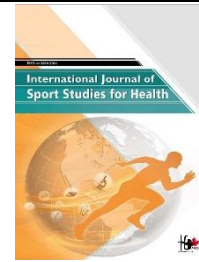


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Lower Extremity Injuries in Basketball Players: A Systematic Review



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Objective: This study aims to analyze recent scientific evidence on lower extremity injuries in basketball practice, identifying the most affected anatomical regions, the most frequent types of injury, and their distribution according to age, gender, and level of sports participation.

Methods and Materials: A systematic review was conducted following PRISMA 2020 guidelines, through a search of scientific articles published between 2017 and 2025 in databases such as PubMed, Scopus, SciELO, Redalyc, and Google Scholar. Quantitative studies addressing lower extremity injuries in basketball players of different participation levels (recreational, amateur, and professional), genders, and age groups were included. After the processes of identification, screening, and eligibility, a total of 27 studies were included in the final analysis.

Findings: The results indicate that lower extremities account for the majority of basketball-related injuries, representing approximately 60–75% of the cases reported across studies. The reviewed literature identified the ankle as the most frequently affected anatomical region, with ankle sprains being the predominant injury, particularly among amateur, adult, and female populations. The knee was the second most commonly reported site, with ligament injuries associated with greater severity and longer periods of time loss. Some studies showed that injury incidence increased with age, training volume, and competitive level, and was mainly associated with basketball-specific movements such as jumping, landing, and changes of direction.

Conclusion: Basketball is associated with a high burden of lower extremity injuries, particularly affecting the ankle and knee across different populations. These findings highlight the need for sport-specific injury prevention programs emphasizing neuromuscular training and proprioception, especially in youth and amateur settings, and underscore the importance of improving epidemiological surveillance in basketball.

Keywords: sports injuries, lower extremity, basketball, sports epidemiology, injury prevention.

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1. Introduction

Sports practice and physical activity generate positive effects on the body, mind, and social relationships, playing a key role in both the prevention and treatment of various conditions (1). Currently, there is a large body of research supporting the positive relationship between physical activity and health, with most studies focusing on the prevention or reduction of pathological symptoms (2).

Bové (3) notes that basketball is currently recognized as a sport involving physical contact and is considered one of the most comprehensive high-impact games. This discipline is widely practiced worldwide and offers substantial benefits for physical fitness, promoting rhythmic acceleration, muscular coordination, speed, and cardiovascular endurance.

Moreover, the literature highlights various benefits associated with basketball participation across different stages of human development, ranging from the enhancement of physical and coordinative capacities to the development of social skills, mental health, and even the promotion of values (4).

Despite the multiple benefits associated with playing basketball, studies have also documented the risks involved in practicing this sport, particularly musculoskeletal injuries and those resulting from overload or overuse (5). Considering that basketball demands a high level of cognitive processing and mental control—especially in contexts of intense physical confrontation and situations requiring rapid tactical decisions (6)—injuries commonly occur during games or training sessions, with the lower extremities being the most affected (7).

Studies conducted in professional leagues, such as the National Basketball Association (NBA), have identified ankle sprains, hamstring muscle strains, and knee ligament injuries—such as anterior cruciate ligament (ACL) tears—as the most common injuries in this region (8, 9).

Anatomically, the ankle is formed by the tibiotalar joint, which connects the tibia, fibula, and talus, and primarily allows dorsiflexion and plantarflexion movements, complemented by inversion and eversion at the rearfoot joints (10). From a functional perspective, the ankle acts as a dynamic adaptor that responds to surface irregularities and absorbs forces generated during foot–ground contact. Proper ankle biomechanics allow for adequate load distribution toward superior structures such as the knee and hip (11).

Adámez (12) concluded that male basketball players present a higher incidence of knee and ankle injuries than female athletes, even in the absence of contact with another player during competition. Similarly, Andreoli (7) reported that most injuries were concentrated in the lower extremities, accounting for more than 60% of all recorded injuries. This pattern was observed regardless of gender, with similar statistics for women and men. Furthermore, injury frequency varied according to the level of sports participation, with a higher prevalence observed among master-level athletes, followed by professionals, and then by youth and junior categories.

Although evidence exists regarding the most frequent lower extremity injuries by anatomical region and by athlete gender, there remains a gap in studies examining the relationship between injury occurrence and level of basketball participation, as well as in research involving underage populations. Additionally, there is limited scientific production focused on sports epidemiology, particularly in relation to basketball within youth development categories (13).

