training activities, while the majority reported no injury. Although the proportion of athletes reporting injuries was smaller than that of athletes without reported injuries, the findings remain relevant because training constitutes an essential component of preparation for competitive sports. Training activities are designed to improve physical conditioning, technical proficiency, tactical understanding, coordination, and psychological readiness. In game sports, athletes frequently perform physically demanding movements, including rapid acceleration, deceleration, jumping, landing, pivoting, and changes of direction. These movements place varying demands on muscles, joints, ligaments, and other musculoskeletal structures, particularly when performed repeatedly throughout training sessions. The occurrence of injuries during training may therefore affect athletes' continuity of preparation, limit their participation in subsequent activities, and influence their readiness for competition. However, the present study relied on questionnaire responses and did not document the frequency, duration, or intensity of individual training sessions. Consequently, the reported percentage represents the proportion of athletes who indicated an injury experience rather than a standardized injury incidence rate based on athletic exposure. This distinction is important because the percentage cannot be used independently to compare injury risk between sports or training programs with different participation durations and physical demands.

Table 2. Reported Sports Injuries During Training

Injury experience	Athletes (n)	Percentage (%)
Experienced injury	62	30.54
No reported injury	141	69.46
Total	203	100.00

Source: Primary research data, 2022

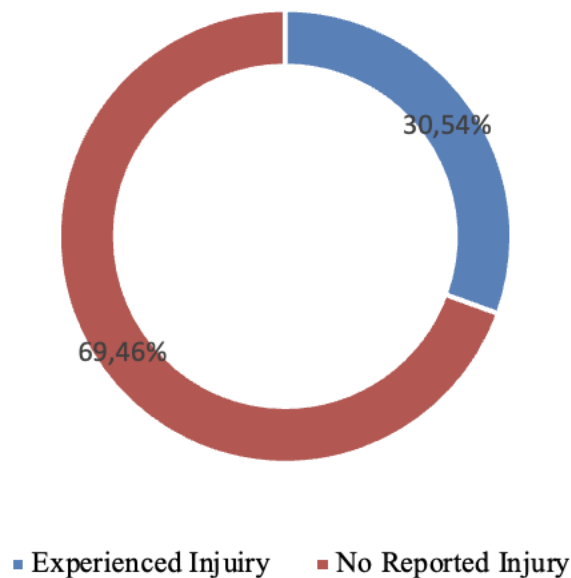


Figure 1. Distribution of Athletes Reporting Injuries During Training

The findings are relevant to previous research examining sports injury surveillance and training-related injury characteristics. Murphy et al. (2025) investigated training load and injury surveillance among schoolboy rugby players, emphasizing the research importance of examining injuries within structured sporting environments. Similarly, Evans et al. (2024) investigated non-contact lower-limb injuries and associated risk factors in rugby union, providing a broader context for considering the physical demands associated with sports participation. Although these studies involved rugby players rather than athletes participating in multiple game sports, they demonstrate the relevance of systematic injury monitoring in understanding sporting injury patterns. In the context of the present study, the proportion of athletes reporting injuries during training highlights the potential value of implementing consistent injury recording procedures and evaluating athletes' physical preparation across different sports. Nevertheless, the available data do not establish whether reported injuries were associated with excessive training loads, inadequate technical execution, previous injuries, insufficient recovery, or particular training conditions. Such explanations would require additional objective assessments and prospective monitoring. Therefore, the findings should be interpreted as descriptive evidence of training-related injury experiences among Banjarbaru City athletes. From a practical perspective, this information can provide a preliminary foundation for coaches, healthcare personnel, and sports organizations to identify the need for more systematic injury surveillance, review existing training practices, and consider appropriate injury prevention measures. Future investigations should incorporate standardized injury definitions, training exposure measurements, and sport-specific injury recording to provide more precise estimates of injury occurrence and identify factors associated with injuries during athletic preparation.

Anatomical Distribution of Sports Injuries During Training

The anatomical distribution of sports injuries during training was classified into upper- and lower-extremity regions to identify the body areas most frequently affected among Banjarbaru City athletes participating in game sports. As presented in Table 3, a total of 140 injury-location responses were recorded, consisting of 74 responses (52.86%) involving the lower extremities and 66 responses (47.14%) involving the upper extremities. These findings indicate that lower-extremity injuries accounted for a slightly greater proportion of reported anatomical injury locations during training.

Table 3. Distribution of Injury Locations by Anatomical Region During Training

Anatomical region	Injury responses (n)	Percentage (%)
Upper extremity	66	47.14
Lower extremity	74	52.86
Total responses	140	100.00

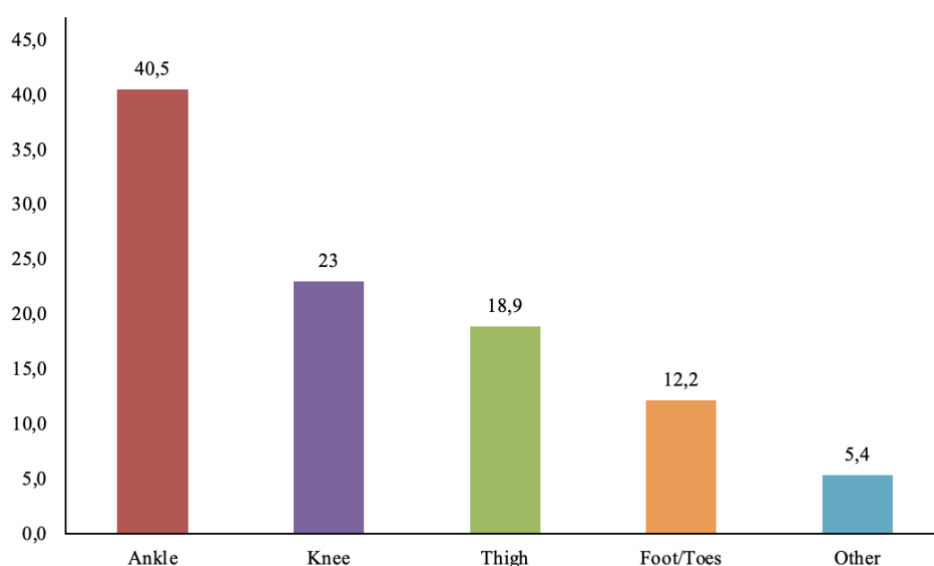
Source: Primary research data, 2022.

Further analysis of lower-extremity injuries, presented in Table 4 and Figure 2, revealed that the ankle was the most frequently reported injury location, accounting for 40.54% of lower-extremity responses, followed by the knee (22.97%), thigh (18.92%), foot and toes (12.16%), and other lower-extremity locations (5.41%). The predominance of ankle-related injuries provides an important descriptive finding regarding the anatomical distribution of sports injuries among athletes participating in various game sports. Sports such as football, basketball, volleyball, futsal, badminton, and sepak takraw require complex lower-extremity movements, including running, acceleration, deceleration, jumping, landing, pivoting, and rapid changes of direction. These activities involve coordinated movements of the ankle, knee, and hip joints and place varying mechanical demands on the musculoskeletal system. The ankle contributes to balance, body-weight support, movement control, and adaptation to different movement directions, making it an important anatomical structure during athletic activities. However, because this study employed a descriptive questionnaire-based approach without direct biomechanical assessment, the observed distribution cannot establish that particular movements caused the reported injuries. Instead, the findings provide descriptive evidence identifying the ankle and other lower-extremity regions as important areas for further injury surveillance and preventive attention within regional game-sport training programs.

