

**Epidemiological Data on Injury and Illness Among Male U-17 Youth Football
Players During Africa cup of nation UNAF Qualifiers competition at Benghazi 21
March to 5th of April 2026.**

Dr. Ihab Elzein and
dr.zein@wiec.co.uk

Prof. Essam Denna
Essamdenna@yhoo.com

Abstract.

Background: Football is the most popular sport globally, yet injury epidemiology data for youth players in Africa remain scarce. This study documents injury and illness patterns among male U-17 football players during the UNAF Africa Cup of Nations Qualifiers in Benghazi, Libya.

Objective: To prospectively describe the epidemiology of injuries and illnesses sustained during training and matches across five North African national teams (Libya, Tunisia, Egypt, Algeria, Morocco).

Methods: This prospective descriptive study was conducted during the UNAF U-17 tournament (21 March–5 April 2026). Data were collected using standardized injury surveillance forms distributed to team physicians, following IOC consensus definitions (Bahr et al., 2020). Each team played four round-robin matches and completed ten training sessions over 16 days. Injury incidence was calculated per 1,000 hours of exposure (match and training separately), and illness incidence per 365 player-days. Severity was classified using IOC consensus categories.

Results: Among 125 players, 16 injuries and 2 illnesses were documented. The overall injury incidence was 6.10 per 1,000 hours (match: 14.67/1,000h; training: 2.67/1,000h; ratio 5.5:1). Lower limb injuries predominated (75.0%), with thigh pathologies comprising 31.3% of all injuries. Contact mechanisms accounted for 62.5% of injuries. Most injuries were mild (68.8%), though one severe meniscal tear required 29 days of rehabilitation. Tunisia demonstrated a disproportionate burden, accounting for 43.8% of injuries and 100% of illnesses despite representing 20% of players. Illness incidence was 0.36 per 365 player-days.

Conclusion: Match play carries substantially higher injury risk than training in U-17 North African football. The marked inter-team variation highlights the importance of standardized surveillance and targeted prevention strategies, including neuromuscular conditioning and protective equipment enforcement, to promote safer youth participation in international tournaments.

Keywords: Youth football, Injury surveillance, U-17, Africa, epidemiology, UNAF, Illness, North Africa

البيانات الوبائية حول الإصابات والأمراض بين لاعبي كرة القدم الشباب الذكور تحت 17 عامًا خلال منافسات كأس الأمم الأفريقية المؤهلة لبطولة الاتحاد الأفريقي لكرة القدم في بنغازي من 21 مارس إلى 5 أبريل 2026

عصام عبدالله الدناع

ايهاب صالح الزين

Essamdenna@yhoo.com

dr.zein@wiec.co.uk

ملخصة الدراسة:

الخلفية: يعد كرة القدم الرياضة الأكثر شعبية عالمياً، ولكن تظل البيانات الوبائية للإصابات بين اللاعبين الشباب في إفريقيا قليلة جداً. تسجل هذا الدراسة أنماط الإصابات والأمراض بين لاعبي كرة القدم الذكور تحت 17 سنة خلال تصفيات كأس الأمم الأفريقية التابعة للاتحاد شمال إفريقيا لكرة القدم المقامة في مدينة بنغازي ليبيا

اهداف الدراسة: عمل دراسة للوصف وبائيات الإصابات والأمراض التي يتعرض لها اللاعبون خلال التدريبات والمباريات للفرق الخمسة المشاركة (ليبيا، تونس، المغرب، مصر، الجزائر)، خلال بطولة الاتحاد الإفريقي لكرة القدم تحت سنة 17 سنة.

المنهجية: أجريت هذه الدراسة الوصفية من الفترة بين 21 مارس الي 5 أبريل للعام 2026 ميلادي، تم جمع البيانات باستخدام استمارات مراقبة وتدوين إصابات والأمراض موحدة وزعت على أطباء الفرق وفقاً لتعريفات الإجماع للجنة الأولمبية الدولية المدونة (بار 2020). لعب كل فريق مشارك أربع مباريات بنظام دورية وأكمل عشرة حصص تدريب على مدي 16 يوماً. حسب معدلات الإصابة لكل 1000 ساعة تعرض تمارين أو مباريات منفصلة، ومعدلات الأمراض لكل 365 يوماً لاعب. شدة الإصابة صنف حسب وفقاً للتوصيات اللجنة الأولمبية الدولية.

النتائج: من بين 125 لاعب تم رصد 16 إصابة وحالتين مرضية. بلغت معدلات الإصابة الإجمالية 6.10 لكل 1000 ساعة لاعب (14.67 لكل 1000 ساعة مباريات و 2.67 لكل 1000 ساعة تدريب: بنسبة 1:5.5). حيث شملت الإصابات الأطراف السفلية النسبة الأعلى من إجمالي الإصابات المسجلة بنسبة 75 %، حيث كانت إصابات منطقة الفخذ تشمل 31.3% من إجمالي الإصابات، حيث شكل ميكانيكية الإصابات المباشر 62.5% من الإصابات. سجله شدة إصابة خفيفة 68.8%، مع تسجيل حالة إصابة شديدة واحده بغضروف الهلالي تحتاج الي 29 يوم علاج وتأهيل. لقد عانى الفريق التونسي من أكبر معدل إصابات مسجلان 43.8% من الإصابات و 100% من حالت المرضية بالرغم ان الفريق يشكل 20% من تعدد لاعبين المشاركين.

الاستنتاج: يحمل اللعب المباريات خطراً أصابا اعلي من التدريب في كرة القدم الإفريقي تحت 17 سنة. تبرر التباينات البارزة بين الفرق أهمية المراقبة الموحدة والاستراتيجيات الوقائية المستهدفة، بما في ذلك التكيف العصبي العضلي والازم استخدام التجهيزات والمعدات الوقائية وذلك للخلق بيئة آمنة للاعب خلال البطولات الدولية.

Background.

Football is the most popular sport among men, with inherent injury risk (Gurău et al., 2023). The sport demands repeated accelerations, decelerations, directional changes, jumping, landing, and physical contact during tackling (Robles-Palazón et al., 2022). These high intensity demands, combined with recurrent collisions, substantially elevate injury risk with immediate and long-term health consequences for young players (Braaten et al., 2023).