Therefore, it is highly relevant to have evidence-based research that considers variables such as age and level of sports participation to guide future studies addressing the design and implementation of programs aimed at reducing lower extremity injury risk, as well as to provide useful information for coaches and basketball professionals.

Accordingly, the purpose of this study is to conduct a systematic review of research published over the past eight years to identify the most common lower extremity injuries in basketball, considering different levels of competition (recreational, amateur, and professional), as well as various gender and age categories.

2. Methods and Materials

This study was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines (14) in order to ensure greater validity and scientific rigor in data collection, using a descriptive-qualitative systematic review. The strategy implemented for the search was carried out using search equations based on keywords, adapted to the databases consulted. For example, the following search equations were used: (“basketball” AND “injuries”), (“injury epidemiology” AND “basketball”), and (“ankle injuries” OR “knee injuries”). The search process was conducted during the months of March and April 2025.

A comprehensive literature search was conducted on the incidence, epidemiology, and outcomes of the most prevalent injuries in basketball using databases such as PubMed, Scopus, SciELO, Redalyc, and Google Scholar. The search was limited to articles published over the past eight years.

For the final selection of articles, titles and abstracts were first reviewed to exclude non-relevant studies, followed by a full-text analysis of the selected articles. The entire selection process was documented using the PRISMA 2020 flow diagram.

The inclusion criteria comprised quantitative and qualitative research studies addressing lower extremity injuries, published between 2017 and 2025, and available through open access. Exclusion criteria included systematic review articles and studies with restricted access, as well as publications outside the specified time frame or databases, duplicate records, and non-scientific dissemination articles.

To determine the risk of bias of the studies included in this review, the JBI Critical Appraisal Checklist was used. Data extraction and study appraisal were conducted independently by two reviewers from the research team.

Discrepancies were resolved by consensus and, when necessary, with the involvement of a third reviewer.

To assess the methodological quality of each article, the items from the checklists were considered in accordance with JBI methodological recommendations. Studies were classified as low quality when they presented major methodological deficiencies, moderate quality when they showed some limitations, and high quality when they met the majority of the established methodological criteria.

3. Results

A total of 248 articles were identified, selected, and extracted from the different databases consulted. Of these, 33 were excluded due to duplication and 8 were discarded due to legibility issues. After removing duplicates and the initial exclusions, 207 records remained for review, with 149 being eliminated for not meeting inclusion criteria such as year of publication, type of injury, type of sport, and for lacking an appropriate methodological design. Subsequently, 58 articles were evaluated to determine the risk of bias, leaving 27 studies that met the required criteria and were included in the systematic review in accordance with the PRISMA 2020 methodology (Figure 1).