Table 4. Principal Lower-Extremity Injury Locations During Training

Injury location	Percentage (%)
Ankle	40.54
Knee	22.97
Thigh	18.92
Foot and toes	12.16
Total	100.00

Source: Primary research data, 2022


Figure 2. Distribution of Lower-Extremity Injury Locations During Training

Source: Primary research data, 2022

The prominence of ankle injuries in the present study can be discussed in relation to previous research investigating ankle function, joint stability, movement characteristics, and sports injury prevention. Qiao (2024) investigated functional fitness training for the prevention of acute foot and ankle sports injuries, providing a relevant research perspective on physical preparation and ankle-related injury prevention. Similarly, Desnantyo et al. (2025) examined ankle joint laxity and ankle injury occurrence among professional female athletes, highlighting the relevance of examining joint characteristics in athletic injury research. Although these investigations involved different research designs and populations, they provide useful contexts for interpreting the anatomical importance of ankle injuries identified among Banjarbaru City athletes. The relationship between movement characteristics and sports injuries has also received attention in research on functional movement assessment. Liu et al. (2023) investigated the predictive value of functional movement screening among Chinese college students with different levels of physical activity and sports performance, reflecting continued research interest in the assessment of movement-related characteristics. These studies provide a rationale for considering movement quality and physical preparation in future investigations of lower-extremity injury patterns. Nevertheless, the present research did not measure ankle joint laxity, balance performance, movement screening scores, or biomechanical variables. Therefore, it would be inappropriate to conclude that ankle instability, impaired movement control, or specific technical deficiencies were responsible for the higher proportion of ankle injury responses. The findings should instead be interpreted as a descriptive pattern that identifies ankle-related injuries as a priority for further investigation. From a practical perspective, the distribution may assist coaches, athletes, and sports healthcare personnel in recognizing anatomical areas that deserve attention during physical preparation, movement technique evaluation, and injury monitoring. Additional prospective research involving standardized injury definitions, clinical assessments, and measurements of sporting exposure would help clarify the mechanisms and circumstances associated with ankle injuries in this population.

In addition to the ankle, the knee and thigh represented substantial proportions of lower-extremity injury responses during training, accounting for 22.97% and 18.92%, respectively. These findings indicate that injury-related concerns among the surveyed athletes were not limited to a single anatomical location but extended to several structures involved in lower-extremity movement and physical performance. The knee plays an important role in supporting body weight, controlling lower-limb alignment, and coordinating movements during acceleration, deceleration, landing, and changes of direction. Meanwhile, the thigh contains major muscle groups involved in producing force, controlling lower-extremity movement, and supporting activities that require rapid or repeated muscular contractions. Previous research has addressed knee injuries and their prevention in different athletic populations. Chen and Zhuang (2024) investigated the prevention of common knee injuries in martial arts sparring training, while Liu et al. (2024) examined knee injury conditions and related care among children. Although these studies differ from the present investigation in terms of sporting context and participant characteristics, they illustrate the relevance of knee-related injuries within broader sports health research. In the Banjarbaru sample, the proportion of thigh injury responses also indicates the importance of examining muscular and other lower-extremity injury characteristics in greater detail. However, the questionnaire did not provide sufficient clinical information to distinguish specific injury diagnoses, severity levels, or recovery durations for each anatomical region. Consequently, the reported locations cannot be interpreted as evidence of particular ligament, tendon, or muscle injuries. Taken together, the anatomical findings suggest that lower-extremity injuries were prominent during training, with the ankle accounting for the largest proportion of reported locations, followed by the knee and thigh. These findings contribute regional descriptive evidence that may inform the planning of injury surveillance activities and support the development of targeted research concerning movement characteristics, physical preparation, and injury prevention among athletes participating in game sports. Future studies should incorporate sport-specific comparisons, standardized clinical injury assessments, and prospective monitoring to determine whether the observed anatomical patterns are consistent across different sports and training conditions.

Sports Injury Locations During Competition

The anatomical distribution of sports injuries during competition demonstrated that lower-extremity regions accounted for the majority of reported injury locations among Banjarbaru City athletes participating in game sports at the XI South Kalimantan Provincial Sports Week (PORPROV) in 2022.

As presented in Table 5, a total of 41 anatomical injury responses were recorded during competition, consisting of 26 lower-extremity responses (63.41%) and 15 upper-extremity responses (36.59%).

Table 5. Anatomical Distribution of Injury Responses During Competition

Anatomical region	Injury responses (n)	Percentage (%)
Upper extremity	15	36.59
Lower extremity	26	63.41
Total responses	41	100.00

Source: Primary research data, 2022

These findings indicate that lower-extremity regions represented a substantially greater proportion of reported injury locations than upper-extremity regions during competitive activities. Furthermore, the comparison presented in Figure 3 demonstrates that lower-extremity injuries accounted for a larger proportion of anatomical injury responses in both training and competition settings. During training, lower-extremity responses represented 52.86% of the total, compared with 47.14% for upper-extremity responses, whereas during competition, lower-extremity responses increased proportionally to 63.41%, compared with 36.59% for upper-extremity responses. The difference of approximately 10.55 percentage points in the proportional distribution suggests that lower-extremity injury locations were more prominent within the competition injury-response data than within the training injury-response data. However, this comparison describes the relative composition of injury responses rather than differences in injury incidence or individual athlete risk, because the total numbers of responses differed between settings and training and competition exposure durations were not recorded. Game sports involve diverse physical demands, including acceleration, deceleration, sudden changes of direction, jumping, landing, and interactions with opponents, all of which require coordinated lower-extremity movement. During competition, athletes may perform these activities under time constraints, tactical pressure, and changing environmental conditions. These characteristics provide a plausible context for interpreting the predominance of lower-extremity injury responses, although the present study did not directly evaluate biomechanical loading, movement execution, or injury mechanisms. Therefore, the findings should be interpreted as descriptive evidence indicating that lower-extremity injuries were frequently reported during competition, rather than demonstrating that competitive intensity or specific sporting movements directly caused these injuries.