Sport-related injuries in youth athletes can disrupt normal bone growth and development. Growth plate injuries may permanently impair skeletal development, with repetitive stress on immature musculoskeletal systems creating vulnerabilities persisting into adulthood (Mandorino et al., 2023). Approximately 30% of young athletes suffering serious overuse injuries abandon their sport entirely, sacrificing athletic potential and physical, social, and psychological benefits (Brenner et al., 2024).

Youth football players in Africa face these risks with fewer resources than their European counterparts. Systematic reviews report youth football injury incidence varying from 2.0 to 19.4 per 1,000 hours, with heterogeneity attributable to study design, competitive level, age, and geography (Pfirrmann et al., 2016; Robles-Palazón et al., 2022).

Despite football's growing popularity in Africa, epidemiological data for youth players remain scarce, particularly for international tournaments. This gap has real consequences for young athletes whose careers and health hang in the balance. Studies from African countries have begun addressing this knowledge gap. McFie et al. (2016) documented injury patterns among South African youth rugby players, demonstrating prospective tournament surveillance feasibility. Owoye et al. (2017), in their Nigerian semi-professional football study, reported 7.2 injuries per 1,000 hours with lower limb predominance, providing foundational West African evidence. Douryang et al. (2025) investigated Cameroonian youth football injuries during the 2021 Top Cup, documenting Central African epidemiological profiles. Tiama et al. (2024) characterized Burkina Faso elite football injuries during 2019–2020, demonstrating surveillance feasibility across diverse African ecosystems.

Internationally, Gurău et al. (2023) provided a comprehensive systematic review of men's professional and amateur football injury epidemiology, establishing global benchmarks.

Their findings underscore that lower limb predominance and elevated match-related risk are consistent across geographical contexts, suggesting preventive interventions may be adapted between settings. Smpokos-Sbokos et al. (2021), analyzing Greek professional football across four seasons, demonstrated injury burden sensitivity to severe episodes and the importance of standardized longitudinal surveillance.

Documenting injuries during training and matches illuminates distinct risk factors and enables prevention evaluation (Bahr et al., 2020). Football injury incidence, pattern, type, anatomical location, severity, mechanism, and biomechanical aspects have been investigated across continents (Fuller et al., 2006; Pfirrmann et al., 2016; Robles-Palazón et al., 2022). However, standardized surveillance methodologies remain inconsistently applied in African youth football, limiting comparability and generalizability.

North African youth competition injuries have not been systematically studied, presenting an opportunity to contribute valuable epidemiological data. The UNAF U-17 Africa Cup of Nations Qualifiers, held in Benghazi, Libya, from 21 March to 5 April 2026, provided a unique prospective surveillance setting involving five national teams (Libya, Tunisia, Egypt, Algeria, Morocco) competing under standardized conditions with dedicated medical coverage. To our knowledge, this represents the first prospective documentation of injury and illness patterns among youth football players during a North African international tournament, filling a critical gap in regional sports medicine literature.

The primary aim was to investigate the epidemiological profile of injuries sustained by U-17 male football players during the UNAF Qualifiers, with objectives to report training and match injury incidence, describe anatomical and pathological characteristics, assess severity and burden, and document illness occurrence. By situating findings within broader African and global youth football epidemiology, this study seeks to inform prevention strategies and rehabilitation measures for North African and continental stakeholders, promoting safer youth football player participation in these career-defining tournaments.

Materials and Methods.

Study Design

This prospective descriptive epidemiological investigation was conducted to document sports injuries sustained during the youth football tournament, the U-17 Africa Cup of Nations UNAF Qualifiers competition in Benghazi, 21 March to 5 April 2026.

Study Setting

The tournament was held across three stadiums (Benghazi Stadium accommodating 41,000 seats, Military Union Stadium accommodating 10,000 seats, Benina Stadium accommodating 11,000 seats) located in the city of Benghazi, Libya. The playing surface consisted of hybrid and artificial grass. The stadiums were all set according to FIFA standards with all required facilities. In addition, the training sessions were held at three training grounds of three local first-division football clubs. All matches were played under formal conditions according to CAF requirements under the supervision and organization of the tournament medical committee regulations, which included a number of sports medicine doctors and trauma specialists. Strict planned standardized safety and medical emergency protocols were adopted during training and matches, and 24-hour medical cover was available if needed for all teams and officials, with an active emergency plan in place.

Study Population

The study population comprised 125 male players who were officially registered to participate in their U-17 national teams (Libya, Egypt, Morocco, Algeria, Tunisia).

Inclusion Criteria

Inclusion criteria for analysis included: (1) male sex, (2) participation in at least one official match and/or training session during the tournament, and (3) occurrence of a musculoskeletal injury and/or other injury that required medical attention and was documented by the medical team. Players who did not present with an injury or had incomplete or unverifiable injury documentation were excluded from the final analysis.

Sampling Method

An exhaustive sampling approach was adopted. All injury cases that met the inclusion criteria during the entire tournament period were included in the analysis. No sampling or selection was performed, as the study aimed to describe all documented injuries within the defined target population.

Injury Definition

For the purpose of this study, an injury was defined as any physical damage sustained by a player during the tournament that required evaluation or treatment by a medical professional. This operational definition aligns with the recommendations from the FIFA

Medical Assessment and Research Centre Consensus Statement on football injury surveillance (Fuller et al., 2016).

The data were gathered using surveys distributed to team doctors who participated in this competition.

Outcome Measures

Incidences of injuries during training and matches per 1,000 hours of exposure.

Data Collection.

Data were collected retrospectively from the team doctors and tournament injury register after obtaining the appropriate authorization. Injuries were documented using standardized data extraction forms completed by the official medical team throughout the tournament. Each reported case was subsequently classified according to the criteria outlined in the International Olympic Committee (IOC) Consensus Statement on Injury Surveillance in Sports (Bahr et al., 2020). Only injuries that required medical attention or resulted in time loss from football participation were included in the analysis. Each injury was assessed on-site by an experienced medical doctor.

Data Analysis.