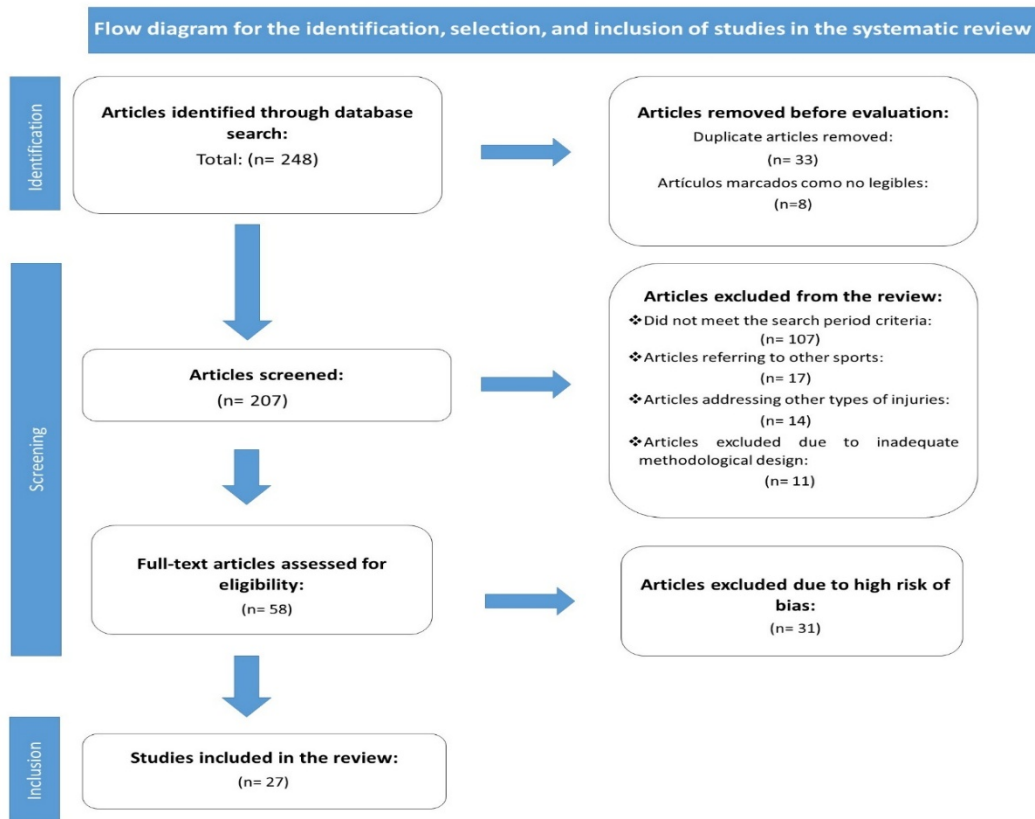


Figure 1. PRISMA 2020 flow diagram of study selection.

Table 1 presents the distribution of the 27 articles included in this review that report sports injuries organized by anatomical region (ankle, knee, thigh, hip, and unspecified), level of sports participation (professional, amateur, recreational), age group, and gender. These data allow for the identification of trends and patterns in injury occurrence across different athletic populations, highlighting how factors such as age, level of competition, and gender may influence injury frequency and type.

The ankle was the most frequently reported anatomical region in the scientific literature, with a greater representation of studies focusing on amateur athletes, particularly women over 22 years of age. The knee was identified as the second most frequently reported injury site, mainly among amateur athletes aged 13 to 22 years, with a higher incidence observed in males.

Reports of thigh and hip injuries were scarce, which may indicate a lower incidence, limited academic focus, or

the application of specific inclusion criteria within the reviewed studies.

The results also show a greater number of investigations focusing on injuries in amateur-level basketball players, with a higher representation of female athletes. Additionally, a lack of studies involving recreational basketball participants was observed, suggesting an important opportunity for future research at this level of practice.

In summary, the findings indicate that the most extensively reported lower extremity injuries in the scientific literature involve the ankle and knee, with a greater number of studies focusing on amateur athletes. Ankle injuries appear to be more strongly associated with adult players, and a significant research gap exists regarding lower extremity injuries in recreational basketball participants.

Table 1 summarizes the distribution of studies, not injury incidence rates.

Table 1. Distribution of scientific articles reporting lower extremity injuries by anatomical region, level of participation, age, and gender in basketball players.

| Anatomical region | Professional (n) | Amateur (n) | Recreational (n) | < 12 years (n) | 13–22 years (n) | > 22 years (n) | Women (n) | Men (n) |
|-------------------|------------------|-------------|------------------|----------------|-----------------|----------------|-----------|---------|
| Ankle | 3 | 13 | — | 2 | 7 | 13 | 5 | 4 |
| Knee | — | 6 | — | 1 | 3 | — | 2 | 3 |
| Thigh | 1 | — | — | — | — | 1 | — | 1 |
| Hip | — | 1 | — | — | 1 | — | 1 | — |
| Unspecified | 1 | 1 | — | — | 2 | 1 | 2 | 1 |

Note: n = number of articles. The symbol “—” indicates data not reported

Table 2 presents the selected articles and their analysis, focusing on the identification of the most frequent lower extremity injuries, their prevalence, and their distribution according to sex, age, and level of basketball participation. The included studies span a broad time period, with a predominance of descriptive and observational methodologies, mainly using cross-sectional, retrospective, and longitudinal designs.

Overall, the included studies consistently indicate that lower extremities account for approximately 60–75% of all basketball-related injuries, regardless of sex or competitive level. Specifically, proportions of 60% have been reported in elite female players, 67.6% in women’s leagues, 73.5% in collegiate basketball, and around 70% in professional injury surveillance studies. These findings reinforce the evidence that the lower extremities constitute the predominantly injured anatomical region in basketball practice.