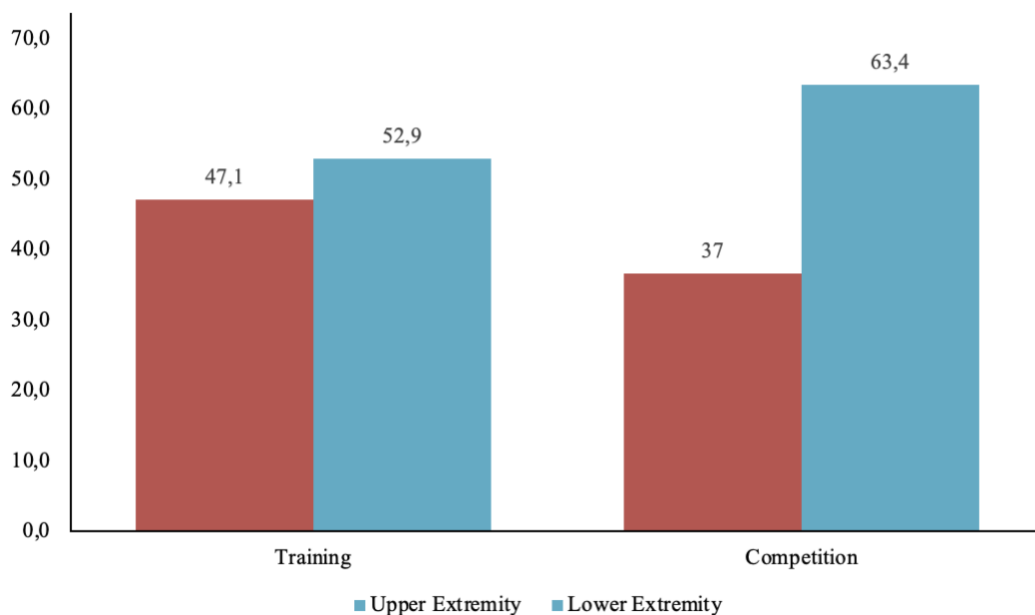


Figure 3. Anatomical Distribution of Injury Responses During Training and Competition

Source: Primary research data, 2022

The distribution of injuries during competition can be considered in relation to previous research investigating sports injury patterns across different sporting environments. Li et al. (2025) examined factors associated with sports injuries among Korean youth track and field athletes during training and competition, highlighting the relevance of distinguishing between different contexts of athletic participation when investigating injury-related characteristics. Although track and field events differ from game sports in movement demands and competitive structures, the study provides a relevant perspective on the importance of examining injury experiences within specific sporting settings. Similarly, Nicholas and Ekom (2025) investigated patterns of sports injuries and their association with injury prevention strategies among professional football players, providing a more directly related context for understanding injuries in competitive team sports. Tankeng et al. (2024) investigated the epidemiology and clinical characteristics of sports injuries treated in hospitals in Cameroon, emphasizing the value of documenting injury characteristics within defined populations. However, hospital-based investigations generally involve injuries requiring medical attention, whereas the present study collected self-reported injury information through questionnaires. Differences in injury definitions, population characteristics, data collection procedures, and healthcare-seeking behavior should therefore be considered when interpreting findings across these studies. In the present research, the original manuscript identified the ankle as an important anatomical injury location during competition, reporting 46.15% in the abstract and conclusion, while the detailed results section reported 29.27%. This inconsistency indicates that the original injury frequencies and percentage denominators require verification before the precise proportion of ankle injuries can be established. Nevertheless, the prominence of lower-extremity responses in the overall anatomical distribution supports the importance of examining ankle, knee, and other lower-limb injury patterns in future investigations. The findings also suggest that more detailed injury recording procedures are necessary to distinguish anatomical injury locations, injury severity, contact and non-contact mechanisms, and sport-specific circumstances. Such information would enable more accurate comparisons across sports and provide stronger evidence for understanding the distribution of injuries during competitive activities.

From a practical and scientific perspective, the findings highlight the importance of incorporating systematic lower-extremity injury surveillance into regional athlete preparation and competition management. Because lower-extremity regions accounted for the majority of anatomical injury responses during both training and competition, preventive attention may reasonably focus on movement preparation, physical conditioning, technical execution, and sporting conditions relevant to lower-limb function. Coaches and healthcare personnel may consider reviewing athletes' preparation routines and monitoring their experiences of injuries involving the ankle, knee, thigh, and other lower-extremity regions. However, specific prevention interventions should be selected according to the demands of each sport and evaluated using appropriate evidence rather than assuming that a particular intervention would have prevented the injuries reported in this study. The descriptive results also demonstrate the importance of distinguishing between injury-response distributions and injury incidence. Although the proportion of lower-extremity responses was greater during competition than during training, the findings do not establish that competition presented a higher overall injury risk because the study did not record standardized exposure measures such as training hours, match duration, or athlete participation time. Furthermore, the analysis combined athletes from 14 different game sports, limiting the ability to determine whether particular sporting disciplines contributed disproportionately to the overall distribution. Future research should therefore employ prospective injury surveillance, standardized injury classifications, clinically verified injury diagnoses, and sport-specific analysis to provide more detailed evidence regarding injury mechanisms and occurrence. Recording athlete exposure and previous injury history would also improve the interpretation of injury rates and support more meaningful comparisons between training and competition. Overall, the present findings contribute context-specific descriptive evidence concerning the anatomical distribution of sports injuries among Banjarbaru City athletes at PORPROV XI South Kalimantan. By identifying the predominance of lower-extremity injury responses, the study provides preliminary information that may support regional sports organizations, coaches, and healthcare personnel in establishing priorities for injury monitoring, athlete preparation, and the development of evidence-informed injury prevention strategies.

Intrinsic and Extrinsic Contributing Factors During Training

The analysis of factors associated with sports injuries during training classified athletes' responses into two principal categories: intrinsic and extrinsic factors. As presented in Table 6 and Figure 4, a total of 151 contributing-factor responses were recorded, consisting of 89 intrinsic-factor responses (58.94%) and 62 extrinsic-factor responses (41.06%). These findings indicate that intrinsic factors accounted for a greater proportion of reported contributing factors than extrinsic factors, with a difference of 17.88 percentage points between the two categories. Intrinsic factors encompass individual characteristics and conditions related to athletes' physical preparation, movement techniques, sporting experience, training demands, and recovery, whereas extrinsic factors refer to external conditions, including sports facilities, infrastructure, environmental characteristics, and physical contact during sporting activities. The greater proportion of intrinsic responses suggests that athletes more frequently identified individual or preparation-related conditions when reporting factors associated with injuries during training. However, this distribution should be interpreted carefully because the questionnaire measured reported contributing factors rather than objectively established injury mechanisms. Furthermore, the 151 responses represent the total number of selected contributing-factor categories and should not be interpreted as 151 individual injured athletes, since respondents could report more than one factor. These findings provide an initial description of how intrinsic and extrinsic factors were represented within the injury-related experiences of Banjarbaru City athletes participating in game sports at PORPROV XI South Kalimantan in 2022. The descriptive distribution may be useful for identifying priority areas for further investigation, particularly in relation to athletes' technical preparation, physical readiness, recovery practices, and the conditions of their training environments.