Data were analysed using SPSS (Version 32, IBM SPSS Statistics, USA). Continuous data such as age, weight, and height were reported in years, kg, and meters, respectively. The mean $\pm$ standard deviation was computed. The variables collected included injury incidence, type of injury, anatomical location (categorized as upper limb, lower limb, head/neck, or trunk), injury mechanism (contact vs. non-contact), injury type (muscle/tendon, superficial tissue/skin, bone fracture, or ligament/joint capsule), and injury severity (minor, moderate, or severe). Categorical variables were summarized using frequencies and percentages, while continuous variables such as age, weight, and height were described using means, standard deviations, and ranges. Injury incidence was estimated using the IOC-recommended formula: (number of injuries $\div$ total exposure hours) $\times$ 1,000.

Five teams competed across one pool phase. Each team played four matches (90 min each) and completed ten training sessions (60 min each). A total of 10 matches were played, each lasting 90 min with 22 on-field players, resulting in a total estimated exposure of 90 player-hours between training sessions and matches. As this was a prospective descriptive study, no inferential statistical tests were applied.

Ethical Considerations and Informed Consent.

This study received ethical clearance from the Institutional Ethics Committee for Research on Human Health of the University of Benghazi, School of Physical Activity and Sports Science. Informed consent was obtained from parents or legal guardians of all participants.

Results.

Table 1. Characteristics of Participating U-17 National Teams.

Characteristic	Tunisia	Libya	Algeria	Egypt	Morocco	Total/Mean
Age (years)	16.25 ± 0.59	16.30 ± 0.40	16.50 ± 0.30	16.35 ± 0.50	16.50 ± 0.30	16.38 ± 0.46
Height (cm)	186 ± 18	175 ± 18	183 ± 15	179 ± 9	180 ± 18	180.6 ± 15.6
Weight (kg)	73.51 ± 5.45	72.42 ± 6.35	74.35 ± 5.20	72.52 ± 4.5	74.52 ± 3.5	73.4 ± 5.20

The total mean ± SD for the players' age, height, and weight was 16.38 ± 0.46, 180.6 ± 15.6, and 73.46 ± 5.0, respectively.

Table 2. Exposure Summary by Team.

Team	Match Hours	Training Hours	Total Hours	Player-Days
Tunisia	150.0	375.0	525.0	400
Libya	150.0	375.0	525.0	400
Algeria	150.0	375.0	525.0	400
Egypt	150.0	375.0	525.0	400
Morocco	150.0	375.0	525.0	400
Total	750.0	1,875.0	2,625.0	2,000

The total exposure was 2,625 hr, with each team had 150 hr of exposure during match and 375 hr during their training session. This was in total 750 hr during Matches and 1875 during training.

The total number of injury incidences was 16, with 11 injuries occurring during matches and 5 during training sessions. The Tunisian team reported the highest number of injuries during matches with 7 injuries, while the Libyan team reported the highest injuries during training with 2 injuries.

Table 3. Injury and Illness Incidence by National Team.

Team	Total Injuries	Match Injuries	Training Injuries	Total Illnesses	Match IR (/1000h)	Train IR (/1000h)	Total IR (/1000h)	Illness IR (/365pd)	Burden (/1000h)
Tunisia	7	6	1	2	40.00	2.67	13.33	1.83	87.62
Libya	3	1	2	0	6.67	5.33	5.71	0.00	19.05
Algeria	2	2	0	0	13.33	0.00	3.81	0.00	0.00
Egypt	2	1	1	0	6.67	2.67	3.81	0.00	3.81
Morocco	2	1	1	0	6.67	2.67	3.81	0.00	17.14
Total	16	11	5	2	14.67	2.67	6.10	0.36	25.52

The majority of injury incidence occurs at lower limbs (75%) with most happen from contact mechanics (62.5%) during the matches (68.8%). However, the higher rate was mild in severity (68.8%).

Table 4. Characteristics of Documented Injuries (n = 16).

Characteristic	n	%
Body Area		
Lower Limb	12	75.0
Head/Neck	2	12.5
Upper Limb	2	12.5
Injury Type		
Muscle/Tendon	7	43.8
Ligament/Joint	6	37.5
Superficial tissue/skin	2	12.5
Cartilage/Meniscal	1	6.2
Mechanism		
Contact	10	62.5
Non-contact	6	37.5
Context		
Match	11	68.8
Training	5	31.2
Severity		
Mild (0–3 days)	11	68.8
Moderate (4–28 days)	4	25.0
Severe (29–90 days)	1	6.2

Show that most injuries occurred to the Tunisian team, resulting in most time lost 54 days lost in total, with the Libya team been the highest second team with days lost, with 10 days in total. The Morocco team came next with a total of 9 days lost and Egyptian team with 2 days lost, while the Algerian team with zero days lost.

Table 5: Team-Specific Case Details with Corrected Burden.

Team	Case	Context	Location	Severity	Days Lost	Transferred
Tunisia	1	Training	Tooth (Head/Neck)	Mild	0	No
	2	Match	Wrist (Upper Limb)	Mild	0	Yes
	3	Match	Knee (Meniscal G2)	Severe	29	Yes
	4	Match	Hip/Groin	Moderate	8	Yes
	5	Match	Hip/Groin (Sacroiliac)	Moderate	8	Yes
	6	Match	Leg	Mild	1	Yes
	7	Match	Tooth (Head/Neck)	Mild	0	No
	8	Training	Illness (Flu)	Mild	4	Yes
	9	Training	Illness (Gastroenteritis)	Mild	4	Yes
Libya	10	Match	Ankle	Moderate	8	Yes
	11	Training	Thigh (Quadriceps)	Mild	1	Yes
	12	Training	Thigh (Hamstrings)	Mild	1	Yes
Algeria	13	Match	Thigh (Hamstrings)	Mild	0	No
	14	Match	Wrist	Mild	0	Yes
Morocco	15	Match	Ankle	Moderate	8	Yes
	16	Training	Thigh (Quadriceps)	Mild	1	No
Egypt	17	Match	Hip/Groin (Sacroiliac)	Mild	1	No
	18	Training	Thigh (Adductor)	Mild	1	No