Moreover, the ankle was identified as the most affected lower extremity region in basketball, with ankle sprain being the most prevalent injury type. Several studies reported that ankle sprains account for approximately 40–45% of all basketball-related injuries and up to 43.3% of ankle and foot injuries in women’s basketball. Additionally, in female youth populations, ankle sprains were found to represent as much as 72.3% of total injuries, demonstrating their high frequency during formative stages. The literature also highlights the relevance of a previous ankle sprain as a key risk factor, as up to 97% of players with chronic ankle instability report a history of ankle sprain, with this condition identified in approximately 77% of cases.

Another lower extremity region frequently reported in the literature is the knee, accounting for approximately 25–31% of total injuries. Within this anatomical location, anterior cruciate ligament (ACL) ruptures were identified as severe injuries which, despite their lower frequency, are

associated with longer periods of sport-related absence. Studies also reported a higher incidence of this injury type among female basketball players, mainly occurring through non-contact injury mechanisms.

Injury incidence was found to increase with age and level of participation, occurring predominantly during player contact and being associated with biomechanical mechanisms such as jumping, landing, and changes of direction. In studies with longitudinal follow-up, a cumulative injury incidence of 9.57% after 12 weeks was reported in youth basketball, as well as a 19.1% incidence of ankle sprains in cohorts with a five-month follow-up period. At the professional level, injury surveillance systems reported between 1,550 and 1,892 injuries per season, with the ankle being the most frequently affected site.

The findings further indicate that injury incidence increases with age, playing volume, and competitive level. Regarding sex- and age-related differences, several studies reported a higher prevalence of injuries among women, particularly ankle sprains and chronic ankle instability, as

well as among adolescents and young adults, who showed a gradual increase in knee injuries. In youth development contexts, ankle injuries were more frequent in under-16 players compared with under-18 players, indicating differences in injury risk according to developmental stage.

It should be noted that the interpretation of injury frequency in this review is based on the number of studies reporting specific injuries rather than on pooled incidence or prevalence rates.

Finally, the table presents the methodological quality of the studies included in this review, which ranged from moderate to high. The main strengths identified were the adequate definition of the study population, clear descriptions of injury identification methods, and transparent reporting of results. The most frequent limitations included limited information on the control of confounding factors, heterogeneity in injury diagnostic criteria, and, in some cases, insufficient justification of sample size and follow-up period. Overall, the indicators of this assessment suggest a low to moderate risk of bias among the analyzed studies.

Table 2. Content of studies included in the review.

| Title | Author | Study type | Age | Men | Women | Main findings | Methodological quality |
|--|----------------------------|--|-------|-----|-------|---|------------------------|
| Sports injuries in female youth basketball. | Ayán et al. (15) | Retrospective cross-sectional study. | 13 | NR | 348 | Sprains predominated; 72.3% of injuries were located in the lower extremities. | Moderate |
| Descriptive Epidemiology of Non-Time-Loss Injuries in Collegiate and High School Student-Athletes. | Dompier et al. (16) | Descriptive observational epidemiological study. | NR | NR | NR | The lower extremity was the most frequently injured region, with ankle sprains and knee ligament injuries predominating; muscle strains and Achilles tendon injuries were less frequent, and fractures were uncommon. Injury incidence increased with age and competitive level, occurred mainly through non-contact mechanisms, and knee injuries were associated with greater severity and time loss. | Moderate |
| Incidence of sports injuries in amateur basketball players. | López et al. (17) | Longitudinal descriptive epidemiological study. | 18 | NR | 252 | Ankle sprain predominated; injuries occurred mainly through non-contact mechanisms, with a higher incidence in women and generally mild severity. | High |
| Training habits, motivation, quality of life, and sport injuries in 12- to 15-year-old basketball players. | Sánchez-Jover & Gómez (18) | Descriptive epidemiological study. | 12–15 | NR | NR | Ankle sprains were the most common injury, followed by knee sprains. The most frequent injury mechanism was falls (34%), followed by contact with another player (27%). | Moderate |
| Epidemiology of injury in a non-professional basketball club during a regular | Carnero et al. (19) | Prospective observational study. | 12–40 | 170 | 60 | Knee and calf injuries resulted in the greatest mean time loss from sport (14.29 and 10.2 sessions, respectively), with anterior cruciate ligament | High |