Table 6. Distribution of Reported Contributing Factors During Training

Factor category	Responses (n)	Percentage (%)
Intrinsic	89	58.94
Extrinsic	62	41.06
Total responses	151	100.00

Source: Primary research data, PORPROV XI South Kalimantan, 2022. Percentages represent the distribution of contributing-factor responses, not causal risk estimates

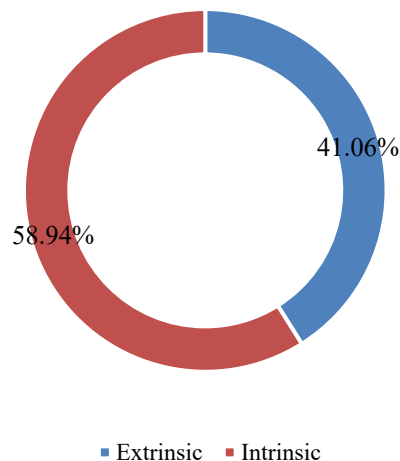


Figure 4. Distribution of Intrinsic and Extrinsic Factor Responses During Training
Source: Primary research data, 2022.

The findings can be considered in relation to previous research examining the characteristics and potential determinants of sports injuries. Cheng (2024) investigated sports injury prevention and treatment from a biomechanical perspective, providing a relevant theoretical context for examining the importance of movement characteristics and physical preparation in sporting activities. From a biomechanical standpoint, athletic movements involve the interaction of muscular forces, joint

positioning, neuromuscular coordination, and external mechanical demands. These considerations are relevant to game sports, where athletes frequently perform rapid acceleration, deceleration, jumping, landing, and changes of direction. Murphy et al. (2025) examined training load and injury surveillance among schoolboy rugby players, illustrating the importance of systematic monitoring of athletic participation and injury-related conditions within organized training environments. Furthermore, Bi et al. (2023) investigated relationships involving body mass index, physical activity, and the risk of joint sports injuries through a Mendelian randomization approach. Although these investigations employed different methodologies and involved populations distinct from the Banjarbaru contingent, they demonstrate the breadth of individual, physical, and training-related characteristics considered in contemporary sports injury research. Nevertheless, the present study did not objectively assess movement biomechanics, quantify individual training loads, measure body mass index, or establish temporal relationships between reported factors and injury occurrence. Consequently, the higher proportion of intrinsic-factor responses cannot be interpreted as evidence that intrinsic factors produced greater injury risk than extrinsic factors. Instead, the findings reflect the relative frequency with which athletes selected different categories of potential contributing factors in the questionnaire. These methodological distinctions are important when comparing descriptive survey results with studies that employ clinical assessments, prospective monitoring, or analytical designs. The findings therefore contribute contextual information regarding athlete-reported injury factors rather than confirming specific physiological, biomechanical, or environmental mechanisms.

From a practical perspective, the distribution of intrinsic and extrinsic factors highlights the importance of adopting a comprehensive approach to sports injury surveillance and prevention among regional game-sport athletes. The prominence of intrinsic-factor responses indicates that aspects of athlete preparation, including movement technique, physical conditioning, training organization, and recovery practices, may warrant further attention from coaches and healthcare personnel. Appropriate technical instruction and systematic evaluation of athletes' preparation routines may help identify areas where additional support is needed. However, the substantial proportion of extrinsic-factor responses demonstrates that injury prevention considerations should not be restricted to individual athletes. Sports infrastructure, equipment, environmental conditions, and interactions between participants may also represent important areas for monitoring and organizational evaluation. Regional sports organizations and event organizers may therefore benefit from reviewing training environments, maintaining appropriate sporting facilities, and establishing consistent procedures for recording and evaluating injuries. The integration of athlete-centered preparation with environmental safety considerations may provide a broader framework for developing injury prevention initiatives, although the effectiveness of specific interventions must be evaluated through further research. In addition, the present findings indicate a need for more detailed investigations into the relationships between intrinsic and extrinsic factors, as these categories may interact under actual sporting conditions. Future studies should incorporate standardized injury definitions, objective assessments of physical and environmental characteristics, prospective injury surveillance, and sport-specific analyses to clarify how different factors relate to injury occurrence. Overall, this study provides descriptive evidence that intrinsic factors were reported more frequently than extrinsic factors during training among Banjarbaru City game-sport athletes, contributing preliminary information that may support injury monitoring, athlete preparation, and the development of evidence-informed prevention strategies at the regional competitive level.

Intrinsic Factors Contributing to Sports Injuries

The analysis of intrinsic factors associated with sports injuries during training identified several individual and preparation-related conditions reported by athletes representing Banjarbaru City at the XI South Kalimantan Provincial Sports Week (PORPROV) in 2022. As presented in Table 7 and Figure 5, a total of 89 intrinsic-factor responses were recorded, with incorrect movement technique representing the most frequently reported factor, accounting for 39.33% (35 responses). Other contributing factors included insufficient warm-up at 17.98% (16 responses), personal factors at 16.85% (15 responses), inadequate rest at 12.36% (11 responses), previous sporting experience at 6.74% (6 responses), movement skills at 3.37% (3 responses), excessive training intensity at 2.25% (2 responses), and nutritional factors at 1.12% (1 response). These findings indicate that athletes most frequently identified incorrect movement technique among the intrinsic factors associated with their injury experiences during training. The relatively high proportion of movement-related responses provides an important

descriptive finding because game sports involve complex physical activities requiring coordination between muscular strength, joint stability, balance, neuromuscular control, and sport-specific movement techniques. Athletes participating in football, basketball, volleyball, futsal, badminton, and sepak takraw frequently perform acceleration, deceleration, jumping, landing, pivoting, and rapid directional changes, which involve coordinated movements of the upper and lower extremities. Appropriate movement execution is important for maintaining technical performance and controlling physical demands during training activities. Nevertheless, the present research did not objectively assess biomechanical characteristics or directly observe movement execution at the time of injury. Consequently, the identification of incorrect movement technique as the most frequently reported intrinsic factor should be interpreted as an athlete-reported association rather than evidence that technical errors directly caused the injuries. Furthermore, the percentages represent the distribution of 89 intrinsic-factor responses rather than the proportion of all 203 participating athletes. This distinction is important because athletes could identify multiple contributing factors, and the resulting response frequencies should not be interpreted as independent injury events or individual risk estimates.

Table 7. Intrinsic Factors Reported During Training

Intrinsic factor	Responses (n)	Percentage (%)
Personal factors	15	16.85
Previous experience	6	6.74
Movement skills	3	3.37
Excessive training intensity	2	2.25
Incorrect movement technique	35	39.33
Insufficient warm-up	16	17.98
Inadequate rest	11	12.36
Nutritional factors	1	1.12
Total	89	100.00