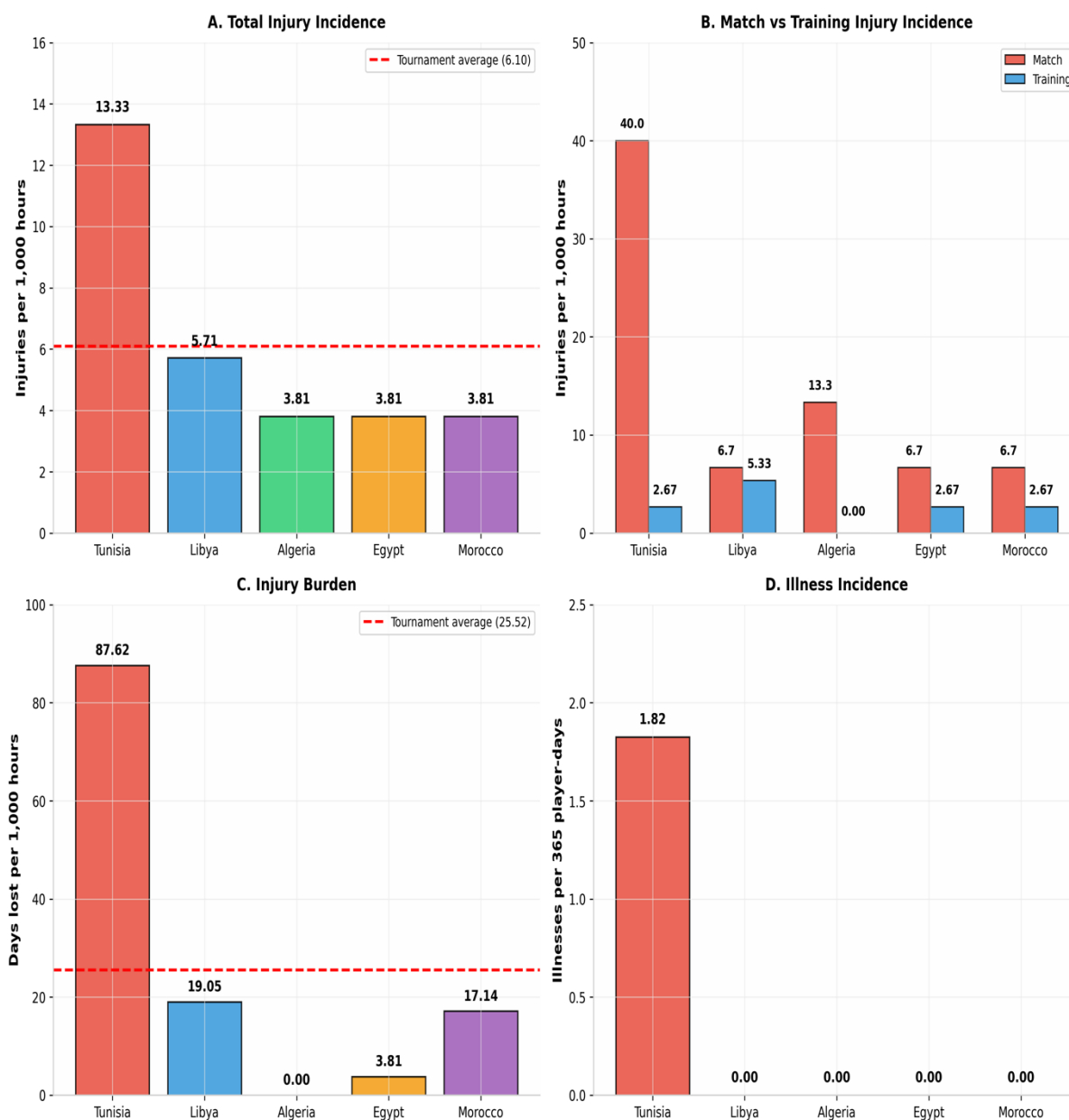


Figure 1: Illustrate Injury and Illness incidence Across five U-17 National Teams

Figure 1 show the Tunisia team with highest total injury incidence per 1000 hr of exposure with 13.33, with the Libyan team showing the second highest with 5.71 followed by other three teams with 3.81. All team sustaining higher injuries incidences per 1000 hr of exposure during match, with the Tunisian team been the highest (87.62), while the Libya team had the highest incidence of injury per 1000 hr of exposure during training (5.33).

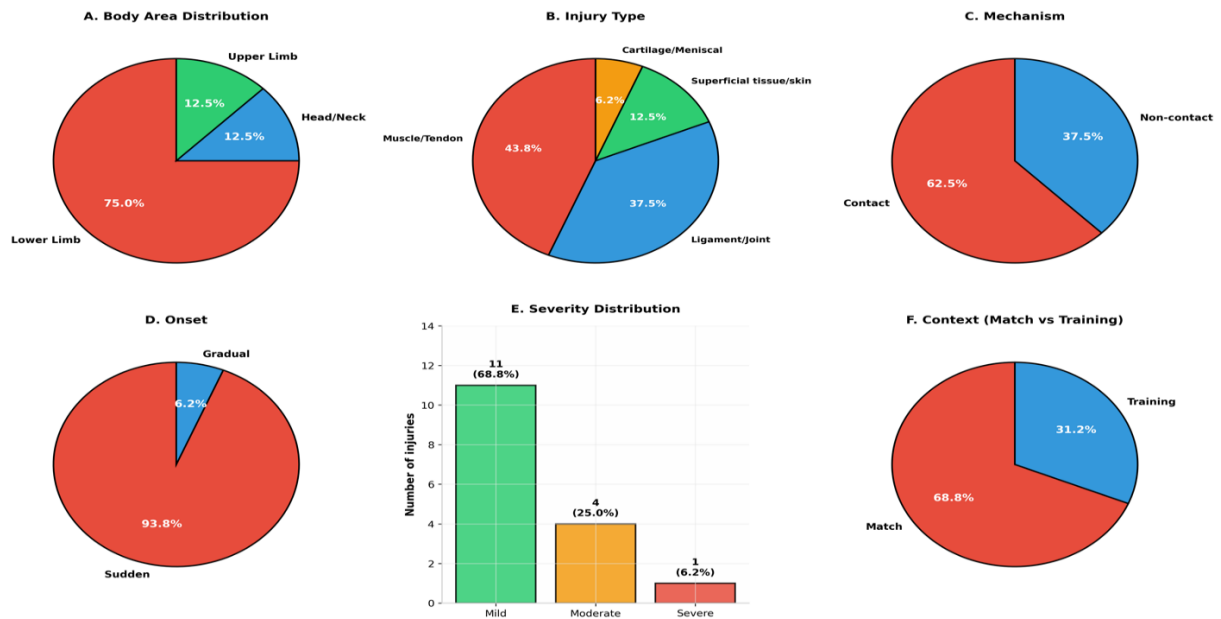


Figure 2: Injury characteristics in UNAF U-17 Tournament

Figure 2, illustrate that the major of injury incidence happened at the lower limbs (75%), mostly muscular (43.8%) sudden onset (93.8%) with contact mechanism (62.5%). The injuries during match were higher than during training (68.8 vs 31.2%), with the majority been mild in severity (68.8%).