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| season: A prospective study. | | | | | | (ACL) tears identified as the most severe lower extremity injuries. | |
| Relationship between training planning and sports injuries in federated basketball players aged 12 to 15 years. | Sánchez-Jover & Gómez (20) | Quantitative descriptive study. | 12–16 | 155 | 62 | The most frequent injury was ankle sprain, followed by knee injuries, and then low back pain and patellar tendinitis/chondropathy. | Moderate |
| 10-Year Epidemiology of Ankle Injuries in Men's and Women's Collegiate Basketball. | Tummala et al. (21) | Descriptive epidemiological study. | 18–22 | 81 teams (2004–2009); 28 teams (2009–2014) | 84 teams (2004–2009); 29 teams (2009–2014) | In men, 1,298 ankle injuries were recorded, predominantly ACL tears (79.97%), followed by deltoid ligament injuries (7.24%) and anterior tibiofibular syndesmosis sprains (7.01%). In women, the most frequent injuries were ACL tears (83.47%), followed by anterior tibiofibular syndesmosis sprains (7.05%) and other ligament injuries (5.57%). | High |
| Prevalence of Musculoskeletal Injuries, Pain, and Illnesses in Elite Female Basketball Players. | Garbenytė-Apolinskienė et al. (22) | Retrospective study. | 17–29 | NR | 389 | Lower extremity injuries were the most frequent (60%), mainly affecting the ankle, knee, and calf/Achilles tendon. The predominant injury was ankle sprain, followed by knee ligament injuries, muscle strains, and musculoskeletal pain. | Moderate |
| Ankle Sprain Risk Factors: A 5-Month Follow-Up Study in Volleyball and Basketball Athletes. | Moré-Pacheco et al. (23) | Single-blind cohort study. | 15–17 | 47 | NR | 19.1% sustained ankle sprains; 61.1% occurred in the left foot; 72.2% were grade II and 27.8% grade I. Most occurred during training, mainly when landing on one foot after a jump. | High |
| A retrospective study of mechanisms of anterior cruciate ligament injuries in high school basketball, handball, judo, soccer, and volleyball. | Takahashi et al. (24) | Retrospective study. | 15–17 | 500 | 500 | Lower extremity injuries predominated in basketball, with a higher incidence of ankle sprains; knee ligament injuries were less frequent but more severe. Incidence was higher in adolescents and higher competitive levels, mainly through non-contact mechanisms. | Moderate |
| Analysis of injury incidence and warm-up habits in women's basketball. | Robles et al. (25) | Retrospective descriptive study. | 17–29 | NR | 204 | The most affected anatomical structure was the ankle/foot (43.3%), followed by the knee (30%) and thigh (10%). Hip injuries accounted for 6.7% of cases. | Moderate |
| Epidemiology of injuries in a professional basketball team in Argentina: A two-year retrospective study. | Crespo (26) | Quantitative descriptive study. | Mean 28 | 33 | NR | Injury prevalence was 60.6%; 33.3% occurred during matches and 66.7% during training. Ankle sprains were the most frequent injury both inside and outside the key area. | Moderate |
| Epidemiology and injury incidence over a ten-year period in U16 and U18 basketball players. | Izquierdo-Velasco (13) | Quantitative descriptive study. | 13–17 | 1,325 | NR | U16 players showed a higher percentage of ankle injuries than U18 players. Ankle sprain was the main diagnosis in both categories. | High |
| Knee Joint Injuries in Young Basketball | Huang & Zheng (27) | Cross-sectional observational descriptive– | NR | 600 | NR | 25.7% presented knee injuries; the most frequent were medial collateral ligament and | Moderate |