Source: Primary research data, 2022

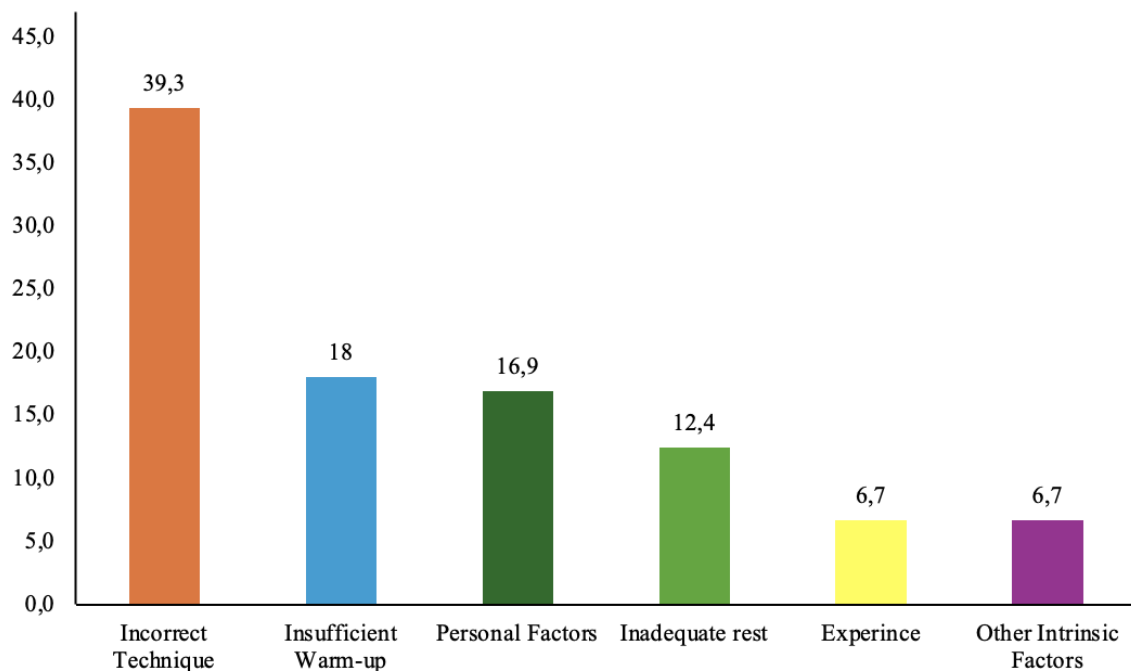


Figure 5. Distribution of Intrinsic Factors Reported During Training

The findings concerning incorrect movement technique and physical preparation can be considered in relation to previous research investigating biomechanics, functional movement assessment, and sports

injury prevention. Cheng (2024) examined sports injury prevention and treatment from a biomechanical perspective, providing a relevant framework for understanding the importance of movement characteristics in sporting activities. From this perspective, athletic movement involves interactions among muscular forces, joint positioning, movement coordination, and external mechanical demands, which may differ according to the characteristics of each sport. Liu et al. (2023) investigated the predictive value of functional movement screening among Chinese college students with different levels of physical activity and sports performance, demonstrating the relevance of investigating movement characteristics within sports injury research. Although the present study did not administer functional movement screening or evaluate specific movement deficiencies, the prominence of incorrect movement technique in the questionnaire responses indicates that movement-related characteristics deserve further investigation among regional game-sport athletes. Insufficient warm-up was the second most frequently reported intrinsic factor, accounting for 17.98% of responses. This finding is relevant to research by Ding et al. (2023), who investigated the efficacy of a neuromuscular warm-up program in reducing sports injury risk among Chinese schoolchildren. Although differences in age, sporting context, and research methodology limit direct comparison, the study provides a relevant perspective on structured physical preparation as a potential component of injury prevention. Warm-up activities may include progressive movements and sport-specific preparation intended to facilitate readiness for subsequent physical activity. However, because the present study did not record warm-up duration, exercise content, intensity, or adherence, it cannot establish whether particular warm-up practices were associated with injury occurrence. Similarly, the finding that personal factors accounted for 16.85% of responses indicates that athletes identified individual characteristics as relevant to their injury experiences, but the questionnaire did not provide sufficient detail to determine which personal characteristics were involved. Therefore, the results highlight the importance of investigating movement techniques and preparation routines while also demonstrating the need for more precise assessment methods.

Inadequate rest, previous sporting experience, movement skills, excessive training intensity, and nutritional factors were also represented among the intrinsic responses, although their reported frequencies were lower than those of incorrect movement technique and insufficient warm-up. Inadequate rest accounted for 12.36% of responses, indicating that recovery-related considerations formed part of athletes' perceptions of factors associated with injuries during training. Recovery is relevant to athletic preparation because athletes repeatedly participate in training sessions and competitions that place demands on physical performance and adaptation. De Jonge and Taris (2025) investigated sleep patterns in relation to sports injury prediction among recreational runners, while Shi and He (2024) examined athlete biorhythms and sports injuries. These studies provide broader research contexts for considering recovery and physiological characteristics in sports injury investigations. Nevertheless, the present research did not measure sleep duration, sleep quality, physiological rhythms, or objective recovery indicators. Accordingly, inadequate rest should be interpreted as a self-reported contributing factor rather than a confirmed physiological mechanism. Previous sporting experience, movement skills, training intensity, and nutrition were reported less frequently, but their lower proportions do not necessarily indicate that these factors are unimportant. The frequency with which respondents selected a factor may be influenced by questionnaire wording, athletes' awareness, and their interpretation of injury circumstances. From a practical perspective, the findings suggest that injury prevention efforts among Banjarbaru City athletes could benefit from greater attention to movement technique education, appropriate physical preparation, structured warm-up activities, and recovery management. Coaches and healthcare personnel may consider incorporating regular evaluations of technical execution and monitoring athletes' preparation routines, while recognizing that the effectiveness of specific interventions requires further investigation. Future research should employ prospective injury surveillance, standardized movement assessments, objective measures of training exposure, and detailed recovery evaluations to investigate potential relationships between intrinsic factors and injury occurrence. Overall, the findings contribute descriptive evidence showing that incorrect movement technique was the most frequently reported intrinsic factor during training and identify several athlete-related conditions that warrant further investigation in regional game-sport injury prevention programs.

Extrinsic Factors Contributing to Sports Injuries

The analysis of extrinsic factors associated with sports injuries during training identified several environmental, organizational, and sporting conditions reported by athletes representing Banjarbaru City at PORPROV XI South Kalimantan in 2022. As presented in Table 8 and Figure 6, a total of 62 extrinsic-factor responses were recorded, with sports infrastructure representing the most frequently reported category at 41.94% (26 responses), followed by sports facilities at 30.65% (19 responses) and collisions at 20.97% (13 responses). Other reported factors included sport characteristics at 3.23% (2 responses), environmental conditions at 1.61% (1 response), and refereeing-related factors at 1.61% (1 response), while spectator-related factors accounted for 0.00% of responses. These findings indicate that infrastructure and facilities collectively accounted for a substantial proportion of the extrinsic-factor responses, suggesting that athletes frequently identified conditions associated with sporting environments when reporting factors related to their injury experiences. Sports infrastructure encompasses the physical components supporting training and competition, whereas sports facilities refer to the resources and spaces used to conduct sporting activities. Depending on the characteristics of each sport, these conditions may include playing surfaces, training areas, sporting equipment, and other physical components necessary for athletic participation. Game sports are performed under different environmental and technical conditions, and the suitability of sporting environments may influence athletes' ability to execute movements and participate in training activities. However, the present study did not conduct objective safety inspections, assess playing surface characteristics, or document the environmental circumstances surrounding individual injuries. Consequently, the prominence of infrastructure and facility responses cannot establish that particular environmental deficiencies directly caused the reported injuries. The findings should instead be interpreted as descriptive evidence that athletes frequently perceived external sporting conditions as relevant to their injury experiences. Additionally, because the percentages were calculated from 62 extrinsic-factor responses, they represent the relative distribution of selected factors rather than the proportion of athletes who experienced injuries attributable to each category.