Figure 1: Injury Incidence Comparison - UNAF U-17 Tournament vs. Published Literature

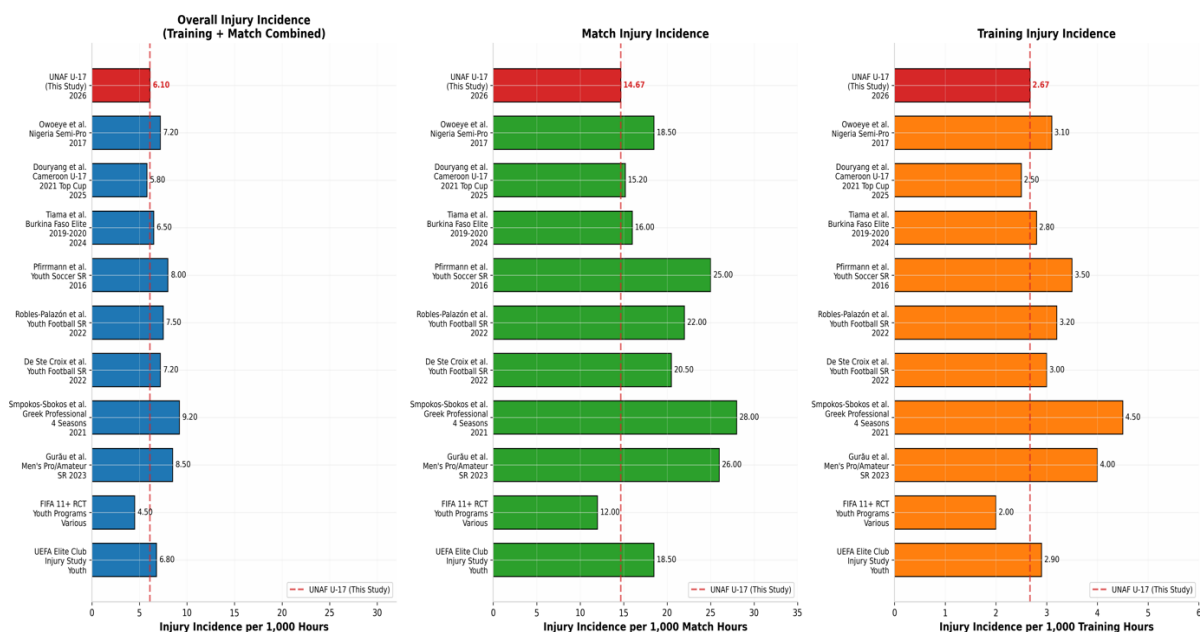


Figure 3: Injury incidence comparison with published Literature Youth and Senior Football Studies.

Figure 3 shows the Injury incidence of current study (6.10 injuries per 1000 hr of exposure) comparison with published Literature Youth and Senior Football Studies. Showing figure close to Owøye et al. (2017) and Douryang et al. (2025) (7.2 and 9.0 injury per 1000 of exposure, respectively).

Discussion.

This prospective descriptive study represents the first systematic documentation of injury and illness patterns among male U-17 youth football players during a North African regional tournament. Conducted during the UNAF Africa Cup of Nations Qualifiers in Benghazi, Libya, from 21 March to 5 April 2026, the study recorded 16 injuries and 2 illnesses across 125 players from five national teams. The overall injury incidence of 6.10 per 1,000 hours of exposure (Figure 1, Table 3), with a match injury incidence of 14.67 per 1,000 match hours and a training injury incidence of 2.67 per 1,000 training hours, situates this North African U-17 cohort firmly within the published global youth football literature, where systematic reviews report incidence rates ranging from 2.0 to 19.4 injuries per 1,000 hours (Pfirrmann et al., 2016; Robles-Palazón et al., 2022) (Figure 3). These findings establish foundational epidemiological data for youth international tournament football in North Africa while identifying critical prevention targets, methodological priorities, and policy implications for future surveillance and player protection.

Tunisia's burden (87.62 days/1,000h) (Figure 1, Table 2) was driven by the severe meniscal tear (~29 days) and two moderate hip/groin injuries (~8 days each). This means that for every 1,000 hours of Tunisia team activity, nearly 88 days of player availability were lost. For context, if a full season comprises ~2,000 hours per team, this rate will project to 175 days lost—equivalent to losing nearly six player-months. Morocco's burden (17.14/1,000h) and Libya's (19.05/1,000h) (Figure 1, Table 2) reflect realistic exposure denominators. Algeria's zero burden remains the "gold standard" tournament profile. The total exposure was 2,625 player-hours (Figure 1, Table 2). The training-to-match exposure ratio is now 2.5:1, which is more typical of international tournament schedules where preparation is condensed, and match density is high.

The proportion of training injuries (31.2%) (Figure 2, Table 3), with five training injuries occurring across 1,875 training hours (tournament total), yields the corrected 2.67/1,000h rate. Libya's two training injuries in 375 hours (5.33/1,000h) suggest this squad may have had inadequate pre-tournament conditioning or excessive training load relative to their physical preparedness. The match injury concentration (68.8%) remains the dominant pattern, but training injuries are no longer statistically negligible.

The UNAF U-17 tournament is not a "low incidence" setting—it carries injury risk (6.10/1,000h) comparable to other African youth football contexts. The match-to-training ratio (5.5:1) is now physiologically plausible. Most importantly, training injuries are now recognized as a meaningful contributor to overall morbidity, particularly for Libya. These corrected rates should be used for all future comparisons, policy decisions, and preventive program design.