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|---|----------------------------------|--|-------|----------------------------|----------------------------|---|----------|
| Players. | | analytical study. | | | | meniscal injuries. ACL injuries and fractures were less common. | |
| Causes and Prevention of Sports Injuries in Youth Basketball. | Kong (28) | Longitudinal descriptive–analytical study. | 15–19 | 433 | 79 | After 12 weeks, total injury incidence was 9.57%; the most frequent injuries affected the knee, followed by wrist, waist, and ankle. | Moderate |
| The prevalence of chronic ankle instability in basketball athletes: A cross-sectional study. | Lin et al. (29) | Cross-sectional observational study. | 18–26 | 243 | 145 | High prevalence of ankle injuries; 97% had a history of ankle sprain, and chronic ankle instability reached 77%, with higher prevalence in women. | Moderate |
| Musculoskeletal injuries in basketball players from Southern Portugal: Epidemiology and risk factors. | Minghelli (30) | Cross-sectional study. | 10–53 | 238 | 123 | The most frequent injuries were sprains (43.8%); the ankle was the most affected site (40.1%), and the main injury mechanism was contact with another athlete (19.4%). | Moderate |
| Ankle sprain in young athletes: A two-year retrospective study in a multisport club. | Santos et al. (31) | Retrospective observational study. | ≤18 | 402 (year 1), 354 (year 2) | 127 (year 1), 141 (year 2) | Basketball showed a high incidence of ankle sprain, occurring through both contact and non-contact mechanisms. | Moderate |
| Descriptive epidemiology of injuries in Japanese collegiate men’s basketball: 2013/2014 to 2019/2020. | Sekine et al. (32) | Longitudinal descriptive observational design. | NR | 97,515 | NR | Lower extremity injuries accounted for 73.5%, with ankle injuries being the most common. | High |
| Epidemiology and injury trends in the National Basketball Association: Pre- and per-COVID-19 (2017–2021). | Balsalobre-Fernández et al. (33) | Retrospective study. | NR | 625 | NR | Lower extremity injuries (knee, ankle, foot) were the most frequent, with variations in incidence across seasons and COVID-19 periods. | High |
| Epidemiology of Pediatric Basketball Injuries Presenting to Emergency Departments: Sex- and Age-Based Patterns. | Zynda et al. (34) | Descriptive epidemiological study. | 7–17 | NR | NR | Lower extremity injuries predominated in pediatric basketball, with ankle sprains being the most frequent and an increase in knee injuries during adolescence, especially in females. | Moderate |
| Research and prevention of knee joint injuries in collegiate basketball. | Bin (35) | Observational study. | NR | 92 | NR | Knee injuries accounted for 60.9% of cases, mainly involving the meniscus and medial collateral ligament. | Moderate |
| Epidemiology and risk factors in young female athletes: basketball, soccer, and volleyball. | Peña et al. (36) | Retrospective observational study. | 11–21 | NR | 1,235 | Basketball showed the highest percentage of injured players; ankle sprain was the most frequent injury. | Moderate |
| Characterization of Ankle Injuries and Associated Risk Factors in the NBA. | Tummala et al. (37) | Retrospective descriptive analysis. | NR | 1,011 NBA players | NR | A total of 554 ankle injuries were recorded; ankle sprain/strain was the most frequent injury, associated with greater game exposure and prior injury history. | Moderate |
| Prevalence of Sports Injuries and Illnesses in Saudi Arabia’s Inaugural Women’s | Attar & Jedaani (38) | Descriptive observational epidemiological study. | 18–32 | NR | 213 | 67.6% of injuries involved the lower extremities, mainly calf/Achilles tendon, ankle, and knee. | Moderate |

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|---|--------------------|---|-------|----------------------------|----|---|----------|
| Basketball League. | | | | | | | |
| Musculoskeletal Injuries in Basketball Athletes: A Cross-Sectional Study. | Coelho & Casa (39) | Observational cross-sectional analytical study. | 18–40 | 66 | 55 | Sprains predominated; ankle and knee were the most affected sites; common mechanisms included jumps, falls, and collisions. | Moderate |
| Epidemiology of Injuries Among NBA Players: 2013–2014 Through 2018–2019. | Mack et al. (40) | Retrospective cohort study. | NR | 552–606 NBA players/season | NR | Seasonal injury incidence ranged from 1,550 to 1,892 cases; ankle sprains were the most common lower extremity injuries, followed by knee ligament injuries and muscle strains. | High |

Note: NR = data not reported. *s/e* = age not specified.

4. Discussion

Ankle injury was one of the most frequently reported outcomes across the included studies, regardless of competitive level or sex, with ankle sprain identified as the most common condition. These findings are consistent with studies such as Aksović (41), which report a high incidence (25%) of ankle sprains among team sports injuries across all levels. Moreover, in elite competitions such as the Olympic Games, ankle sprains have been identified as the most prevalent injury type (42, 43).

One relevant finding of this review is that most of the analyzed articles focused on lower extremity injuries in amateur-level athletes, with fewer studies conducted in professional contexts. These results align with San Martín and Picabea (44), who identified a high percentage of lower limb injuries (56.25%) in amateur basketball players. This trend may be attributed to several factors, including inadequate training planning, insufficient injury prevention programs, and limited access to appropriate injury management strategies (45, 46).

An important aspect to consider when interpreting the findings of the reviewed articles is the methodological heterogeneity among the included studies. Injury definitions varied across studies, including time-loss injuries, injuries requiring medical attention, and self-reported pain. Similarly, differences in injury recording methods and exposure assessment may substantially influence the type and number of injuries reported. In this regard, studies adopting broader injury definitions may overestimate injury occurrence compared with those based on medical surveillance systems or time-loss criteria.