Table 8. Extrinsic Factors Reported During Training

Extrinsic factor	Responses (n)	Percentage (%)
Collisions	13	20.97
Facilities	19	30.65
Infrastructure	26	41.94
Environment	1	1.61
Spectators	0	0.00
Referees	1	1.61
Sport characteristics	2	3.23
Total	62	100.00

Source: Primary research data, 2022. Percentages are rounded

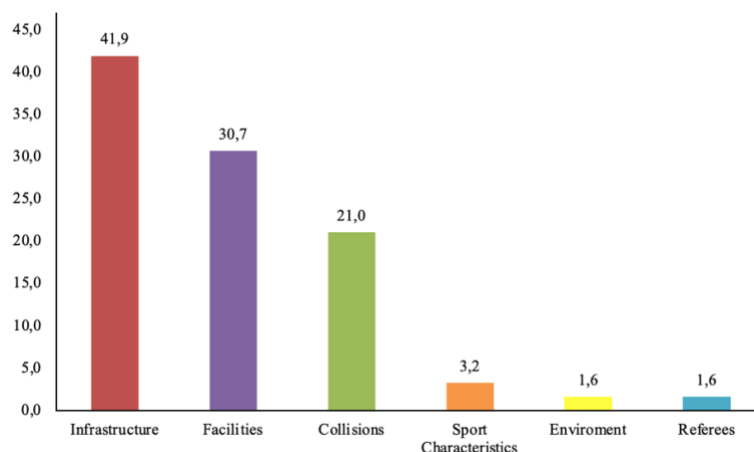


Figure 6. Distribution of Extrinsic Factors Reported During Training

The importance of considering sporting environments in injury-related research can be discussed in relation to previous investigations addressing athletes' experiences and injury prevention in different sporting contexts. Gerçek et al. (2023) examined sports injury anxiety among athletes participating on different surfaces, providing a relevant perspective on the relationship between sporting environments and injury-related perceptions. Although that study focused on psychological responses rather than objectively measured facility conditions, it demonstrates the broader relevance of environmental characteristics in sports injury research. The present findings extend this discussion to a regional competitive context by identifying infrastructure and facilities as frequently reported extrinsic factors among athletes participating in multiple game sports. Nevertheless, differences in the outcome measures, research designs, and participating populations prevent direct comparison of the findings. Collisions represented another important extrinsic category, accounting for 20.97% of responses. Physical contact between athletes may occur during sports involving direct interaction, competition for possession, defensive movements, or close positioning between participants. Sports such as football, futsal, and basketball include situations in which players may interact physically while performing rapid movements, whereas other game sports involve different forms of interaction and physical demands. These characteristics provide a relevant context for discussing collision-related responses, although the survey did not distinguish between player-to-player contact, contact with equipment, or other collision mechanisms. Research by Nicholas and Ekom (2025), which examined sports injury patterns and injury prevention strategies among professional football players, provides an additional perspective on injury-related considerations in competitive team sports. However, the original study did not categorize collision mechanisms or compare extrinsic factors separately across the 14 participating sports. Consequently, the results cannot determine whether particular sporting disciplines, forms of contact, or environmental conditions were associated with greater injury occurrence. The relatively small proportions attributed to sport characteristics, environmental conditions, and refereeing also require cautious interpretation because a low frequency of reported responses does not necessarily indicate that these factors have no relevance to athlete safety.

From a practical perspective, the predominance of infrastructure- and facility-related responses emphasizes the importance of considering external sporting conditions within regional sports injury prevention and management programs. Although athlete-centered preparation remains important, the findings suggest that injury prevention strategies should also involve the organizations and personnel responsible for providing and maintaining sporting environments. Regional sports authorities, competition organizers, coaches, and facility managers may benefit from establishing procedures for evaluating training areas, maintaining equipment, identifying potential environmental hazards, and responding to safety concerns reported by athletes. The findings concerning collisions also suggest the value of reviewing sport-specific safety procedures and providing appropriate technical instruction related to physical interactions during training and competition. Nevertheless, these recommendations should be understood as potential preventive considerations rather than interventions demonstrated to be effective by the present study. The questionnaire did not establish the timing of environmental exposure relative to injury occurrence, and it did not assess the quality of sporting facilities through standardized measurement procedures. Furthermore, the analysis combined athletes from different game sports, limiting the ability to identify whether particular external conditions were more frequently reported within specific disciplines. Future research should therefore incorporate systematic facility assessments, prospective injury recording, detailed classification of contact mechanisms, and sport-specific analyses to clarify the relationships between external sporting conditions and injury occurrence. Integrating athlete-reported information with objective evaluations of training environments may also provide a more comprehensive understanding of the circumstances surrounding sports injuries. Overall, the present findings demonstrate that sports infrastructure, facilities, and collisions were the predominant extrinsic factors reported during training among Banjarbaru City game-sport athletes. These results contribute context-specific descriptive evidence and highlight the importance of considering both organizational responsibilities and athlete-related preparation when developing comprehensive injury surveillance and prevention strategies for regional competitive sports.

Contributing Factors During Competition

The analysis of reported contributing factors during competition revealed that intrinsic factors constituted a greater proportion of responses than extrinsic factors among Banjarbaru City athletes participating in game sports at the XI South Kalimantan Provincial Sports Week (PORPROV) in 2022. As presented in Table 9, a total of 33 contributing-factor responses were recorded, consisting of 23 intrinsic-factor responses (69.70%) and 10 extrinsic-factor responses (30.30%). These findings indicate a difference of approximately 39.40 percentage points between the two categories, demonstrating that factors associated with athletes' individual characteristics and preparation were reported more frequently than those related to external sporting conditions. Intrinsic factors may include movement techniques, physical readiness, preparation routines, and recovery-related conditions, whereas extrinsic factors involve environmental characteristics, sporting infrastructure, and interactions between participants. The original research also reported that collisions, incorrect movement techniques, insufficient warm-up, and inadequate rest each accounted for 21.74% of responses within a reported category during competition. However, these categories require careful interpretation because collisions were classified as an extrinsic factor elsewhere in the questionnaire analysis. This inconsistency indicates that the original response classifications and denominators should be verified before drawing detailed conclusions regarding individual contributing factors. Nevertheless, the overall distribution suggests that athletes frequently associated their competition-related injuries with factors involving physical preparation and sporting activities. Competitive game sports require athletes to perform complex physical movements under changing tactical and environmental conditions, including acceleration, deceleration, jumping, landing, and rapid directional changes. These activities provide a relevant context for interpreting athletes' reported injury experiences, although the present study did not objectively assess movement execution, physiological conditions, or injury mechanisms. Consequently, the predominance of intrinsic-factor responses should be interpreted as a descriptive pattern rather than evidence that intrinsic factors independently caused a greater proportion of injuries during competition.