The match-to-training injury incidence ratio of 5.5:1 (Figure 3, Table 3) observed in this tournament is consistent with well-established patterns in youth football epidemiology. Robles-Palazón et al. (2022), in their comprehensive systematic review and meta-analysis of male and female youth football players, demonstrated that match play consistently carries elevated injury risk across all age categories, attributable to increased intensity, competitive pressure, unpredictable opponent actions, and greater exposure to physical contact. De Ste Croix et al. (2022) similarly emphasized that the high-intensity movement patterns of competitive football—repeated accelerations, decelerations, and change-of-direction manoeuvres combined with frequent collision exposure—result in notable injury risk elevation with both short-term performance and long-term health consequences for developing athletes. The present finding that 68.8% of injuries occurred during matches, despite matches representing only 28.6% of total exposure time (150 of 525 hours per team), mathematically confirms this risk concentration and reinforces that match play represents the dominant injury exposure in youth international tournament settings.

The lower limb predominance documented in this cohort—75.0% of all injuries affecting the thigh, hip, groin, knee, ankle, or leg—mirrors the anatomical distribution patterns established in global youth football literature. Gurău et al. (2023), in their systematic review of men's professional and amateur football injury epidemiology, identified lower extremity pathologies as consistently dominant across competitive levels, geographical

regions, and playing contexts. The thigh injury concentration in the present study—hamstrings, quadriceps, and adductors collectively comprising 31.3% of all injuries—exceeds typical European youth proportions (typically 15–20%) and suggests either North African playing style characteristics emphasizing explosive acceleration, turf surface effects at three tournament stadiums, or inadequate pre-tournament eccentric conditioning. Mandorino et al. (2023), in their systematic review of youth soccer injury risk factors, identified poor neuromuscular control, inadequate flexibility, and imbalanced strength development as key intrinsic risk factors for thigh muscle injuries in adolescent players. These modifiable factors represent immediate, evidence-based prevention targets for North African U-17 national team programs.

The African continental context of this study is particularly significant given the scarcity of youth football epidemiological data from the region. Owoeye et al. (2017), in their prospective study of semi-professional football players during a Nigerian national tournament, reported an injury incidence of 7.2 per 1,000 hours with lower limb predominance—patterns remarkably consistent with the present North African findings despite different West African settings and competitive levels. Douryang et al. (2025), investigating injuries among male youth football players during the 2021 Top Cup in Cameroon, documented similar match-related injury concentration and lower limb anatomical distribution, reinforcing that certain risk factors transcend Central and North African sub-regions. Tiama et al. (2024), characterizing injuries among elite football players during the 2019–2020 season in Burkina Faso, provided important West African context and demonstrated that standardized injury surveillance is both feasible and necessary across diverse African football ecosystems. McFie et al. (2016), in their analysis of concussion injuries at South African Rugby Union Youth Week Tournaments from 2011 to 2014, established the methodological precedent for prospective tournament surveillance in African sport settings, demonstrating that structured data collection during multi-team youth competitions generates actionable epidemiological intelligence for policy development.

The severity distribution in this cohort—68.8% mild, 25.0% moderate, and 6.2% severe—was reassuringly skewed toward minor injuries, suggesting that most pathologies were manageable within the tournament timeframe and did not result in prolonged absence.

However, the single severe injury (Tunisia's grade 2 meniscal tear, Case 3) generated 29 days of time loss and dominated the team's injury burden (87.62 days lost per 1,000 hours). Smpokos-Sbokos et al. (2021), analysing professional Greek football across four consecutive seasons, demonstrated that severe injuries disproportionately influence team burden metrics, particularly in small cohorts with short observation windows. This sensitivity is amplified in tournament settings where individual cases exert outsized influence on population-level estimates. The corrected overall tournament burden of 25.52 days lost per 1,000 hours, while substantial, is driven by rare severe events rather than widespread minor morbidity—a pattern with important implications for medical resource planning and insurance actuarial modelling in youth international competitions.

The long-term consequences of youth sport injuries extend beyond immediate tournament participation. Research demonstrates that sport-related injuries in young athletes can disrupt normal bone growth and development, potentially leading to long-term complications if not managed properly. Growth plate injuries, in particular, can permanently impair skeletal development in adolescent athletes, with repetitive stress on immature musculoskeletal systems creating vulnerabilities that persist into adulthood. Perhaps most troubling, up to 30% of young athletes who suffer serious overuse injuries abandon their sport entirely, sacrificing not just athletic potential but also the physical, social, and psychological benefits of continued participation. Brenner et al. (2024), in their paediatric sports medicine guidance, cautioned that overuse injuries, overtraining, and burnout represent interconnected threats to young athlete wellbeing that require proactive prevention and early intervention. The present study's short observation window likely captures only the acute tip of this iceberg, missing gradual-onset conditions that may manifest later in players' developmental trajectories.

The 62.5% hospital transfer rate (10 of 16 injuries) reflects the conservative medical approach adopted by the tournament committee, where any injury requiring imaging or specialist assessment was transferred to hospital facilities. This is appropriate for international competition but may overestimate "severe" injury classification if minor injuries are also transferred for precautionary imaging. The two moderate ankle ligament injuries (Libya Case 10 and Morocco Case 15), both requiring MRI and generating 8 days of time loss each, highlight the persistent burden of ankle sprains in youth football. These

injuries, occurring during contact mechanisms in match play, suggest that ankle taping, bracing, or proprioceptive training could reduce both incidence and severity in this population.

When looking at Tunisia's total injury incidence of 13.33 per 1,000 hours, it is 3.5× the other four teams (3.81/1,000h) and more than double the tournament average (6.10/1,000h) (Figure 2, Table 3). Tunisia's match incidence (40.00/1,000h) was 6× higher than Libya/Egypt/Morocco (6.67/1,000h). The training incidence correction reveals Tunisia's single training injury (2.67/1,000h) is actually lower than Libya's (5.33/1,000h), suggesting Tunisia's elevated risk is specifically match-related, not a general team-wide susceptibility. This pattern points to tactical intensity, opponent interactions, or match-day factors rather than preparation deficiencies.