In line with these observations, not all studies included standardized exposure measures, such as training or competition hours, which limits direct epidemiological comparisons across populations and competitive levels. Furthermore, variability in competitive context—ranging

from recreational and amateur environments to elite professional leagues—may influence injury risk, reporting accuracy, and access to preventive and medical resources.

Within this context, the higher number of injuries reported in amateur players compared with professional athletes should be interpreted with caution. This finding may reflect not only true differences in injury occurrence, but also variability in methodological approaches, training load management, injury surveillance systems, and access to evidence-based injury prevention programs in non-professional settings.

Regarding injury mechanisms, this review—consistent with previous studies—indicates that lower extremity injuries are mainly associated with basketball-specific movements such as jumping, landing, and changes of direction (9, 39). These findings align with multiple studies highlighting the importance of implementing injury prevention programs that incorporate proprioceptive exercises, strategies to improve landing technique, and interventions targeting neuromuscular control deficits, with particular emphasis on youth and non-professional basketball contexts (47, 48).

Furthermore, the analysis of the included studies revealed a notable gap in research on lower extremity injuries within youth development and recreational basketball, as well as limited evidence involving pediatric populations. Several authors emphasize the need to generate scientific evidence in school and recreational settings, given that basketball is one of the most widely practiced sports during early developmental stages (4, 49).

5. Conclusion

The findings of this review allow us to conclude that basketball is a sport associated with a high incidence of injuries, particularly involving the lower extremities, which represent the most affected anatomical region across different levels of practice, age groups, and gender

categories. The reviewed literature indicates that approximately 60–75% of reported injuries are located in this region, reflecting a high exposure to the biomechanical demands inherent to basketball.

Among lower extremity injuries, ankle sprains emerge as the most frequent diagnosis, accounting for a high proportion of cases, especially in youth and female populations. The high prevalence of previous ankle sprains and chronic ankle instability suggests that a substantial number of these injuries are not adequately managed, thereby increasing the risk of recurrence and long-term functional impairment.

Conversely, the knee was identified as a less prevalent but clinically more severe injury site, associated with longer periods of sport-related absence and a substantial impact on athletic performance and career longevity, particularly among young female athletes and in non-contact injury mechanisms. This finding highlights the importance of considering not only injury frequency but also functional and sport-related injury burden when designing preventive strategies.

The critical analysis of the evidence suggests that injury incidence and prevalence tend to be higher among amateur and youth athletes than at the professional level, which may be related to reduced medical supervision, less structured training planning, and limited implementation of evidence-based injury prevention programs. In this context, early prevention emerges as a key component, especially during formative stages.

Nevertheless, the included studies present important methodological limitations, including heterogeneity in injury diagnostic criteria, lack of standardized exposure measures, and a limited number of prospective studies reporting normalized incidence rates. Collectively, these limitations hinder direct comparisons between studies and underscore the need to strengthen epidemiological surveillance systems in basketball.

Overall, the findings of this review support the systematic implementation of basketball-specific injury prevention programs, focusing on neuromuscular training, proprioception, landing control, and strengthening of periarticular structures of the ankle and knee. Additionally, there is a clear need to promote further research in recreational settings and pediatric populations, as well as to encourage longitudinal studies with homogeneous methodologies to improve the quality and applicability of the available scientific evidence.

Authors' Contributions

M.S.Z.L. conceived and designed the study and provided overall supervision of the research. K.N.C.M. and R.A.M.B. contributed to the search and selection of studies, the design of tables and figures, and the data analysis. J.C.R.G.H. contributed to the preparation of the results, supervised citations, and assisted with the translation of the manuscript. H.M.H. and L.J.M.D.S. contributed to the discussion and the formulation of the conclusions.

Declaration

The authors declare the use of artificial intelligence tools to improve grammatical clarity and spelling. All content was reviewed and validated by the authors, who assume full responsibility for the interpretation of the results.

Transparency Statement

All data analyzed in this systematic review are derived from previously published studies, which are cited in the reference list. No new data were generated.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

Given the nature of the study as a systematic review, approval from a bioethics committee was not required, as no direct research involving human participants was conducted. Nevertheless, the review was carried out in accordance with the ethical principles of scientific research, ensuring responsible use of information and appropriate attribution to all cited authors.

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