Table 9. Distribution of Reported Contributing Factors During Competition

Factor category	Responses (n)	Percentage (%)
Intrinsic	23	69.70
Extrinsic	10	30.30
Total	33	100.00

Source: Primary research data, 2022

The findings can be discussed in relation to previous studies investigating sports injury characteristics during training and competition. Li et al. (2025) examined factors associated with sports injuries among Korean youth track and field athletes during training and competition, providing a relevant perspective on the importance of distinguishing between different sporting contexts when evaluating injury-related characteristics. Although track and field events differ from the game sports examined in the present study, the research illustrates the value of considering injury patterns within specific phases of athletic participation. Similarly, Nicholas and Ekom (2025) investigated patterns of sports injuries and their association with injury prevention strategies among professional football players, offering a comparative context involving competitive team sports. These publications demonstrate the relevance of examining injury-related factors within organized sporting environments. However, the present study employed a descriptive questionnaire-based approach rather than prospective injury monitoring or an analytical design capable of identifying causal relationships. Therefore, direct comparisons regarding injury risk or the effects of particular contributing factors are not justified. The findings nevertheless provide information about how athletes reported intrinsic and extrinsic factors during competition and highlight the importance of collecting more detailed evidence on movement execution, physical preparation, contact mechanisms, and environmental conditions. Future investigations could examine these characteristics using standardized injury classifications, athlete-exposure measurements, clinical assessments, and sport-specific analyses. Such approaches would help clarify the circumstances associated with injuries and support the development of more targeted injury prevention strategies for regional competitive athletes.

Medical Support and Sports Injury Management

The availability of medical support represents an important component of athlete health management and injury-related preparedness during organized sporting events. The findings presented in Table 10 indicate that 191 athletes (94.09%) reported the availability of medical support, whereas 12 athletes (5.91%) reported that medical support was unavailable. These results demonstrate that the majority of participants perceived medical services as accessible within their sporting environments. Such availability is relevant to regional competitive events because athletes participating in different game sports may experience injuries requiring assessment, initial management, and subsequent medical attention. Medical support can form part of a broader system of athlete care involving injury recognition, appropriate referral, rehabilitation, and decisions concerning participation in subsequent training or competition. However, the present study assessed reported availability rather than the quality or effectiveness of medical services. The questionnaire did not systematically examine the qualifications of healthcare personnel, availability of medical equipment, response times, treatment procedures, or rehabilitation outcomes. Therefore, the high proportion of athletes reporting medical support should not automatically be interpreted as evidence that all participants received comprehensive or standardized injury management. Similarly, the relatively small proportion reporting unavailable services identifies a potential concern but does not explain whether the absence reflected particular sporting disciplines, competition locations, or differences in service provision. These findings provide descriptive information regarding athletes' perceptions of medical support and indicate the value of examining healthcare preparedness more systematically within regional sports organizations.

Table 10. Reported Availability of Medical Support

Medical support	Athletes (n)	Percentage (%)
Available	191	94.09
Unavailable	12	5.91
Total	203	100.00

Source: Primary research data, 2022

The importance of professional preparedness and injury prevention knowledge has been examined in previous research involving different sporting and educational settings. Alnefaie et al. (2025) investigated awareness and implementation of sports injury prevention programs among physical therapists in Saudi Arabia, providing a relevant context for understanding professional involvement in injury prevention. Alharthy et al. (2024) examined preparedness for sports injuries among primary school teachers, while Uzoigwe et al. (2025) investigated sports injury knowledge and attitudes among physical education teachers in Nigeria. Although these studies involved populations and institutional environments that differ from the Banjarbaru contingent, they demonstrate the broader relevance of knowledge, professional preparedness, and organizational support in sports injury management. In the context of the present research, the availability of medical services reported by most athletes provides an initial indication of existing support, but further evaluation is necessary to determine whether these services adequately address athletes' needs across different game sports. From a practical perspective, regional sports organizations may benefit from strengthening coordination among coaches, healthcare personnel, and event organizers, particularly in relation to injury reporting, medical referral, and safe return-to-sport procedures. Future investigations should assess medical personnel qualifications, access to injury treatment, emergency preparedness, rehabilitation availability, and athlete experiences with healthcare services. Such information would complement the present descriptive findings and provide a stronger foundation for improving athlete safety and injury management within regional competitive sports.

Research Novelty and Contribution to Sports Science

The primary contribution of this study lies in its context-specific examination of anatomical injury locations and reported contributing factors among athletes representing Banjarbaru City in multiple game sports at PORPROV XI South Kalimantan in 2022. Rather than focusing exclusively on a single sporting discipline or a particular injury diagnosis, the research included athletes participating in 14 game sports and distinguished between injury experiences reported during training and competition.

This approach provided a broader descriptive perspective on injury patterns within a regional multisport contingent. The findings identified lower-extremity injuries as prominent among reported anatomical injury locations, particularly those involving the ankle, while incorrect movement technique and sporting infrastructure represented frequently reported intrinsic and extrinsic factors during training, respectively. These results provide information that may be useful for identifying priorities in regional athlete preparation and injury surveillance. However, the novelty of the study should be interpreted within its specific population and research context rather than as evidence of a newly discovered injury mechanism or universally applicable prevention strategy. The investigation employed a descriptive survey and did not establish causal relationships, evaluate interventions, or introduce a new clinical injury assessment instrument. Its scientific contribution therefore consists primarily of documenting athlete-reported injury patterns and contributing factors within an athletic population for which context-specific information was limited. By distinguishing anatomical injury locations and reported contributing factors across training and competition settings, the study provides an initial descriptive foundation for more comprehensive investigations of sports injury occurrence in regional game-sport athletes.

The importance of standardized injury information and methodological development has been addressed in contemporary sports science literature. Orchard et al. (2025) discussed updates to the Orchard Sports Injury and Illness Classification System, emphasizing the relevance of consistent injury terminology and classification for sports injury research. Although the present study did not employ this classification system, future investigations could benefit from standardized definitions to improve the reliability and comparability of injury records. Hausken-Sutter et al. (2023) examined interdisciplinary sports injury research and the integration of qualitative and quantitative data, providing a relevant perspective on the potential value of combining athlete-reported information with clinical assessments, observation, and detailed descriptions of sporting circumstances. Technological developments have also created opportunities for more advanced approaches to injury-related assessment. Ayala et al. (2024) investigated machine learning techniques for the early identification of injury risks among athletes, while Li and Gu (2025) examined cognitive evaluation and medical imaging in sports injury rehabilitation. These studies illustrate possible directions for future sports injury research but should not be interpreted as directly explaining the findings obtained from the Banjarbaru survey. Before advanced predictive approaches can be considered, consistent data collection and clearly defined injury outcomes are required. Therefore, future studies involving the Banjarbaru athletic population should prioritize prospective surveillance, standardized injury classifications, sport-specific exposure information, and clinically verified diagnoses. Integrating these approaches with athlete-reported experiences may help strengthen the scientific contribution of regional sports injury research and support the development of evidence-informed injury prevention initiatives.