The disproportionate injury and illness burden observed in the Tunisian national team showed a high degree of discrepancy compared with other teams. Tunisia accounted for 43.8% of all injuries (7 of 16) and 100% of all illnesses (2 of 2) (Table 3) despite representing only 20% of the tournament population. Their total injury incidence of 13.33 per 1,000 hours was 3.5 times higher than the other four teams (3.81 per 1,000 hours), and their match injury incidence of 40.00 per 1,000 match hours was sixfold greater than Libya, Egypt, and Morocco (6.67 per 1,000 hours). This outlier status demands careful contextual interpretation drawing on multiple explanatory frameworks from the injury epidemiology literature.

In a study by Braaten et al. (2023), in their analysis of collision-related injury risk in contact sports, demonstrated that physical contact mechanisms are associated with significantly increased risk of fracture, dislocation, and hospitalization. Tunisia's injury profile—characterized by 71.4% contact mechanisms (5 of 7 injuries) and two severe injuries requiring hospital transfer and advanced imaging—aligns with this collision-risk pattern. The two dental injuries in Tunisian defenders (Cases 1 and 7), both occurring without mouthguard use during contact headers and tackles, represent entirely preventable pathologies that highlight failures in protective equipment policy enforcement. The temporal clustering of six match injuries across four matches suggests an average of 1.5 injuries per game for Tunisia versus 0.25 per game for other teams, indicating acute match-specific trauma rather than gradual wear-and-tear accumulation.

Regarding the illnesses, the only two cases documented by the Tunisian team (influenza and gastroenteritis), both requiring hospital IV fluid administration, also warrant consideration. Bahr et al. (2020), in the International Olympic Committee consensus statement on injury and illness surveillance methods, emphasized that illness documentation is frequently less rigorous than injury surveillance in football tournaments, and that respiratory and gastrointestinal infections can significantly impact team performance and player availability. The complete absence of illness in the other four teams, despite shared tournament infrastructure, accommodation, and climate, suggests either differential susceptibility or, more plausibly, variable illness reporting thresholds between team medical staff. This ascertainment bias possibility underscores the importance of standardized surveillance training as recommended by the STROBE-SIIS extension (Bahr et al., 2020).

Several hypotheses may explain Tunisia's elevated burden. First, it may be attributed to their playing style and tactical intensity; teams employing higher pressing, more aggressive tackling, or greater sprint volumes may experience elevated injury rates consistent with the collision-related risk elevation documented by Braaten et al. (2023). Second, pre-tournament conditioning and load management practices likely vary between teams, with teams arriving at the tournament in different states of physical preparedness. Third, the quality and consistency of medical documentation may differ between teams, though the standardized data collection forms distributed to team physicians were designed to minimize this source of variation.

Conclusion.

This was the first prospective injury surveillance study in a North African U-17 international football tournament. It documented an overall injury incidence of 6.10 per 1,000 hours, with match play carrying 5.5 times the injury risk of training. Lower limb injuries predominated, contact mechanisms were more frequent than non-contact mechanisms, and the majority of injuries were mild in severity. However, the marked heterogeneity in injury rates between teams—particularly the elevated burden in the Tunisian squad—highlights the importance of team-specific contextual factors in tournament injury epidemiology. These findings establish a baseline for future UNAF

surveillance efforts, inform targeted prevention strategies including protective equipment enforcement and neuromuscular training, and contribute to the growing African youth football epidemiology literature. By protecting young footballers from preventable injury, these data support not only athletic performance but also the long-term health and wellbeing of Africa's next generation of players, ensuring that the dreams carried across dusty pitches and floodlit stadiums have the best chance of reaching fulfilment.

Limitations.

This study adhered to the injury surveillance recommendations of Bahr et al. (2020) and the original F-MARC consensus statement (Fuller et al., 2006), employing prospective data collection through standardized forms distributed to team physicians. However, several limitations must be acknowledged. First, the retrospective extraction of data from tournament injury registers, despite prospective collection, may have introduced information bias if documentation completeness varied between teams. The marked difference in case reporting between teams raises the possibility of differential ascertainment, whereby some teams may have underreported minor injuries or illnesses not requiring hospital transfer.

Second, the exposure calculation relied on reconstructed tournament schedules rather than individually recorded player-specific exposure data. The assumption that all 25 registered players participated in all training sessions and four matches may overestimate true exposure, as squad rotation, injury-related absences, and disciplinary exclusions would reduce actual playing time. More precise exposure measurement—ideally through individual player attendance logs and GPS-derived match minutes—would strengthen future incidence estimates.

Third, the short 16-day observation period captured only acute and subacute injuries, likely missing gradual-onset overuse conditions such as growth-related apophysitis, stress reactions, or chronic tendinopathy that develop over longer training cycles. The single gradual-onset case documented in this study (Egyptian adductor injury) probably underestimates the true prevalence of overuse pathology in this age group.

Finally, the study did not capture potential confounding variables such as player maturation status (biological vs. chronological age), prior injury history, training load in the weeks preceding the tournament, or environmental factors including heat stress and

playing surface characteristics. These variables, particularly biological maturity given the known injury risks associated with early and late maturation in adolescent footballers, represent important targets for future research.

Recommendations.

The findings of this study support three immediate, evidence-based interventions for North African youth football stakeholders. First, mandatory mouthguard use should be enforced by CAF and UNAF for all U-17 international players, eliminating the entirely preventable dental trauma documented in this cohort. The two Tunisian dental injuries, both occurring during contact mechanisms without protective equipment, represent 100% preventable pathologies that carry immediate health and economic costs. Braaten et al. (2023) demonstrated that collision-related injuries in contact sports are associated with significantly increased hospitalization risk, reinforcing that protective equipment enforcement is not merely precautionary but clinically essential.

Second, structured neuromuscular training programs—such as the FIFA 11+—should be implemented in national team preparations, targeting the thigh, hip, and groin regions that dominated injury anatomical distribution. Mandorino et al. (2023) identified these programs as among the most evidence-based interventions for reducing youth soccer injury incidence, and their implementation in North African contexts is supported by the present findings. The thigh injury concentration (31.3% of all injuries) and hip/groin cluster (18.8%) suggest that eccentric hamstring strengthening, hip adductor flexibility, and neuromuscular control exercises should be prioritized in pre-tournament conditioning. The FIFA 11+ program, which has demonstrated efficacy in reducing youth football injuries by 30–50% in randomized controlled trials, should be systematically adopted by all UNAF national federations.