Practical Implications for Injury Prevention

The findings of this study provide several practical considerations for improving sports injury surveillance, athlete preparation, and injury prevention among regional game-sport athletes. First, the predominance of lower-extremity injury responses, particularly those involving the ankle, indicates that lower-limb preparation deserves attention within training and competition programs. Coaches and healthcare personnel may consider reviewing athletes' movement techniques, physical conditioning, and sport-specific preparation routines to identify areas requiring additional support. Because game sports involve different combinations of running, jumping, landing, acceleration, and changes of direction, preparation programs should take account of the movement characteristics and physical demands of each sporting discipline. Second, the finding that incorrect movement technique represented the most frequently reported intrinsic factor during training suggests that technical instruction and movement evaluation may warrant particular attention. Regular feedback concerning movement execution and appropriate physical preparation may support athletes' development, although the effectiveness of specific interventions should be assessed through further research. Third, the substantial proportion of infrastructure- and facility-related responses highlights the potential importance of evaluating the environments in which athletes train and compete. Regional sports organizations and facility managers may consider routine inspections, appropriate equipment maintenance, and procedures for identifying conditions that could compromise sporting safety. Fourth, the findings concerning medical support indicate the value of maintaining accessible healthcare services and strengthening collaboration among

athletes, coaches, medical personnel, and event organizers. Such cooperation may support appropriate injury reporting, medical assessment, referral, rehabilitation, and return-to-sport decision-making. These recommendations are based on the descriptive patterns identified in the study and should not be interpreted as interventions whose effectiveness has already been demonstrated among the participating athletes.

The practical implications of the findings are consistent with broader research themes concerning structured preparation, injury surveillance, and prevention-oriented athlete management. Ding et al. (2023) investigated a neuromuscular warm-up program for reducing sports injury risk among schoolchildren, providing a relevant research perspective on structured physical preparation. Qiao (2024) examined functional fitness training for the prevention of acute foot and ankle injuries, addressing an anatomical region that was prominent in the present findings. Murphy et al. (2025) investigated training load and injury surveillance among schoolboy rugby players, illustrating the importance of systematically documenting athletic participation and injury experiences. Furthermore, Orchard et al. (2025) addressed standardized injury classification, highlighting a methodological consideration relevant to improving sports injury records. Although these studies involved different populations, research designs, and intervention contexts, they provide useful perspectives for identifying possible directions for injury prevention and surveillance programs. In the Banjarbaru context, an integrated approach involving athlete preparation, environmental safety, accessible medical support, and consistent injury recording may provide a practical framework for future program development. However, the present study did not evaluate the effectiveness of any specific intervention, and recommendations should therefore be implemented and assessed according to the requirements of individual sports and the available professional expertise. Future research could investigate whether structured preparation programs, improved facility management, and prospective injury monitoring contribute to measurable changes in injury occurrence and athlete health outcomes.

Study Limitations and Future Research

Several methodological limitations should be considered when interpreting the findings of this study. First, the investigation employed a descriptive questionnaire-based survey, which provides information about athletes' reported injury experiences but does not establish causal relationships between contributing factors and injury occurrence. The intrinsic and extrinsic factors identified in the findings therefore represent reported associations or perceptions rather than objectively confirmed mechanisms. Second, injury information was obtained through questionnaire responses without systematic clinical verification, which limits the ability to distinguish specific injury diagnoses, severity levels, and anatomical structures involved. Third, the research did not collect standardized measures of athlete exposure, such as training hours, competition duration, or the frequency of participation in particular sporting activities. Consequently, the reported percentages cannot be interpreted as exposure-adjusted injury incidence rates, and direct comparisons of injury risk between training and competition are not justified. Fourth, participants represented 14 game sports with different movement patterns, physical demands, and competitive characteristics, yet the findings were primarily analyzed in aggregate form. This approach provides a broad description of injury patterns but limits the identification of sport-specific differences. Fifth, athletes may have selected more than one injury location or contributing factor, meaning that the number of responses did not necessarily correspond to the number of individually injured athletes. This distinction is particularly important when interpreting anatomical injury distributions and intrinsic or extrinsic factor percentages. Finally, inconsistencies in the original research manuscript, including differences in reported population figures, competition-related ankle injury percentages, and the classification of certain contributing factors, require verification using the original dataset before final publication. These limitations do not eliminate the descriptive value of the findings, but they should be acknowledged to ensure that the conclusions remain consistent with the evidence obtained.

Future research should address these limitations through more comprehensive study designs and standardized data collection procedures. Prospective injury surveillance would allow researchers to record injuries closer to the time of occurrence and obtain more detailed information regarding anatomical location, injury type, severity, sporting exposure, and circumstances surrounding injury events. Standardized injury definitions and classification systems would also improve consistency across participants and sporting disciplines. In addition, sport-specific analyses could identify

differences in injury patterns among athletes participating in football, basketball, volleyball, futsal, badminton, and other game sports, allowing more focused investigations of sporting demands and prevention priorities. Incorporating clinical injury assessments, previous injury history, objective measures of physical preparation, training load monitoring, and recovery indicators would provide stronger evidence regarding factors associated with injury occurrence. Future studies could also investigate athletes' experiences of medical services, access to rehabilitation, recovery duration, and return-to-sport outcomes. Combining quantitative injury surveillance with qualitative information may further clarify how athletes perceive injury-related circumstances and sporting conditions. Overall, the present study provides preliminary descriptive evidence concerning injury locations and reported contributing factors among Banjarbaru City athletes participating in regional game sports. By identifying prominent anatomical injury locations and frequently reported intrinsic and extrinsic factors, the findings offer an initial foundation for developing more comprehensive injury surveillance programs and informing future prevention-oriented research. Nevertheless, verification of the original data and the application of more rigorous prospective methods remain essential for strengthening the reliability, interpretation, and practical application of subsequent findings.

CONCLUSION

The findings of this study indicate that lower-extremity injuries were more frequently reported than upper-extremity injuries among Banjarbaru City athletes participating in game sports at the XI South Kalimantan Provincial Sports Week (PORPROV) in 2022. The ankle was identified as the most frequently reported injury location during both training (40.54%) and competition (46.15%). Regarding contributing factors, incorrect movement technique was the most frequently reported intrinsic factor during training (39.33%), whereas sports infrastructure was the predominant extrinsic factor (41.94%). During competition, collisions, incorrect movement techniques, insufficient warm-up, and inadequate rest were commonly reported as contributing factors. These findings highlight the importance of appropriate movement techniques, structured physical preparation, adequate recovery, and safe sporting facilities in supporting athlete safety. The study contributes descriptive evidence concerning injury locations and reported contributing factors among regional game-sport athletes, providing a basis for developing more targeted injury surveillance and prevention strategies. Coaches, athletes, sports organizations, and healthcare personnel should collaborate to improve injury prevention practices during training and competition. Further research employing prospective designs, standardized injury assessments, and sport-specific analyses is recommended to identify injury mechanisms and evaluate the effectiveness of preventive interventions.

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