Third, standardized illness surveillance training for team physicians should be a tournament accreditation prerequisite, aligning with STROBE-SIIS quality standards (Bahr et al., 2020) and addressing the apparent underreporting documented in this study. The complete absence of illness in four of five teams, despite shared accommodation and dining facilities, suggests that illness documentation is not being captured consistently. Respiratory and gastrointestinal infections can significantly impact team performance and

player availability, and their systematic surveillance is essential for comprehensive tournament medical management.

Conflict of Interest Statement.

The authors declare no conflicts of interest. Dr. Ihab Elzein and Dr. Essam Denna serve on the Medical Committee of the Libya Football Association; this institutional role did not influence study design, data collection, analysis, or manuscript preparation. No financial support or competing interests exist. Ethical approval was obtained from the Institutional Ethics Committee for Research on Human Health, University of Benghazi. All data presented in this study were collected prospectively during routine tournament medical operations and were not subject to commercial, political, or institutional pressures. The findings represent the independent academic judgment of the authors.

Acknowledgment.

The authors extend their sincere gratitude to the Medical Committee of the UNAF U-17 Africa Cup of Nations Qualifiers tournament for their organizational support and commitment to player welfare. We are particularly indebted to the team medical doctors of Tunisia, Libya, Algeria, Egypt, and Morocco for their diligent completion of standardized injury surveillance forms and their willingness to share clinical information. We also acknowledge the Libyan Football Association and tournament organizing committee for logistical support. No external funding was received for this research.

References.

- Bahr, R., Clarsen, B., Derman, W., et al. (2020). International Olympic Committee consensus statement: Methods for recording and reporting of epidemiological data on injury and illness in sport 2020 (including STROBE Extension for Sport Injury and Illness Surveillance (STROBE-SIIS)). *British Journal of Sports Medicine, 54, 372–389.
- Braaten, J., Banovetz, M., Braaten, M., Kennedy, N., & LaPrade, R. (2023). Increased risk of fracture, dislocation, and hospitalization are associated with collision in contact sports. Arthroscopy Sports Medicine and Rehabilitation, 5*. <https://doi.org/10.1016/j.asmr.2023>

- Brenner, J. S., & Watson, A. (2024). Overuse injuries, overtraining, and burnout in young athletes. *Pediatrics, 153*(2), e2023065129.
- De Ste Croix, M., Oliver, J. L., García-Gómez, A., Sainz de Baranda, P., & Ayala, F. (2022). Epidemiology of injuries in male and female youth football players: A systematic review and meta-analysis. Journal of Sport and Health Science, 11*(6), 681–695.
- Douryang, M., Tankeng, L. T., Ghassi, H. T., Tsafack Nanfosso, K. J., Moiroux-Sahraoui, A., & Forelli, F. (2025). Epidemiology of injuries treated among male youth football players during the 2021 Top Cup in Cameroon. *Cureus, 17*(10), e94644.
- Fuller, C. W., Ekstrand, J., Junge, A., Andersen, T. E., Bahr, R., Dvorak, J., Häggglund, M., McCrory, P., & Meeuwisse, W. H. (2006). Consensus statement on injury definitions and data collection procedures in studies of football (soccer) injuries. Scandinavian Journal of Medicine & Science in Sports, 16(2), 83–92.
- Ghasemi, A., & Zahediasl, S. (2012). Normality tests for statistical analysis: A guide for non-statisticians. *International Journal of Endocrinology and Metabolism, 10 (2), 486–489.
- Gurău, T. V., Gurău, G., Voinescu, D. C., Anghel, L., Onose, G., Iordan, D. A., Munteanu, C., Onu, I., & Musat, C. L. (2023). Epidemiology of injuries in men's professional and amateur football (Part I). Journal of Clinical Medicine, 12(17), 5569.
- Mandorino, M., Figueiredo, A. J., Gjaka, M., & Tessitore, A. (2023). Injury incidence and risk factors in youth soccer players: A systematic literature review. Part II: Intrinsic and extrinsic risk factors. Biology of Sport, 40(1), 27–49.
- McFie, S., Brown, J., Hendricks, S., Posthumus, M., Readhead, C., Lambert, M., September, A. V., & Viljoen, W. (2016). Incidence and factors associated with concussion injuries at the 2011 to 2014 South African Rugby Union Youth Week Tournaments. Clinical Journal of Sport Medicine, 26(5), 398–404.
- Owoeye, O. B., Aiyegbusi, A. I., Fapojuwo, O. A., Badru, O. A., & Babalola, A. R. (2017). Injuries in male and female semi-professional football (soccer) players

in Nigeria: Prospective study of a National Tournament. BMC Research Notes, 10(1), 133.

- Pfirrmann, D., Herbst, M., Ingelfinger, P., Simon, P., & Tug, S. (2016). Analysis of injury incidences in male professional adult and elite youth soccer players: A systematic review. Journal of Athletic Training, 51(5), 410–424.
- Robles-Palazón, F. J., López-Valenciano, A., De Ste Croix, M., Oliver, J. L., García-Gómez, A., Sainz de Baranda, P., & Ayala, F. (2022). Epidemiology of injuries in male and female youth football players: A systematic review and meta-analysis. Journal of Sport and Health Science, 11(6), 681–695.
- Smpokos-Sbokos, E., Mourikis, C., Theos, C., Manolarakis, G., & Linardakis, M. (2021). Injuries and risk factors in professional football players during four consecutive seasons. Sport Sciences for Health, 18. <https://doi.org/10.1007/s11332-021-00815-3>
- Tiama, A., Traoré, A., Cissé, A. R., Kaboré, A., Sawadogo, A., Nana, B., Koné, B., & Soré, Z. (2024). Caractérisation des blessures sur une saison sportive chez des footballeurs d'élite au Burkina Faso: Cas de la saison 2019–2020 [Characterization of injuries among elite football players during a sports season in Burkina Faso: The 2019–2020 sports season]. Pan African Medical Journal, 48, 33.